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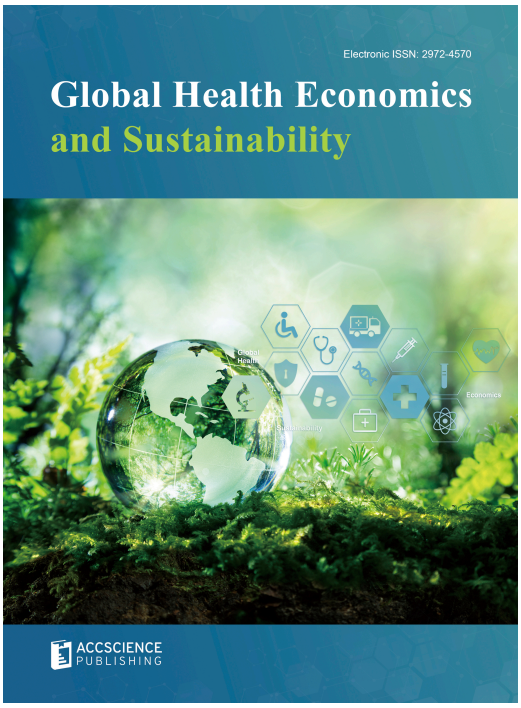

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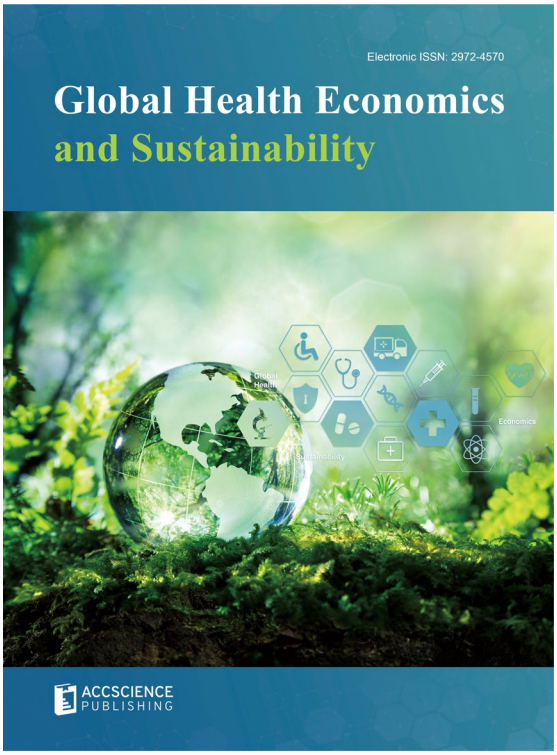

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REVIEW ARTICLE

Medical oxygen production, supply, and infrastructure augmentation during the COVID-19 pandemic in India: A narrative review

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Abstract

According to the World Health Organization, the primary symptoms of COVID-19 include fever, cough, and fatigue, while more serious cases present with dyspnea (difficulty breathing) and chest pain. The medical use of oxygen therapy is a common life support treatment for numerous diseases at multiple levels of health care in India. An abrupt spike in medical oxygen demand (nearly 100 – 200 fold) has been observed in regions such as South America, Africa, and Asia, including India. Governments of the respective countries have implemented policy decisions to tackle medical oxygen shortage during the pandemic. In this narrative review, we describe and summarize the actions taken by the Indian government to manage the medical oxygen requirement during the deadly COVID-19 waves in India. Searches were conducted on PubMed, Scopus, Google Scholar databases, and websites of various ministries and departments of the Government of India, covering the period from January 2020 to January 31, 2023. Qualitative data were extracted using pre-defined themes from published documents related to medical oxygen supply during the COVID-19 pandemic in the Indian context. This narrative review summarizes the state of medical oxygen during the COVID-19 pandemic, focusing on medical oxygen production, supply, infrastructure augmentation, pressure swing adsorption plants, capacity building, web application, and monitoring mechanisms. The 76th World Health Assembly has also adopted the Access to Medical Oxygen Resolution to prevent deaths and ensure that no country faces an oxygen shortage, as seen during the COVID-19 pandemic.

Keywords: Oxygen; Medical oxygen; COVID-19; Pressure swing adsorption plant; Oxygen storage

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1. Introduction

The emergence of coronavirus disease 2019 (COVID-19) threw a curveball at countries and their health-care systems. The initial case of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus responsible for COVID-19, was identified in Wuhan, Hubei province, China, during the January 2020 pneumonia epidemic

(Wu *et al*., 2020; Zhou *et al*., 2020). Subsequently, the coronavirus swiftly disseminated worldwide, leading to the World Health Organization's (WHO) designation of COVID-19 as a "Public Health Emergency of Concern" on January 30, 2020 (WHO, 2020a) and as a global pandemic on March 11, 2020 (WHO, 2020b). While many infected individuals remained asymptomatic carriers, others experienced a range of symptoms from mild to critical. Fever, cough, and fatigue were common, while severe cases presented with difficulty breathing and chest pain (WHO, 2022b). A recent investigation by Lima (2020) identified fever, cough, dyspnea (shortness of breath), and myalgia (muscle pain) as prevalent presenting symptoms of COVID-19. Oxygen therapy, crucial for numerous medical conditions, became a vital lifeline for a significant portion of COVID-19 patients, particularly those with severe infections in India. In the initial days of the COVID-19 pandemic, approximately 15% of COVID-19 patients with severe infection required oxygen, and 5% required intensive care (WHO, 2022a). Severe pneumonia due to COVID-19 infection resulted in a surge in oxygen demand globally. According to the WHO, over 0.5 million patients in low- to middle-income countries (LMICs) required daily oxygen treatment during the pandemic (WHO, 2021a).

Recognizing this critical need, the WHO is calling for a global effort to improve oxygen availability, accessibility, and affordability across the globe (WHO, 2021b). COVID-19 exposed a global shortage of easily accessible and affordable medical oxygen, especially in LMICs. Even before the pandemic, LMICs struggled with patchy oxygen supplies, with approximately one-third (31%) of health-care facilities in sub-Saharan Africa facing interruptions and another quarter (25%) having no available oxygen at all (Belle *et al*., 2010). In addition, most seriously ill COVID-19 patients admitted to health facilities require mechanical ventilation (Grasselli *et al*., 2020; WHO, 2022c). The pandemic drastically worsened this situation, driving oxygen demand up to 200 times normal levels in affected regions such as South America, Africa, and Asia (WION, 2021).

COVID-19 highlighted the critical need for properly equipped treatment centers, including a reliable oxygen supply, pulse oximeters, and functional oxygen systems (WHO, 2022a). Recognizing this global challenge, the WHO and other organizations are ramping up their efforts to provide technical support, especially in LMICs. In India, the pandemic served as a wake-up call for assessing and addressing gaps in medical oxygen infrastructure. The Ministry of Health and Family Welfare of India conducted a comprehensive assessment of public health facilities across all states/union territories (UTs), revealing areas needing improvement in medical oxygen availability.

On May 26, 2023, the 76th World Health Assembly (WHA) adopted the Access to Medical Oxygen Resolution to prevent deaths and ensure that no country faces a medical oxygen shortage as seen during the COVID-19 pandemic (Every Breathe Counts, 2023). The 76th WHA included medical oxygen as a lifesaving essential treatment and added it to the 8th WHO's Model List of Essential Medicines for Children. Other high-impact actions include developing medical oxygen plans, assessing and monitoring oxygen gaps, raising public awareness about the role of medical oxygen, and updating national pharmacopeia (WHO, 2023). A new Global Oxygen Alliance (GO2AL) has been launched by global health partners (including WHO, United States Agency for International Development [USAID], United Nations Office for Project Services [UNOPS], United Nations International Children's Emergency Fund [UNICEF], World Bank, Global Fund, Clinton Health Access Initiative [CHAI], Bill & Melinda Gates Foundation, Access to Medicine Foundation, Program for Appropriate Technology in Health, Save the Children, and Every Breath Counts [coalition]) to continue the vital task of the Access to COVID-19 Tools Accelerator (ACT-A) Oxygen Emergency Taskforce, which raised more than US$1 billion for boosting the accessibility of medical oxygen. These efforts include financing to expand production, lower the medical oxygen price, and provide technical support to governments (Unitaid, 2023).

With this background, this narrative review aims to summarize the actions taken by the Government of India (GoI) to address the medical oxygen need during the deadly COVID-19 waves in India and prepare for future emergencies. In addition, this review summarizes the challenges faced and the success achieved in addressing the oxygen shortage during the COVID-19 pandemic.

2. Methods

2.1. Research question

What are the steps or actions taken by the GoI to combat the shortage of medical oxygen in India during the COVID-19 pandemic, and what lessons can be drawn from the available literature?

2.2. Search strategy

Search terms were combined using Boolean operators, and a search strategy was constructed by AA, KS, and AV through brainstorming and a preliminary literature search. A literature search was conducted by KS and AA on January 31, 2023, covering the date range from January 2020 to January 31, 2023. This search was further verified

by AV using purposive sampling. All authors have over 7 years of experience working in the public health sector in India. KS and AV have prior experience developing search strategies and have published systematic reviews in peer-reviewed journals.

2.3. Data sources

Searches were conducted in PubMed, Scopus, and Google Scholar databases using the search terms "Coronavirus," "COVID-19," "Oxygen," and "Medical oxygen." Additional gray literature searches were also conducted among various Government of India ministries, including the Ministry of Health and Family Welfare (MoHFW), Ministry of Commerce, Ministry of Housing and Urban Affairs (MoHUA), Ministry of Home Affairs (MHA), Department of Industrial Policy and Promotion (DIPP), and Press Information Bureau (PIB) publications. Searches also included guidelines, websites, and Indian newspapers such as Hindustan Times, Times of India, and Indian Express. Other sources included United Nations (UN) organizations and non-governmental organizations such as the WHO, United Nations Development Programme (UNDP), World Bank, UNICEF, and Asian Development Bank (ADB). Hand searches of relevant bibliographies were also conducted to identify additional studies. There were no restrictions based on the study design for inclusion in this review. Studies, reviews, or documents discussing oxygen management during the COVID-19 pandemic in India were eligible for inclusion. Studies, reviews, or documents based outside of India were excluded. Citations of the included articles were further scanned for potential inclusions of additional eligible studies.

2.4. Screening and data extraction

Title and abstract (Ti-Ab) screening was conducted independently by two authors (AA and AV) to identify potentially eligible articles. This procedure was followed by a full-text screening of the included documents, performed independently by two authors (KS and AV). Disagreements during the Ti-Ab stage were resolved by mutual discussion, while disagreements during the full-text stage were resolved in consultation with AA. Thematic analysis using a deductive approach was employed to report the actions taken by the GoI to tackle the medical oxygen shortage during the COVID-19 pandemic in India.

Qualitative data on oxygen crisis management during the COVID-19 pandemic in India were extracted in consultation with all three authors based on predefined and emerging themes as given below:

(i) Inter-departmental and ministerial coordination
(ii) Oxygen supply and oxygen therapy
(iii) Constitution of an empowered group
(iv) Infrastructure augmentation
(v) Ensuring uninterrupted supply of medical oxygen
(vi) Capacity building
(vii) Development of web applications
(viii) Monitoring and coordination with state governments.

3. Results

During the COVID-19 pandemic, an abrupt spike in demand for medical oxygen, a life-saving treatment for a large number of patients with moderate-to-severe clinical manifestations of COVID-19, was observed. This sudden increase in demand highlighted the need for rapid assessment and scaling up of medical oxygen infrastructure in the country. The following strategies and interventions were implemented to augment the oxygen capacities and ensure uninterrupted supplies in the states/UTs.

3.1. Inter-departmental and ministerial coordination

India's fight against the oxygen shortage received a boost with the establishment of the Programme Management Unit for Medical Oxygen (PMU-MO) by the MoHFW. This team, funded and coordinated by ADB, became the central hub for planning, building, and tracking oxygen plants across the country. Close collaboration was key, and the PMU-MO coordinated with different ministries such as MoHUA, Ministry of Commerce, Ministry of Railways, and Ministry of Road Transport and Highways with respect to site allocation, site changes, implementation planning, and achievement of milestones within set timelines (Every Breathe Counts, 2023; WHO, 2023). Nodal officers also worked in close coordination with agencies such as the Central Medical Services Society (CMSS), HLL Infra Tech Service Limited (HITES), and the Defence, Research and Development Organization (DRDO) for the implementation, delivery, installation, and commissioning of the pressure swing adsorption (PSA) plants for oxygen generation (Unitaid, 2023). The PMU-MO collaborated with various executing organizations, such as the Central Public Works Department, National Highways Authority of India, and National Buildings Construction Corporation India Limited. These organizations supported the development of site layouts and the construction of oxygen plants at designated locations. In addition, the PMU-MO maintained consistent communication with state governments to evaluate and collect information about their oxygen needs. This ongoing assessment enabled them to provide essential resources, such as liquid medical oxygen (LMO), PSA plants, oxygen cylinders, LMO storage tanks, oxygen concentrators, and more, to assist the states effectively (Every Breathe Counts, 2023).

3.2. Oxygen supply

Saving lives during the COVID-19 pandemic is not just about ventilators; it is about ensuring a steady flow of medical oxygen. The successful treatment of moderate and severe COVID-19 patients hinges on having a sufficient and dependable supply of medical oxygen. This vital gas supply is the backbone of treating not only severe COVID-19 cases but also other respiratory complications, surgeries, and intensive care unit (ICU) care and operations in all health-care facilities. It was observed that the major sources of oxygen are oxygen cylinders, LMO tanks, and PSA plants. However, reliance solely on oxygen cylinders and LMO tanks has proven insufficient to meet the rising demands during the COVID-19 pandemic. To address this surge in demand, the National Medical Commission has mandated that all medical colleges install PSA plants within 6 months (Ministry of Health and Family Welfare, 2021e).

3.3 Oxygen therapy

Oxygen therapy plays a crucial role in managing severe and critical COVID-19 patients. However, navigating the different delivery methods can be complex. Further details concerning the delivery methods are discussed as follows.

3.3.1. Low-flow oxygen therapy (nasal cannula, Venturi mask)

- Delivery: Oxygen flows through thin tubes placed in the nostrils (nasal cannula) or a Venturi mask covering the nose and mouth.
- Flow rates:
  - Children: 1 – 2 L/min
  - Adults: 5 L/min (nasal cannula), 6 – 10 L/min (Venturi mask)
- Benefits: Low-cost, simple to use, comfortable for patients.

3.3.2. Moderate-flow oxygen therapy (reservoir mask)

- Delivery: Oxygen flows through a mask with a reservoir bag, providing higher concentrations.
- Flow rates: 10 – 15 L/min
- Benefits: Delivers higher oxygen concentrations than a Venturi mask or nasal cannula.

3.3.3. High-flow nasal cannula (HFNC):

- Delivery: Oxygen flows through heated and humidified tubes placed in the nostrils at higher flow rates and concentrations.
- Flow rates: Up to 60 L/min
- Benefits: Improves oxygenation without needing invasive ventilation, reduces the risk of intubation, and is comfortable for patients.

3.3.4. Non-invasive ventilation (NIV):

- Delivery: A mask or helmet delivers pressurized air or a mixture of air and oxygen to improve breathing.
- Benefits: Supports breathing without intubation and avoids potential complications of invasive ventilation.

3.3.5. Invasive ventilation:

- Delivery: A tube inserted through the mouth or throat delivers oxygen directly into the lungs.
- Application: Patients with severe respiratory failure who do not respond to other oxygen therapy methods.

Important considerations for choosing an oxygen delivery method include:

1. Choice of therapy: Depends on the patient's severity, oxygen needs, and availability of equipment.
2. Aerosol generation: HFNC and NIV carry a risk of spreading the virus, requiring airborne precautions for healthcare workers.
3. Monitoring: Oxygen levels and vital signs need close monitoring during all forms of oxygen therapy

While oxygen therapy is vital for COVID-19 patients, consulting a health-care professional is crucial to determine the most appropriate method and ensure safe and effective treatment (WHO & UNICEF, 2019).

3.4. Constitution of empowered group

An empowered group consisting of secretaries of various union ministries and senior-level officials from different central ministries of the GoI was formed to plan strategies for improving and augmenting health infrastructure. This group aimed to enhance oxygen capacity storage, analyze the region-wise oxygen demand-supply position, discuss caseload projections, and plan medical oxygen supply dynamically in response to the shifting pandemic (HT Correspondent, 2021; Ministry of Health and Family Welfare, 2021d).

3.5. Oxygen production, allocation, and storage

As India's medical oxygen demand during the COVID-19 pandemic soared, the health-care system was pushed to its limits. During the first wave, the peak of oxygen demand reached 3,095 metric tons (MT) per day on September 29, 2020 (Ministry of Commerce & Industry, 2021). However, the real crisis unfolded in April 2021, with demand skyrocketing to an average of 5,500 MT per day in the 3rd week, then further increasing to 7,100 MT and 8,943 MT in the following weeks (Ministry of Health and Family Welfare, 2021a). The Indian government, in collaboration with state governments, scrambled to avert disaster. They quickly ramped up LMO production, boosting daily output from 5,700 MT in August 2020 to a record high of 9,690 MT

by May 13, 2021 (Ministry of Health and Family Welfare, 2021a). This feat was achieved by maximizing production in steel plants and other LMO facilities, establishing a real-time monitoring system for production and distribution, and even imposing temporary restrictions on industrial oxygen use (Ministry of Commerce & Industry, 2021; Ministry of Health and Family Welfare, 2021g). To swiftly address the pressing need, India secured 1,385 MT of LMO through multiple imports from the United Arab Emirates, Bahrain, Kuwait, Qatar, Singapore, and other sources (Ministry of Health and Family Welfare, 2021a). The availability of tankers and ISO containers was augmented through the conversion of existing nitrogen and argon tankers, as well as imports and domestic manufacturing. Logistical support for transporting LMO tankers was provided with support from the Indian Air Force and Railways (Ministry of Commerce & Industry, 2021).

A collaborative and transparent framework (Ministry of Health and Family Welfare, 2021h) was established for medical oxygen allocation. This framework involved consultation with states, UTs, and stakeholders, including relevant ministries and oxygen manufacturers/suppliers. Allocation was primarily based on active COVID-19 cases in each state/UT, with additional factors like case doubling rate and available medical infrastructure also considered. The framework remained dynamic, adapting to changes in the pandemic's burden. The initial allocation of medical oxygen, issued on April 15, 2021, was subsequently revised based on fluctuations in active COVID-19 cases and oxygen supply availability. As of May 28, 2021, a cumulative total of 10,250 MT had been allocated to 26 states identified as having a high disease burden (PTI, 2021c). Under the Emergency COVID Package-Part-II (ECRP-II), more than 930 LMO tanks, along with 1,359 medical gas pipeline systems (MGPS), were set up across the country at a cost of INR 8 million, aiming to increase storage capacity in all 37 states/UTs.

3.6. PSA plant

PSA technology, a well-established method for localized oxygen generation, is being implemented in hospitals, particularly in remote regions. This technology empowers hospitals to generate their own oxygen supply, decreasing the strain on the nationwide medical oxygen supply network. As of April 25, 2023, more than 4,135 PSA plants have been established and installed in India (Ministry of Finance, 2023; Ministry of Health and Family Welfare, 2021f). As of October 2021, a total of 1,225 PSA oxygen plants had been funded through PM CARES, with more than 1,100 plants commissioned (Prime Minister's Office, 2021).

The Indian government provided assistance to states/UTs by establishing and operationalizing 1,225 PSA units under the PM CARES initiative. Furthermore, an additional 336 PSA units were established through government-owned public sector undertakings and other channels (Ministry of Finance, 2023). Moreover, the PSA facilities established under PM CARES have been enhanced with Internet of Things (IoT) devices (Prime Minister's Office, 2021) by DRDO with the National Informatics Centre. On July 6, 2021, the MoHFW formulated and distributed guidelines to states outlining suggested standards for establishing oxygen production units in healthcare facilities. At present, a total of 2,574 PSA oxygen plants are being established using funds from both state resources and corporate social responsibility (CSR) contributions (Ministry of Finance, 2023).

India's fight against oxygen scarcity received a major boost with a multi-pronged approach. Ample resources were allocated to crucial equipment and infrastructure:

(i) PSA plants: 4,127 units installed by December 2022, generating 4,852 MT of oxygen daily (Ministry of Finance, 2023).
(ii) Oxygen concentrators: 114,000 units distributed to states under PM CARES and ECRP-II schemes (Ministry of Health and Family Welfare, 2021b).
(iii) Ventilators, oxygen cylinders, LMO tanks, and MGPS: Ongoing initiatives to bridge the gap between existing equipment and needed systems.
(iv) Daily monitoring and collaboration: Close coordination with agencies such as DRDO, HITES, and CMSS ensures the smooth operationalization of this infrastructure.

This comprehensive strategy addresses the issue from multiple angles, aiming to eliminate potential oxygen shortages and prepare health-care facilities for future challenges. Equipment availability, technology, and financial aid for PSA plants, ventilators, oxygen concentrators and cylinders, LMO, and MGPS are being closely monitored. The GoI has directed that the status of these modalities should be monitored on a daily basis to ensure that the gap between equipment and systems is reduced to zero. In addition, coordination with DRDO, HITES, and CMSS for the operationalization of medical oxygen infrastructure is essential. As of December 28, 2022, 4,127 PSA plants have been installed and commissioned, with an oxygen capacity of 4,852 MT (Ministry of Finance, 2023). Under PM CARES and ECRP-II funds, 114,000 oxygen concentrators were provided to states/UTs. In addition, 958 LMO storage tanks and MGPS in 1,374 hospitals have been sanctioned under ECRP-II (Ministry of Health and Family Welfare, 2021b).

3.7. Oxygen cylinders and concentrators

India ramped up its oxygen reserves to combat the COVID-19 pandemic, equipping itself with over 113,000 oxygen concentrators and 400,000 cylinders. This impressive stockpile includes:

- 99,000 concentrators: Sourced through Oil and Natural Gas Corporation under the PM CARES initiative, specifically targeting rural areas.
- 14,000 concentrators: Part of the ECRP, ensuring support beyond PM CARES (Ministry of Finance, 2023).
- Over 400,000 cylinders: Distributed across states, UTs, and central hospitals. This distribution includes:
    - 100,000 cylinders: Supplied by CMSS in 2020.
    - 130,000 cylinders: Provided by CMSS in 2021.
    - 150,000 SPO_2-based oxygen control systems cylinders: Developed by DRDO in 2021.
    - 23,000 cylinders: Received through foreign aid.
    - 14,000 D-Type cylinders: Approved for distribution by MoHFW with UNICEF/ADB support (Ministry of Finance, 2023).

To ensure efficient allocation and management, states are required to:

- Record recipient points and receipt details: Using the OxyCare Management Information System (OC-MIS) portal at the district level (Ministry of Finance, 2023).
- Prioritize rural areas: PM CARES concentrators are specifically designated for rural health-care facilities.

This comprehensive approach to oxygen supply demonstrates GoI's commitment to strengthening its health-care infrastructure for future challenges.

3.8. Supply of medical oxygen

To avoid stockouts, a system for the advanced planning and timely replenishment of oxygen through health facility-wise oxygen inventory management has been enabled on the GoI's COVID-19 portal. In addition, a "Green Corridor" for 24×7 unrestricted, seamless, and unhindered inter-state and intra-state movement of LMO tankers has been set up (Kaul, 2020).

3.9. Transportation of oxygen

As part of emergency response efforts to mitigate oxygen scarcity, the implementation of air transport for empty tankers has been initiated to expedite turnaround time. The Ministry of Defence is collaborating with oxygen suppliers to facilitate airlifts, while the Indian Air Force is undertaking the transportation of ISO tankers both within and beyond national borders (PTI, 2021a). Railways have been used for long-distance transport of tankers through the roll-on-roll-off (RORO) service (Das, 2021). Through INS Jalashwa, Indian Navy's Operation Samudra Setu II transported 18 cryogenic oxygen tanks (15 filled with LMO), along with other COVID-19 medical supplies, including 3,650 oxygen cylinders and 39 ventilators from Brunei and Singapore to Visakhapatnam on May 23, 2021 (Ministry of Defence, 2021).

3.10. Infrastructure augmentation

An abrupt rise has been observed in the number of oxygen-supported beds, ICU beds, and ventilator beds, from 57,924 to 265,046 beds, within 6 months from April 2020 to October 2020. The number of ICU and ventilator beds also tripled by the end of October 2020 (Lalwani, 2020).

3.11. Augmentation in the availability of tankers

As of May 2021, India had 1,681 oxygen tankers with a capacity of 23,056 MT (Ministry of Commerce & Industry, 2021). During the second wave, endeavors were undertaken to enhance the number of oxygen transport vehicles by repurposing half of the current nitrogen and argon tankers, resulting in the conversion of approximately 1,098 tankers. In addition, Messrs Indian Oil Corporation Limited (M/s IOCL) repurposed both new and modified LNG tankers for the purpose of transporting medical oxygen. At present, the collective count of oxygen transport tankers stands at 2,540, with a combined capacity of 34,588 MT (PTI, 2021b). Compared to March 31, 2020, there is a 36% increase in LMO road tankers and a 58% enhancement in the transportation capacity of the LMO road tankers.

3.12. Augmentation in storage capacity

Presently, the number of LMO tanks in hospitals is 1,242, with a capacity of 15,622 MT. Compared to March 31, 2020, when there were 609 tanks with a capacity of 6,759 MT, this represents a 104 % increase in the number of tanks and a 131 % increase in storage capacity (Das *et al.*, 2022). This augmentation was facilitated by the relaxation of rules by the Petroleum and Explosives Safety Organization (PESO) and constant follow-up with states by the GoI. The data gathered by PESO includes licensed storage tanks in both government and private hospitals.

3.13. Capacity building

The Ministry of Skill Development and Entrepreneurship, the Indian Navy, and the Indian Institute of Technology Kanpur have developed training programs for the operation and maintenance of PSA plants. These programs have identified and trained personnel across the country (Indian Navy, 2021). The training, as per the OC-MIS portal and the Ministry of Skill Development and Entrepreneurship, includes:

- 10 h for day-to-day operations: 6,900 candidates trained

- 180 h for maintenance and troubleshooting: 5,084 candidates trained

India's "National Oxygen Stewardship Program," launched in December 2021, empowers health-care professionals, especially in resource-limited settings. It equips technicians and clinicians with crucial skills for the efficient and responsible use of medical oxygen. Key features include:

- District-level "Oxygen Stewards": Trained individuals spearhead local education on oxygen therapy and equipment upkeep (Ministry of Health and Family Welfare, 2021c).
- Extensive training: Over 1,600 participants across 738 districts have honed their skills in oxygen management.
- Online PSA training: A separate program by the Ministry of Skill Development and Entrepreneurship trained 4,690 participants in 180-h maintenance and troubleshooting, while 6,825 completed a 10-h day-to-day operations course (Ministry of Health and Family Welfare, 2022).

This multi-pronged approach serves several purposes, including:

- Ensuring proper oxygen care in hospitals.
- Empowering local expertise for sustained preparedness.
- Building confidence in managing future needs.

Overall, the program empowers health-care professionals to become stewards of this life-saving resource, promoting responsible and efficient oxygen use throughout India.

3.14. Development of web application

The Oxygen Demand Aggregation System (ODAS) is designed to determine the requirement for medical oxygen across all health-care facilities by considering bed availability and occupancy. It then combines these requirements at the state level (National Health Authority, 2023). A new platform called "OxyCare" (OC-MIS) (National Health Authority, 2023) tracks various medical oxygen equipment, including PSA plants for generating oxygen, IoT devices for monitoring oxygen flow, oxygen cylinders for storage, ventilators for patients needing respiratory support, oxygen concentrators for portable oxygen supply, and even trained personnel to manage it all. (Ministry of Health and Family Welfare, 2021f).

3.15. Monitoring with the state governments

A central control room has been set up at the MoHFW of India to monitor the efficient and adequate availability of medical oxygen in all 36 states/UTs. Similar control rooms have been set up in all 36 states/UTs, which are in constant touch with the central control room to raise timely alerts. Regular video conferences have been conducted with all 36 states/UTs, the Department for Promotion of Industry and Internal Trade, and the PESO on oxygen-related issues. Mapping of hospital-wise (public and private) oxygen inventory (cylinders, LMO tanks, PSA plants, concentrators) across the country is conducted on a timely basis to guide states in augmenting oxygen availability as per the monthly projection of COVID-19 cases.

3.16. Financial management

LMO tanks and MGPS have been installed through ECRP-II funds, which were further operationalized and secured approval from the PESO. Daily review meetings have been conducted to ensure that states/UTs fully utilize ECRP-II funds, with expenditures uploaded through the dedicated National Health Mission's Performance Management System portal, ensuring the real-time release of funds to strengthen sub-district-level healthcare facilities (Ministry of Health and Family Welfare, 2022).

4. Discussion

In 2011, oxygen was considered and included in the National List of Essential Medicines of India (Ministry of Health & Family Welfare, 2011). The COVID-19 pandemic has posed an unprecedented challenge to India in general and health systems in particular. Based on the WHO's analysis, more than 500,000 COVID-19 patients required oxygen treatment each day in LMICs (WHO, 2021a). This immense pressure exerted by the pandemic on the health system unraveled the inadequacies in crisis management, but it also provided an opportunity to strengthen the system with a long-term strategic perspective. Despite the unprecedented need for oxygen, India developed innovative solutions to address the shortage of oxygen, as summarized in the present review. Strengthening the system to withstand future pandemics is the new mantra. It involves revamping the system to handle sudden increases in demand for health services without disrupting existing services. This approach includes not only expanding the infrastructure but also providing matching human resources and supplies. Effective capacity-building, planning, and responsive procurement and supply chain mechanisms are essential. In line with this vision, the GoI is leaving no stone unturned to fortify the health system to combat present and future emergencies. In addition, the 76th WHA has adopted the Access to Medical Oxygen Resolution to prevent deaths and ensure that no country should face a shortage of medical oxygen in the future (Every Breathe Counts, 2023).

This narrative review summarizes the proactive steps taken by the GoI in terms of the medical oxygen supply during the COVID-19 pandemic, extending to the peripheral level. A database of around 3,000 new PSA plant demands has been compiled and mapped state-wise, district-wise, and facility-wise, demonstrating effectiveness at the field level. The country showcased the power of collective action during the COVID-19 pandemic through inter-ministerial coordination among entities such as the MoHUA, Ministry of Commerce, Ministry of Road Transport and Highways, Ministry of Skill Development and Entrepreneurship, and Ministry of Defence. This coordinated approach augmented oxygen production through PSA plants, facilitated oxygen transport via different mediums, enhanced health-care worker capacity building, and implemented digital health interventions for planning and monitoring.

This narrative review primarily relies on documents published on the GoI's websites, the PIB, newspapers, and other gray literature sources.

5. Conclusion

On May 26, 2023, the 76th WHA adopted the first Access to Medical Oxygen Resolution to prevent deaths and ensure that no country faces medical oxygen shortage as previously experienced during the COVID-19 pandemic. Before the COVID-19 pandemic, the primary sources of oxygen were cylinders and LMO tanks. It has been observed that reliance on these sources alone would not suffice to meet the rising demands for medical oxygen during the COVID-19 pandemic in India. In response to the daily rising requirements for medical oxygen across all 36 states/UTs, the GoI stepped up its oxygen production capacity by setting up a PSA plant and increasing LMO production. Timely transportation of oxygen has been ensured through roadways, waterways, and airways. Oxygen requirements are being monitored at both national and sub-national levels through digital health media such as the ODAS and the OxyCare system, which measure the long-term oxygen needs of health-care facilities. Capacity building of health-care workers and associated staff in the operation and maintenance of PSA plants has been undertaken through updated training modules focused on oxygen management.

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References

Belle, J., Cohen, H., Shindo, N., Lim, M., Velazquez-Berumen, A., Ndihokubwayo, J.B., *et al.* (2010). Influenza preparedness in low-resource settings: A look at oxygen delivery in 12 African countries. *Journal of Infection in Developing Countries*, 4(7):419-424.

https://doi.org/10.3855/jidc.859

Das, A.K. (2021). Indian Railways Ready to Roll Out Wagons With Oxygen Tankers. Swarajya. Available from: https://swarajyamag.com/news-brief/indian-railways-ready-to-roll-out-wagons-with-oxygen-tankers

Das, S., Jacob, S., Dutt, I., & Umarji, V. (2022). India Now has 20,000 Tonnes Per Day Oxygen Capacity. 90% of it Lying Idle. Business Standard. Available from: https://www.business-standard.com/article/current-affairs/india-sitting-on-18-000-tonnes-per-day-idle-oxygen-capacity-health-min-122101600107_1.html [Last accessed on 2023 Mar 11].

Every Breathe Counts. (2023). Milestone Adoption of Medical Oxygen Resolution And Launch Of New Global Oxygen Alliance at World Health Assembly. Lancet Global Health Commission on Medical Oxygen Security. Available from: https://stoppneumonia.org/wp-content/uploads/2023/05/lancetglobalhealthoxygencommissionstatementwhaoxygenresolution26-may-2023final.pdf [Last accessed on 2023 Mar 11].

Grasselli, G., Zangrillo, A., Zanella, A., Antonelli, M., Cabrini, L., Castelli, A., *et al.* (2020). Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy Region, Italy. *JAMA*,

323(16):1574-1581.

https://doi.org/10.1001/jama.2020.5394

HT Correspondent. (2021). Covid Empowered Groups Reconstituted, Oxygen Included. Hindustan Times. Available from: https://www.hindustantimes.com/india-news/covid-empowered-groups-reconstituted-o2-included-101622312433958.html [Last accessed on 2023 Mar 12].

Indian Navy. (2021). Indian Navy Conducts Skill Development Training Program on Maintenance of PSA Oxygen Plants. Ministry of Defence. Available from: https://indiannavy.nic.in/content/indian-navy-conducts-skill-development-training-program-maintenance-psa-oxygen-plants [Last accessed on 2023 Mar 12].

Kaul, R. (2020). Provide 'Green Corridor' for Medical Oxygen Tankers: Centre to States. Hindustan Times. Available from: https://www.hindustantimes.com/india-news/provide-green-corridor-for-medical-oxygen-tankers-centre-to-states/story-yqlx7doksmo9rv3gyvgjjj.html [Last accessed on 2023 Mar 13].

Lalwani, V. (2020). COVID-19: As Demand for Medical Oxygen Surged, Industries that Needed the Gas Were Hit. Available from: https://scroll.in/article/976398/COVID-19-as-demand-for-medical-oxygen-surged-industries-that-needed-the-gas-were-hit [Last accessed on 2023 Mar 13].

Lima, C.M.A.O. (2020). Information about the new coronavirus disease (COVID-19). *Radiologia Brasileira*, 53(2):4-6.

https://doi.org/10.1590/0100-3984.2020.53.2e1

Ministry of Commerce and Industry. (2021). Centre Undertakes Multiple Initiatives to Enhance Oxygen Availability, Distributionand Storage Infrastructure. Press Information Bureau. Available from: https://pib.gov.in/pressreleaseshare.aspx?PRID=1717459 [Last accessed on 2023 Mar 17].

Ministry of Defence. (2021). Operation Samudra Setu II-INS Jalashwa Arrives Visakhapatnam with Critical COVID Relief Consignment Including Oxygen Cylinders and Ventilators from Brunei and Singapore. Press Information Bureau. Available from: https://pib.gov.in/pressreleaseiframepage.aspx?prid=1721107 [Last accessed on 2023 Mar 17].

Ministry of Finance. (2023). Health-a Narrative on Dedicated Covid Infrastruture. Press Information Bureau. Available from: https://pib.gov.in/PressReleasePage.aspx?PRID=1894908 [Last accessed on 2023 Mar 18].

Ministry of Health and Family Welfare. (2011). National List of Essential Medicines of India 2011. Available from: https://pharmaceuticals.gov.in/sites/default/files/nlem.pdf [Last accessed on 2023 Mar 21].

Ministry of Health and Family Welfare. (2021). Centre Reviews Commissioning, Installation and Functional Status of Oxygen supply Equipments Supplied by it to the States/UTs. Press Information Bureau. Available from: https://pib.gov.in/pressreleasepage.aspx?prid=1781722 [Last accessed on 2023 Mar 21].

Ministry of Health and Family Welfare. (2021). Dr. Bharati Pravin Pawar Inaugurates National Oxygen Stewardship Program. Press Information Bureau. Available from: https://pib.gov.in/pressreleasepage.aspx?prid=1784112 [Last accessed on 2023 Mar 21].

Ministry of Health and Family Welfare. (2021). Empowered Group 2 Initiates Action to Avoid Panic Regarding Availability of Medical Oxyge. Press Information Bureau. Available from: https://pib.gov.in/pressreleasepage.aspx?prid=1711922 [Last accessed on 2023 Mar 21].

Ministry of Health and Family Welfare. (2021). Ongoing Initiatives to Strengthen Healthcare Infrastructure. Press Information Bureau. Available from: https://pib.gov.in/pressreleasepage.aspx?prID=1743137 [Last accessed on 2023 Apr 02].

Ministry of Health and Family Welfare. (2021). OxyCare-Management Information System (OC-MIS). Government of India. Available from: https://oxycare.gov.in/ocmis/oxycare.aspx [Last accessed on 2023 Apr 02].

Ministry of Health and Family Welfare. (2021). Union Government takes Steps to Boost Supply of Oxygen to Hospitals. Available from: https://pib.gov.in/pressreleaseiframepage.aspx?prid=1712590 [Last accessed on 2023 Apr 02].

Ministry of Health and Family Welfare. (2021). Upgradation of Healthcare System for Effective Management of COVID-19. Press Information Bureau. Available from: https://pib.gov.in/pressreleaseiframepage.aspx?prID=1739460 [Last accessed on 2023 Apr 02].

Ministry of Health and Family Welfare. (2021a). Availability of Medical Oxygen (No. 911; Lok Sabha Parliament Question). Available from: https://sansad.in/ls/questions/questions-and-answers [Last accessed on 2023 Mar 31].

Ministry of Health and Family Welfare. (2022). Centre Reviews Preparedness Status of the Entire Spectrum of Oxygen Infrastructure Including PSA Plants, Oxygen Concentrators and Oxygen Cylinders, Ventilators with States/UTs. Press Information Bureau. Available from: https://pib.gov.in/pressreleasepage.aspx?prid=1788446 [Last accessed on 2023 Apr 02].

National Health Authority. (2023). Oxygen Demand Aggregation System. Ministry of Health and Family Welfare. Available from: https://oxygen.nha.gov.in/odas [Last accessed on 2023 Apr 02].

Press Trust of India. (2021). Air Force Airlifts Empty Oxygen Tankers, Containers to Filling Stations across India. New Delhi: NDTV. Available from: https://www.ndtv.com/india-news/air-force-airlifts-empty-oxygen-tankers-containers-to-filling-stations-across-india-2420666 [Last accessed on 2023 Apr 03].

Press Trust of India. (2021). IOC Converts LNG Tankers to Carry Medical Oxygen. Economic Times. Available from: https://energy.economictimes.indiatimes.com/news/oil-and-gas/ioc-converts-lng-tankers-to-carry-medical-oxygen/82538052 [Last accessed on 2023 Apr 03].

Press Trust of India. (2021). No Deaths Due to Lack of Oxygen Specifically Reported by States, UTs During Second Covid Wave: Centre. The Times of India. Available from: https://timesofindia.indiatimes.com/india/no-deaths-due-to-lack-of-oxygen-specifically-reported-by-states-uts-during-second-covid-wave-centre/articleshow/84586245.cms [Last accessed on 2023 Apr 03].

Prime Minister's Office. (2021). PM to Dedicate to the Nation PSA Oxygen Plants Established Under PM CARES on 7th October. Press Information Bureau. Available from: https://www.pib.gov.in/PressReleasePage.aspx?PRID=1761388 [Last accessed on 2023 Apr 02].

Unitaid. (2023). Global Oxygen Alliance Launched to Boost Access to Life Saving Oxygen. Available from: https://unitaid.org/news-blog/global-oxygen-alliance-launched-to-boost-access-to-life-saving-oxygen/#en [Last accessed on 2023 May 28].

WION. (2021). Countries Suffer Oxygen Shortage amid COVID-19 Crisis. Available from: https://www.wionews.com/world/countries-suffer-oxygen-shortage-amid-COVID-19-crisis-387366 [Last accessed on 2023 May 30].

World Health Organization, & UNICEF. (2019). WHO-UNICEF Technical Specifications and Guidance for Oxygen therapy Devices. Switzerland: World Health Organization. Available from: https://www.who.int/publications/i/item/9789241516914 [Last accessed on 2023 Apr 11].

World Health Organization. (2020). Statement on the Second Meeting of the International Health Regulations (2005) Emergency Committee Regarding the Outbreak of Novel Coronavirus (2019-nCoV). Switzerland: World Health Organization. Available from: https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov) [Last accessed on 2023 April 12].

World Health Organization. (2020). WHO Director-General's Opening Remarks at the Media Briefing on COVID-19-11 March 2020. Switzerland: World Health Organization. Available from: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020 [Last accessed on 2023 Apr 12].

World Health Organization. (2021). COVID-19 Oxygen Emergency Impacting More than Half a Million People in Low-and Middle-Income Countries Every Day, as Demand Surges. Switzerland: World Health Organization. Available from: https://www.who.int/news/item/25-02-2021-COVID-19-oxygen-emergency-impacting-more-than-half-a-million-people-in-low--and-middle-income-countries-every-day-as-demand-surges [Last accessed on 2023 Apr 11].

World Health Organization. (2021). Oxygen. Switzerland: World Health Organization. Available from: https://www.who.int/health-topics/oxygen#tab=tab_1 [Last accessed on 2023 Apr 11].

World Health Organization. (2022a). Clinical Management of Severe Acute Respiratory Infection (SARI) when COVID-19 Disease is Suspected. Switzerland: World Health Organization. Available from: https://www.who.int/docs/default-source/coronaviruse/clinical-management-of-novel-cov.pdf [Last accessed on 2023 Apr 11].

World Health Organization. (2022b). Coronavirus Disease (COVID-19). Switzerland: World Health Organization. Available from: https://www.who.int/health-topics/coronavirus#tab=tab_3 [Last accessed on 2023 Apr 11].

World Health Organization. (2022c). COVID-19 Weekly Epidemiological Update. Switzerland: World Health Organization. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20201020-weekly-epi-update-10.pdf [Last accessed on 2023 Apr 12].

World Health Organization. (2023). Increasing Access to Medical Oxygen. Available from: https://apps.who.int/gb/ebwha/pdf_files/EB152/b152_conf4-en.pdf [Last accessed on 2023 April 12].

Wu, F., Zhao, S., Yu, B., Chen, Y.M., Wang, W., Song, Z.G., *et al.* (2020). A new coronavirus associated with human respiratory disease in China. *Nature*, 579(7798):265-269.

https://doi.org/10.1038/s41586-020-2008-3

Zhou, P., Yang, X.L., Wang, X.G., Hu, B., Zhang, L., Zhang, W., *et al.* (2020). Addendum: A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*, 588(7836):E6.

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REVIEW ARTICLE

Artificial intelligence-enabled antibiotic prescribing and clinical support in Nigerian health-care settings: Budgetary constraints, challenges, and prospect

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Abstract

Today, resistance developed by bacteria to common antibiotics that were otherwise regarded as effective is posing a serious challenge. It is believed that without any different efforts, this perennial problem will undermine all the ongoing efforts in antibiotic discovery and therapy development. In Nigeria, antibiotics are frequently prescribed in hospitals. However, issues like multidrug resistance (MDR) and inappropriate use and misuse of antibiotics, including incorrect dosages and use of broad-spectrum antibiotics for targeted infections, have precipitated the rise of MDR bacteria. Consequently, this leads to higher healthcare costs, mainly due to prolonged hospital stays and additional medications as well as increased patient mortality. The prospects of artificial intelligence (AI)-enabled antibiotic prescribing hold significant promise in transforming the current health-care practices. AI has the potential to enhance the precision and efficiency of antibiotic treatment through advanced algorithms and data analytics. This technology can contribute to improved diagnostic accuracy, providing real-time clinical support, optimizing dosage recommendations, personalized treatment plans, and streamlined antimicrobial stewardship, ultimately aiding the global fight against antibiotic resistance and optimizing patient outcomes. The integration of AI in antibiotic prescribing reflects a cutting-edge approach with the potential to revolutionize how antibiotics are prescribed to address challenges in antimicrobial stewardship, clinical decision-making, and combating antibiotic resistance. One of the key impediments to integrating AI into Nigeria's health-care system is budgetary constraints. Addressing these constraints through strategic investments, improved budgetary allocation to research and development, and leveraging the opportunities presented by AI technologies can significantly enhance antibiotic prescribing and health-care practices, leading to improved public health outcomes.

Keywords: Antibiotic resistance; Antimicrobial stewardship; Artificial intelligence; Antibiotic prescribing; Budgetary constraints; Dosage recommendations; Multidrug resistance

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1. Introduction

It is widely believed that the persistent and indiscriminate use of antibiotics is a primary contributor to the alarming surge in multidrug and extremely drug-resistant pathogens. At present, bacterial resistance to once-effective common antibiotics presents a formidable challenge. Many experts fear that without intervention, this issue would undermine the positive strides made in antibiotic discovery and therapy developments. Coupled with challenges like the exorbitant costs and limited availability of antibiotics in remote rural areas, there is a growing impetus to explore sustainable approaches for mitigating bacterial resistance to antibiotics. In response to these concerns, the concept of employing artificial intelligence (AI) for antibiotic prescribing and clinical support in Nigerian health-care settings has been formulated. This initiative seeks to address the complex interplay of factors contributing to bacterial resistance to antibiotics, aiming to establish a more sustainable and effective framework for antibiotic use in the healthcare landscape (Jiménez-Luna *et al*., 2021; Goldberg *et al*., 2024).

AI is a scientific field focused on the computational understanding of what is commonly referred to as intelligent behavior (Fanelli *et al*., 2020). It combines many disciplines, such as data science, computer, and information science, dedicated to crafting systems that mimic human intelligence and execute numerous tasks such as natural language processing, decision-making, speech recognition and visual perception (Fanelli *et al*., 2020). AI is rapidly gaining prominence in health-care settings (GAO, 2020; Sarkar *et al*., 2023). Current AI algorithms support diagnostic and prognostic assessments in various medical specialties, finding applications in hospitals, and clinical settings (GAO, 2020). The potential applications of AI in healthcare are expansive, promising to accelerate the discovery of new antimicrobial drugs, enhance diagnostic and treatment precision, and concurrently reduce costs (Ali *et al*., 2022; Tamma *et al*., 2023). By inputting relevant medical data, the AI tools could analyze and process the information within a given dataset, generating logical responses that aid in patient diagnosis and treatment outcome prediction.

Nigeria's healthcare and research sector is faced with many challenges, which continue to hinder effective research and health-care delivery. These problems include the lack of funding, inadequate health-care staff and technical know-hows who are directly involved in disease diagnosis, and absence of health-care centers in many rural areas. Recent studies (Ali *et al*., 2022). Have shown that AI is a highly effective tool for managing antibiotic resistance. Gathering clinical data to create clinical decision support systems (CDSS) could aid clinicians in tracking antimicrobial resistance (AMR) trends, thereby encouraging the judicious use of antibiotics (Lau *et al*., 2021; Kaplan *et al*., 2023; Valderrama-Rios *et al*., 2023).

2. Historical perspective of applying AI in healthcare settings

During the 1960s, Stanford University researchers developed the inaugural problem-solving program known as "Dendral," designed to assess hypotheses. Its primary objective was to aid pioneers in organic chemistry by identifying unknown samples based on their mass spectra. This pioneering system was later utilized to identify bacteria responsible for severe blood infections and recommend suitable antibiotic treatments. In 1984, an early article on AI utilization was published, introducing the computer-assisted medical decision-making system known as SHELP, aimed at diagnosing inborn errors of metabolism (Fanelli *et al*., 2020; Sahu *et al*., 2022). The application of AI in healthcare gained widespread attention in 2016, when AI software incorporated into the International Business Machines (IBM) Watson platform accurately diagnosed a rare form of leukemia in a 60-year-old woman and proposed an effective treatment plan (IBM, 2023).

Since 1984, there has been a notable rise in AI-focused publications in pediatrics. This includes AI applications in emergency management, such as automatic appendicitis risk stratification, diagnostic decision support, and a framework for asthma exacerbation prediction (Christaki, 2015; ECDPC, 2021). In the field of pediatric oncology, AI contributes to the comparative analysis of genes to aid in the development of anticancer drugs and the profiling of gene expression in pediatric conditions such as neuroblastoma and lymphoblastic leukaemia. Similarly, in pediatric infectious diseases, various AI approaches are employed, ranging from the creation of novel antimicrobial medications to the accurate diagnosis and effective management of infectious ailments (Rawayau *et al*., 2022; Baker *et al*., 2022).

3. The multiple antibiotic resistance crisis in Nigeria

The problem of multiple antibiotic resistances is regarded as a serious global health crisis due to its impact on both the epidemiology and persistence of many diseases, prompting the World Health Organization (WHO) to develop an

action plan for addressing this issue (Fanelli *et al*., 2020; Rabiu *et al*., 2022a; Yusha'u *et al*., 2010). Many studies concerning antibiotic resistance, especially with a focus on different *MDR* genes, in the context of Nigeria have been published. The major carbapenemases, including but not limited to OXA-48 enzyme of class D, class A KPC-type carbapenemases, and NDM-type metallo-beta-lactamases, all play a significant role in antibiotic resistance (Brownstein *et al*., 2023; Tamma *et al*., 2023). In addition, plasmid-mediated β-lactamases like blaTEM/SHV and blaCTX-M can inactivate last-resort antibiotics, limiting treatment options for clinicians. This further compounds the severity of antibiotic resistance issue in Nigeria (Rabiu *et al*., 2022c; Shitu *et al*., 2020; Yusha'u *et al*., 2010).

In Nigeria, antibiotics rank among the most frequently prescribed drugs in hospitals (Jaafaru *et al*., 2022). However, the efficacy of antibiotics could be impacted by various factors, including inappropriate or unnecessary prescriptions. Furthermore, improper usage of broad-spectrum antibiotics, whether at incorrect doses or for infections that can be addressed with a specific, non-antibiotic therapy, may pave the way for the emergence of bacteria resistant to multiple drugs. The elevated resistance levels contribute to higher patient mortality rates, longer hospital stays, and greater health-care expenses (Fanelli *et al*., 2020), all of which are dire associated consequences warranting an immediate counteracting plan and action. With the rapid emergence of antibiotic resistance across different classes of bacteria, there arises a crucial need to develop novel antibiotics and implement precision in antibiotic prescription to effectively combat these escalating cases (Ali *et al*., 2022; Tamma *et al*., 2023).

In general, antibiotics are isolated from a limited number of molecular scaffolds, and synthesized and optimized after undergoing a series of cycles. Given the rising challenge of antibiotic resistance, there is a pressing need to identify novel scaffolds. Emerging techniques for scaffold discovery include exploring untapped microbial pockets for natural compounds and repurposing synthetic molecular catalogues as potential antibiotics (Ali *et al*., 2022; Rabiu *et al*., 2023).

4. Antibiotic prescription

Antimicrobials are frequently prescribed based on empirical evidence or data from surveillance cultures, if accessible. In either case, the specific pathogen causing the infection is typically unidentified. Unfortunately, knowledge of the antimicrobial susceptibility of the causative pathogen typically becomes available only well after the initiation of antimicrobial therapy. Ideally, rapid diagnostic methods should facilitate the swift identification of both the pathogen responsible for an infection and its susceptibility to antimicrobial agents directly from clinical samples, ideally within a timeframe of around 30 min (Sulaiman *et al*., 2022; Tamma *et al*., 2023). This advancement would significantly reduce the reliance on empirical treatment and facilitate adjustment to antimicrobial therapy before administering a second dose, ensuring more timely and suitable treatment. Consequently, there exists a noteworthy gap in research, particularly in Nigeria, where AI can play a pivotal role in optimizing antibiotic prescription practices (Vestesson *et al*., 2023).

5. Strategies and application of AI in antibiotic prescription

Appropriately prescribing antimicrobial drugs presents multifaceted implementation challenges, requiring the selection of suitable treatment for the suspected pathogen. This process involves the regulation of antimicrobial agent concentration, determination of the frequency of administration, and identification of the appropriate route to ensure optimal levels of drug reaching the site of infection (Vestesson *et al*., 2023; Chang & Chen, 2022). A significant challenge in prescribing antimicrobials is marked by the need to continually adjust a patient's treatment as new clinical data emerge. However, the limitations of specialized health-care resources and the overwhelming volume of information make manual surveillance impractical. As a result, there is a growing reliance on automated decision support systems to review antimicrobial prescriptions in hospitals. These systems often utilize rule-based algorithms derived from published and expert guidelines to identify inappropriate prescriptions and prevent potential adverse events (Table 1) (Fanelli *et al*., 2020; Valderrama-Rios *et al*., 2023). This shifts toward automated decision support systems reflects a pragmatic response to the challenges posed by the intricacies of antimicrobial prescription, ensuring a more streamlined and effective approach to healthcare delivery.

6. AI for antimicrobial stewardship

In recent years, considerable attention has been devoted to creating and sustaining antimicrobial stewardship programs customized to meet hospitals' unique requirements. A crucial aspect of most of these initiatives involves reviewing antimicrobial prescriptions and providing feedback to prescribers. This process evaluates several critical parameters of prescribed antimicrobials, including their indication, dosage, route of administration, and duration (Vestesson *et al*., 2023). While antibiotic stewardship programs have demonstrated effectiveness in numerous high-income countries, their success remains unproven in low- and middle-income countries (LMICs), of which Nigeria is a part. The advent of AI solutions presents an innovative approach to addressing this challenge in

Table 1. AI application strategies against antimicrobial resistance

AI applications for AMR	Concepts	Advantages	Drawbacks
Appropriate antibiotic prescription	Appropriate therapy selection, dose, and correct administration route	• Automatic support for decisions and review of antimicrobial prescriptions • Automatic feedback input and relevant improvement • Directed operation	• Biasness in operation • Little labor • Need for health funds
Prediction of antibiotic resistance	ML techniques to predict early AMR or the probability of a microbial agent becoming resistant	• Genomic exploitation to predict the phenotype • Ability to support clinician's decision	• Lack of genotypes and genome data in NCBI or other databases • Challenge of large data integration
Prediction of infection severity	Machine/deep learning tools for infectious pathology recognition and appropriate management	• Efficiency in distinguishing between infectious and noninfectious diseases • Decision support provision • Mortality reduction	• Challenge in collecting accurate data • Insufficient relevant laboratory information

Source: Adapted from Ali *et al.* (2022).
Abbreviations: AI: Artificial intelligence; AMR: Antimicrobial resistance; ML: Machine learning.

LMICs, especially in the context of the escalating threat of antibiotic resistance (Valderrama-Rios *et al.*, 2023). Despite the proven efficacy of antibiotic stewardship programs in various regions globally, their success rate has been notably lower in LMICs, possibly attributed to challenges such as insufficient human resources, lack of local expertise and knowledge, inadequate funding, and limited institutional support. Setting aside health problems as a priority will mandate the government to reduce the cost of governance as well as focus on the implementation of novel technologies including AI in the health-care setting as this will reduce the overdependence on and demand of skilled health personnel. The implementation of these technologies, with proper maintenance, may save costs in the long run. Besides, AI introduces unique opportunities to enhance and augment the current antibiotic stewardship program model (Okeowo *et al.*, 2020; Chang & Chen, 2022). Integrating AI into antimicrobial stewardship efforts in LMICs could potentially overcome existing barriers and foster more effective strategies to combat the rising menace of antibiotic resistance.

AI for Antimicrobial Stewardship focuses on the use of computerized systems in reviewing prescriptions, particularly in identifying patients requiring a review, a task often time-consuming for human reviewers. CDSS are commonly employed, but their reliance on expert and rule-based knowledge bases poses challenges in adapting to changing guidelines (Valderrama-Rios *et al.*, 2023). Resource constraints may lead to selective evaluation of antibiotics. To address this, scientists attempted to develop models using health-care data to identify patients for prescription review. Although these models had fair discriminatory power, the concept of automating the evaluation of all patients with prescribed antimicrobials holds enormous potential. Another approach is combining CDSS with machine learning, as demonstrated by researchers from the Université de Sherbrooke. While promising, integrating machine-learned rules into existing knowledge bases and automating rule maintenance pose significant challenges (Ali *et al.*, 2022; GAO, 2020).

The use of AI has significantly been used to explore antimicrobial stewardship. This is based on a system of information collation about the clinical records of patients. This is then employed in CDSS. This will assist clinicians in monitoring all stewardship parameters such as the guidelines and protocols for the development and implementation of evidence-based guidelines and protocols for antimicrobial prescribing, including recommendations for appropriate drug selection, dosing, duration of therapy, and route of administration; regular review of antimicrobial prescribing practices; implementation of infection prevention and control measures to reduce the spread of antimicrobial-resistant pathogens; and antimicrobial surveillance to monitor AMR patterns and antimicrobial use data to identify trends, patterns of resistance, and emerging threats, and to inform antimicrobial stewardship interventions. This will assist health authorities in promoting sensible applications taking into consideration all aforementioned parameters (Ali *et al.*, 2022). Figure 1 shows a schematic flow of the possible use of AI and the dataflow integration for clinical decisions.

6.1. Pros and cons of using AI in antimicrobial stewardship

While the use of AI has tremendous potential to revolutionize the health-care service providers to patients, it also has some disadvantages (Marra *et al.*, 2023). As such, its implementation in the health-care sector should be accompanied by careful consideration of its risks, implications and possible ways to overcome such challenges. The use of AI in health-care settings offers

numerous advantages such as easing predictive analysis following the input of given parameters, enhancing the efficiency of healthcare delivery, allowing personalized treatment, improving diagnostic accuracy, and facilitating remote monitoring and telemedicine (Cavallaro *et al.*, 2023). However, the application of AI solutions in healthcare settings would raise a series of concerns in, for example, workforce displacement, data privacy and security, legal and regulatory challenges, cost and access issues, and among others (Van Dort *et al.*, 2022).

7. Budgetary constraints as an obstacle to the introduction of AI-enabled antibiotic prescribing (AI-EAP) in Nigeria

There are several challenges facing the Nigerian health-care system, including inadequate funding, lack of infrastructure, and shortage of qualified health-care professionals (Marra *et al.*, 2023). The health-care system is underfunded, with inadequate resources for training and retention of healthcare professionals. Infrastructure, including electricity and water supply, is also lacking in many areas, making it difficult to provide quality care. In addition, the shortage of qualified health-care professionals, including doctors, nurses, and pharmacists, has contributed to the difficulty in providing quality health-care services. These challenges have resulted in a system that is not able to effectively meet the needs of the population. However, the integration of AI will support the system and optimize antibiotic prescribing by providing data-driven insights, recommendations on personalized treatment, and real-time clinical support.

Budgetary constraints stand as a significant impediment to the implementation of AI-EAP in Nigeria. The integration of AI into health-care systems requires substantial financial investments for the acquisition, development, and maintenance of sophisticated technologies. In a resource-limited setting like Nigeria, where healthcare budgets are often constrained, allocating funds for the introduction and sustained operation of AI solutions becomes challenging. This financial hurdle may hinder the timely adoption of AI-EAP, limiting the potential benefits it could bring to the improvement of health-care practices and patient outcomes in the country. Addressing budgetary constraints and seeking innovative funding solutions are crucial steps toward overcoming this obstacle.

8. Challenges for the implementation of AI-EAP in Nigeria

8.1. Technological limitations

Nigeria grapples with inadequate technological infrastructure, hindering the seamless integration of AI solutions into health-care practices.

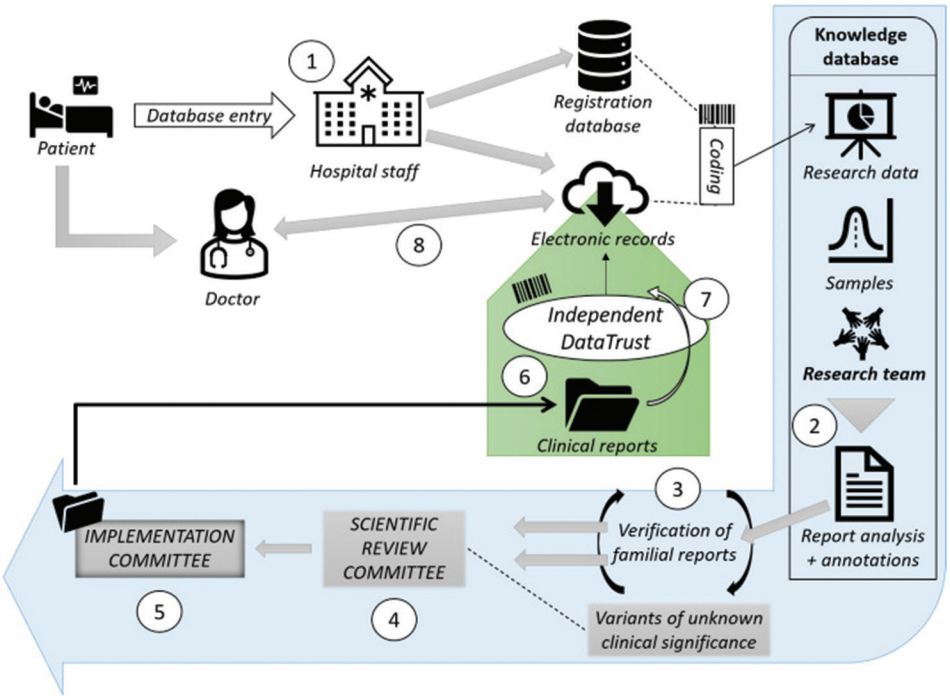

Figure 1. Schematic diagram of the possible use of artificial intelligence and the dataflow integration (Ali *et al.*, 2022)

8.2. Energy constraints

Energy constraints represent a significant challenge in the Nigerian health-care system, particularly in rural areas. Many health-care facilities in rural areas lack reliable supply of electricity, causing problems such as difficulty storing vaccines, running medical equipment, and using diagnostic tests. In addition, the cost of running diesel generators can be prohibitively expensive for many healthcare facilities. As a result, many health-care providers in rural areas are unable to provide the same level of care as those in urban areas. Therefore, addressing the challenge of energy access is essential to fostering the use of AI in Nigerian health-care settings.

8.3. Limited funding

Funding is another major challenge in the Nigerian health-care system. The government currently spends <5% of its gross domestic product (GDP) on healthcare, which is well below the recommended 15% of GDP. As a result, many health-care facilities lack the resources; they need to provide high-quality care. In addition, the lack of funding has led to a shortage of healthcare workers, with only 1.3 doctors and 2.5 nurses per 10,000 people in Nigeria. However, AI holds the potential to improve the efficiency and effectiveness of the health-care system in Nigeria.

8.4. Acceptability issue

The acceptability of AI is another challenge in the Nigerian health-care system. Many people in Nigeria have a lack of trust in AI-based systems, due to concerns about data privacy and security. Providing education and training on AI for healthcare providers and patients can help improve the system.

8.5. Timing

Timing is another challenge to applying AI to address in the Nigerian health-care system. One of the major barriers to healthcare in Nigeria is the long waiting times for services, which can lead to people not seeking care when they need it. However, AI-based systems can be used to streamline the delivery of care and reduce waiting times. For example, AI-based triage systems can be used to assess patients and determine the urgency of their care, allowing for faster access to care for those with more urgent needs. In addition, AI-based systems can be used to schedule appointments and order tests, shortening the waiting time significantly.

8.6. Lack of trust

A lack of trust in AI applications is another important challenge to the upgrading of healthcare in Nigeria. Many people may be reluctant to use AI-based systems, due to concerns about the accuracy and reliability of the systems. In addition, people may be wary of sharing their health data in the AI systems, out of concern that the data may be used in ways they do not agree with (Gille *et al.*, 2015; Kaplan *et al.*, 2023). However, building trust in AI is possible through several measures, such as:

(i) Revealing how the AI system works and how the data are used;
(ii) Independent audits and reviews of the AI system;
(iii) Delineating a clear protocol for addressing concerns and resolving disputes.

8.7. Inadequate on-ground experts

The lack of experts in the fields of AI and healthcare in Nigeria is indeed a problem, further obstructing the development, implementation, and maintenance of AI systems in the healthcare sector. In addition, it can be difficult to find experts who are familiar with both the health-care system and the technical aspects of AI. However, some initiatives are working to address this issue, such as the AI4D Africa program. This program aims to build capacity in AI and data science in Africa, with a focus on healthcare (International Development Research Centre, 2024).

9. Prospects for the implementation of AI-EAP in Nigeria

9.1. Efficiency in prescription

AI can improve the efficiency of prescription processes in the Nigerian health-care system. For example, AI-based systems can be used to assist with medication reconciliation, which is the process of comparing a patient's medications against the best possible medication regimen. This can help to ensure that patients are taking the correct medications and dosages, and can reduce the risk of medication errors.

9.2. Improved efficiency in healthcare settings

If the right systems are in place, AI has the potential to make a real difference in improving health-care outcomes in Nigeria. Not only can it improve efficiency, but it can also help to ensure that patients receive the best possible care. In addition, AI can be used to assist with data collection and analysis, which can help to identify trends and patterns that can inform policy and decision-making.

9.3. Improved security of healthcare delivery to rural areas

Accessibility is a huge challenge when it comes to providing healthcare in Nigeria, especially in remote and rural areas. Insecurity is also a major issue, which can make it difficult or impossible for healthcare workers to reach those who need care. AI can help to address this problem by providing remote diagnosis and monitoring, as well as facilitating the

delivery of medications and other supplies. Furthermore, drones and other technological tools can be used to deliver care in remote areas.

10. Pre-implementation stage requirements for AI-EAP in Nigeria

10.1. Bridging trust issues

Trust is a vital component of healthcare, and it can be especially challenging to build trust in AI-based systems. However, by providing transparency and demonstrating the benefits of AI, it may be possible to build trust among users over time. This is especially important in areas where there is a lack of trust in the healthcare system ("Why Trust Matters in Healthcare," 2015).

10.2. Radio and TV programs

Publicizing the benefits of AI in healthcare services via radio and television programs is an effective way to educate the public in this regard, contributing to deepening the trust and understanding of AI as well as creating a sense of communication around the healthcare environment.

10.3. Peer enlightenment

Peer education is a powerful tool for improving healthcare. It is effective in promoting behavior change and increasing knowledge about health issues. This approach could be especially useful in the context of AI in healthcare, as it could help to address any skepticism or mistrust that people may have about the technology.

10.4. Community and school enlightenment programs

Community and school-based programs can effectively reach and educate a large number of people about AI in healthcare. These programs could be tailored to the specific needs of the community and could incorporate interactive activities to make learning fun and engaging.

10.5. Influence of traditional rulers and religious leaders

Traditional rulers and religious leaders wield huge influence in many communities and thus can be powerful advocates for the use of AI in healthcare. By engaging with these leaders, it will be possible to reach a wider audience and gain their support for the use of AI.

10.6. Addressing energy and electricity problems

As the shortage of energy and electricity has been a major problem in Nigeria, having access to reliable energy and electricity is a long-sought goal awaiting to realized to promote the use of AI in health-care domain in many parts of Nigeria. Without a stable power supply, it can be difficult to run the equipment and software needed for AI-based systems. There are some potential solutions to this issue, such as the use of solar power or other alternative energy sources.

11. Post-implementation stage requirements for AI-EAP in Nigeria

The implementation of AI-EAP and clinical support systems in Nigerian health-care settings holds immense potential to combat antimicrobial AR and improve patient outcomes. However, successful and sustainable implementation requires robust post-implementation strategies addressing key aspects like the establishment of an effective monitoring and evaluation unit (MEU), meant to continuously assess the impact of AI-clinical intervention and prescribing support (AI-CIPS) on antibiotic prescribing practices, AMR rates, patient outcomes, and system usability. In addition, the post-implementation stage must focus on activities aimed at developing standardized data collection and analysis methods, monitoring antibiotic prescribing patterns and trends, and evaluating the effectiveness of AI recommendations and adherence to guidelines (Rajpurkar *et al*., 2022). There is also the need to thoroughly assess the impact on AMR rates and patient outcomes, and conduct user satisfaction surveys among health-care personnel and patients, and most importantly, regularly report findings to stakeholders and inform system optimization.

In the post-implementation stage, it is crucial to implement budget and personnel planning for MEU activities, which require data analysts, statisticians, and health-care professionals (WHO, 2015). The mobilization of the Community as Watchdogs must be supported as it will empower communities to actively participate in AMR surveillance and promote responsible antibiotic use. This can be achieved via community education programs on AMR and responsible antibiotic use, training community health workers to monitor antibiotic prescribing practices and report concerns, and establishing feedback mechanisms for patients and communities to report inappropriate antibiotic use. Government at all levels must partner with community organizations, non-governmental organizations, and local media outlets—Alliance for Responsible Use of Antibiotics (Anon, 2020; WHO, 2019a; WHO, 2019b; Bajwa *et al*., 2021).

11.1. Establishment of sustainable funding sources

- Purpose: Secure long-term financial resources to maintain and scale up AI-CIPS implementation.
- Strategies:
  (i) Public-private partnerships with pharmaceutical companies, technology providers, and international organizations.

(ii) Grant funding from research bodies and foundations focused on AMR and healthcare innovation.
(iii) Cost-recovery mechanisms through user fees or integration into existing healthcare financing systems.

- Resources: Develop robust funding proposals, identify potential funding partners, and demonstrate the cost-effectiveness of AI-CIPS (World Bank, 2017; Anon, 2021).

11.2. Training and retraining of personnel involved

- Purpose: Ensure health-care professionals have the knowledge and skills to effectively utilize and adapt to AI-CIPS.
  1. Activities:
     (i) Develop comprehensive training programs on AI-CIPS for health-care providers, pharmacists, and IT personnel.
     (ii) Provide ongoing training and support to address evolving technologies and user needs.
     (iii) Foster a culture of continuous learning and adaptation within healthcare settings.
  2. Resources: Partner with universities, professional associations, and AI-CIPS developers to provide training programs.

12. Conclusion

The integration of AI in antibiotic prescribing and clinical support presents a transformative opportunity for Nigerian health-care settings. By addressing budgetary constraints through strategic investments, overcoming challenges, and capitalizing on the prospects offered by AI technologies, Nigeria can refine its antibiotic management practices, ultimately improving public health outcomes. With the use of machine learning applications for infectious disease management, the potential impact of AI in healthcare is extensive, promising advancements in decision support, combating antibiotic resistance, and achieving efficiencies in new antimicrobial development, diagnostics, therapeutics, and cost reduction in both economic and health personnel aspects.

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Conflict of interest

The authors declare no conflicts of interest.

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References

Ali, A.R., Alhumaid, S., Al Mutair, A., Garout, M., Abulhamayel, Y., Halwani, M.A., *et al.* (2022). Application of artificial intelligence in combating high antimicrobial resistance rates. *Antibiotics* (*Basel*), 11(6):784.

https://doi.org/10.3390/antibiotics11060784

Anon. (2020). Alliance for Responsible Use of Antibiotics (ARUA). Community Engagement toolkit for Antimicrobial Resistance.

Anon. (2021). Global Fund to Fight AIDS, Tuberculosis and Malaria. Investment Case for Antimicrobial Resistance. Available from: https://www.theglobalfund.org/en/tuberculosis [Last accessed on 2023 Nov 14].

Bajwa, J., Munir, U., Nori, A., & Williams, B. (2021). Artificial intelligence in healthcare: Transforming the practice of medicine. Future Healthcare Journal, 8(2):e188-e194.

https://doi.org/10.7861/fhj.2021-0095

Baker, R.E., Mahmud, A.S., Miller, I.F., Rajeev, M., Rasambainarivo, F., Rice, B.L., *et al.* (2022). Infectious disease in an era of global change. Nature Reviews Microbiology, 20(4):193-205.

https://doi.org/10.1038/s41579-021-00639-z

Brownstein, J.S., Rader, B., Astley, C.M., & Tian, H. (2023). Advances in artificial intelligence for infectious-disease surveillance. New England Journal of Medicine, 388(17):1597-1607.

https://doi.org/10.1056/NEJMra2119215

Cavallaro, M., Moran, E., Collyer, B., McCarthy, N.D., Green, C., & Keeling, M.J. (2023). Informing antimicrobial stewardship with explainable AI. PLOS Digital Health, 2(1):e0000162.

https://doi.org/10.1371/journal.pdig.0000162

Chang, A., & Chen, J.H. (2022). BSAC Vanguard Series:

Artificial intelligence and antibiotic stewardship. Journal of Antimicrobial Chemotherapy, 77(5):1216-1217.

https://doi.org/10.1093/jac/dkac096

Christaki, E. (2015). New technologies in predicting, preventing, and controlling emerging infectious diseases. Virulence, 6(6):558-565.

https://doi.org/10.1080/21505594.2015.1040975

European Centre for Disease Prevention and Control (ECDPC). (2021). Digital technologies for the surveillance, prevention and control of infectious diseases-a scoping review of the research literature. Sweden: European Centre for Disease Prevention and Control (ECDPC).

Fanelli, U., Pappalardo, M., Chinè, V., Gismondi, P., Neglia, C., Argentiero, A., *et al*. (2020). Role of artificial intelligence in fighting antimicrobial resistance in pediatrics. Antibiotics, 9(11):767.

https://doi.org/10.3390/antibiotics9110767

GAO. (2020). Artificial Intelligence in Health Care: Benefits and Challenges of Technologies to Augment Patient Care. In: *Report to Congressional Requesters Technology Assessment*. United States: GAO, pp.13-29.

Gille, F., Smith, S., & Mays, N. (2015). Why public trust in health care systems matters and deserves greater research attention. Journal of Health Services Research and Policy, 20(1):62-64.

https://doi.org/10.1177/1355819614543161

Goldberg, C.B., Adams, L., Blumenthal, D., Brennan, P.F., Brown, N., Butte, A.J., *et al*. (2024). To do no harm-and the most good-with AI in health care. Nature Medicine, 30(3):623-627.

https://doi.org/10.1038/s41591-024-02853-7

International Business Machines (IBM). (2023). IBM's Watson AI Saves Woman's Life by Diagnosing Rare Form of Leukaemia. Available from: Available from: https://www.huffingtonpost.co.uk [Last accessed on 2024 Feb 11].

International Development Research Centre. (2024). Artificial Intelligence for Development (AI4D) Africa. Available from: https://www.idrc.ca/en/project/artificial-intelligence-development-ai4d-africa:citation[oaicite:1]{index=1}:citation[oaicite:0]{index=0}&#8203 [Last accessed on 2023 Dec 11].

Jaafaru, I.A., Rabiu, I., Idris, K.B., & Abdulfatai, K. (2022). Determination of inducible clindamycin resistance amongst clinical isolates of methicillin-resistant *Staphylococcus aureus* in Kaduna, Nigeria. *Journal of Advances in Microbiology,* 22(1):32-38.

Jiménez-Luna, J., Grisoni, F., Weskamp, N., & Schneider, G. (2021). Artificial intelligence in drug discovery: Recent advances and future perspectives. Expert Opinion on Drug Discovery, 16(9):949-959.

https://doi.org/10.1080/17460441.2021.1909567

Kaplan, A.D., Kessler, T.T., Brill, J.C., & Hancock, P.A. (2023). Trust in artificial intelligence: Meta-analytic findings. *Human Factors*, 65(2):337-359.

https://doi.org/10.1177/00187208211013988

Lau, H.J., Lim, C.H., Foo, S.C., & Tan, H.S. (2021). The role of artificial intelligence in the battle against antimicrobial-resistant bacteria. *Current Journal of Genetics*, 67:421-429.

Marra, A.R., Langford, B.J., Nori, P., & Bearman, G. (2023). Revolutionizing antimicrobial stewardship, infection prevention, and public health with artificial intelligence: The middle path. Antimicrobial Stewardship and Healthcare Epidemiology, 3(1):e219.

https://doi.org/10.1017/ash.2023.494

Okeowo, E., Afolabi, A., Adekambi, A., & Oyegbile, T. (2020). Effectiveness of antibiotic stewardship programs: The role of artificial intelligence. *Journal of Antimicrobial Chemotherapy,* 75(10):2657-2659.

Rabiu, I., Auwal, Z., & Muhammad, H.A. (2022a). Detection of carbapenemase producing enterobacteriaceae from clinical samples and their susceptibility to conventional antibiotics and medicinal plant extracts. *Annals of Experimental and Molecular Biology*, 4(1):000115.

Rabiu, I., Jamilu, Z., & Ahmad, F.R. (2023). Buruli ulcer (*Mycobacterium ulcerans* infection) in Nigeria: An update on the disease burden in Nigeria. *Clinical and Medical Research and Studies*, 2(1):1-3.

Rabiu, I., Yusha'u, M., & Abdullahi, A.M. (2022c). Antibacterial activity of *Colocasia esculenta* leaf extracts against multidrug resistant extended spectrum B-lactamase producing *Escherichia coli* and *Klebsiella pneumoniae*. *Bayero Journal of Pure and Applied Sciences*, 13(1):7-12.

Rajpurkar, P., Chen, E., Banerjee, O., & Topol, E.J. (2022). AI in health and medicine. Nature Medicine, 28(1):31-38.

https://doi.org/10.1038/s41591-021-01614-0

Rawayau, A.M., Kano1, A.M., Nuhu, I.A., Salisu, A., Imrana, I., Malami, M.A., *et al*. (2022). *In vivo* evaluation of antidiabetic effects of some polyherbal formulations in alloxan-induced diabetic wistar rats. *Tropical Journal of Natural Product Research,* 6(5):818-825.

https://doi.org/10.26538/tjnpr/v6i5.26

Sahu, A., Mishra, J., & Kushwaha, N. (2022). Artificial intelligence (AI) in drugs and pharmaceuticals. Combinatorial Chemistry and High Throughput Screening, 25(11):1818-1837.

https://doi.org/10.2174/1386207325666211207153943

Sarkar, C., Das, B., Rawat, V.S., Wahlang, J.B., Nongpiur, A., Tiewsoh, I., *et al*. (2023). Artificial intelligence and machine learning technology driven modern drug discovery and development. International Journal of Molecular Sciences, 24(3):2026.

https://doi.org/10.3390/ijms24032026

Shitu, A.S., Mukhkar, M., Bukar, A., & Yusha'u, M. (2020). Extended spectrum beta-lactamase production, biofilm formation and antibiotic resistance in clinical isolates of *Klebsiella pneumoniae*. *Nigerian Journal of Microbiology*, 34(1):4874-4883.

Sulaiman, A., Singh, D., Muhammad, A. Abdullahi, U. Z., & Rabiu, I. (2022). Evaluation of serum level of minerals, alkaline phosphatase and vitamin D in healthy pregnant women of Jodhpur. *International Journal of Scientific and Engineering Research*, 13(2):797.

Tamma, P.D., Aitken, S.L., Bonomo, R.A., Mathers, A.J., Van Duin, D., & Clancy, C.J. (2023). Infectious Diseases Society of America 2023 guidance on the treatment of antimicrobial resistant gram-negative infections. Clinical Infectious Diseases:ciad428.

https://doi.org/10.1093/cid/ciad428

Valderrama-Rios, M.C., Álvarez-Moreno, C.A., & Cortes, J.A. (2023). Interventions to improve antibiotic use in hospitals with different levels of complexity in Colombia: Findings from a before-and-after study and suggestions for the future. Antibiotics (Basel), 12(5):867.

https://doi.org/10.3390/antibiotics12050867

Van Dort, B.A., Penm, J., Ritchie, A., & Baysari, M.T. (2022). The impact of digital interventions on antimicrobial stewardship in hospitals: A qualitative synthesis of systematic reviews. Journal of Antimicrobial Chemotherapy, 77(7):1828-1837.

https://doi.org/10.1093/jac/dkac112

Vestesson, E., De Corte, K., Chappell, P., Crellin, E., & Clarke, G.M. (2023). Antibiotic prescribing in remote versus face-to-face consultations for acute respiratory infections in primary care in England: An observational study using target maximum likelihood estimation. EClinicalMedicine, 64:102245.

https://doi.org/10.1016/j.eclinm.2023.102245

World Bank. (2017). Financing the Health Sector in Low-and Middle-Income Countries. Available from: https://pubdocs.worldbank.org/en/908481507403754670/annual-report-2017-wbg.pdf [Last accessed on 2024 Jan 20].

WorldHealthOrganization(WHO).(2015).MonitoringandEvaluating Implementation of the Global Action Plan for the Containment of Antimicrobial Resistance. Available from: https://www.bing.com/search?Q=world+health+organization+(who)%2c+2015.+monitoring+and+evaluating+implementation+of+the+global+action+plan+for+the+containment+of+antimicrobial+resistance.&cvid=0693873f64c043918b42b4851e98882c&gs_lcrp=egzjahjvbwuybggaeeuyodibbzy2ogowajsoagiwage&form=anab01&pc=astS [Last accessed on 2024 Jun 04].

World Health Organization (WHO). (2019a). Engaging Communities in Addressing Antimicrobial Resistance. Available from: https://www.who.int/publications/i/item/9789240010529 [Last accessed on 2024 Jun 04].

World Health Organization (WHO). (2019b). Global Strategy on Human Resources for Health: Workforce 2030. Available from: https://www.who.int/publications/i/item/9789241511131 [Last accessed on 2024 Jun 04].

Yusha'u, M., Aliyu, H., Kumurya, A., & Suleiman, K. (2010). Prevalence of extended spectrum β-lactamases (ESBLs) among Enterobacteriaceae in Murtala Mohammed specialist hospital, Kano, Nigeria. *Bayero Journal of Pure and Applied Sciences,* 3(1):169-172.

ACCSCIENCE PUBLISHING

Global Health Economics and Sustainability

REVIEW ARTICLE

Sustainability of specialized healthcare in upper-middle-income economies: Innovations despite constraints

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Abstract

Countries such as Jamaica have had to be largely self-reliant in funding their health-care systems. The success of an early and sustained focus on primary healthcare, coupled with a change in the disease profile from infectious concerns to chronic non-communicable diseases associated with aging, has resulted in a marked rise in healthcare costs. Rapid technological advances in the diagnosis and treatment of many specialized conditions have further increased the cost of care. Funding these health-care costs sustainably is a challenge for Jamaica and other similarly developed economies due to competing demands for scarce funds. In addition to government health-care allocations, sources of sustainable funding from local public-private partnerships, through mechanisms such as philanthropy, may help address, at least in part, this chronic problem. This review examines strategies to create a framework for such funding, as well as proposes specific practical steps for their achievement. The author's motivation to participate in the process of change stems from the stubbornly persistent inequalities of healthcare that people and health-care workers in Jamaica – and similar lower- and middle-income countries – routinely cope with. These inequalities must be addressed to truly achieve greater health egalitarianism, social stability, and ultimately, the developed country status they aspire to. The need to think innovatively to achieve this goal is self-evident, given the current inability of governments to achieve this goal.

Keywords: Healthcare; Small island economies; Philanthropy; Social capital; Inequality; Social entrepreneurialism; Innovation; Policy

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1. Introduction

In this review, the second article in a two-article series, the issue of how upper-middle-income countries such as Jamaica, a small island state of three million people, can potentially afford to fund increasingly expensive specialized healthcare at a time of rapid technological change is explored. The first article of this series focused on understanding how Jamaica's history of colonialism and slavery has impacted the provision of health care in the past and its possible impact on current healthcare in this society, which

itself is characterized by persistent inequality, including in healthcare and especially specialized care.

Inequality is, of course, not unique to Jamaica. By way of comparison, although Jamaica's Gini Index is significant at 0.45, it is much lower than many other countries, such as South Africa, whose Gini Index is 0.63, making it the most unequal country in the world (Statista, 2022). This inequality is also apparent in the fairness of the Financial Contribution (FFC) Index, in which South Africa ranks poorly, 143rd in the world (WHO, 2000). The FFC was a term created and included in the World Health Report 2000 of the WHO (WHO, 2000), in which fairness was defined as an equal burden where every household would contribute an equal share of its capacity to pay to the health system. In essence, it is an index of inequality in the burden of health costs across households in different countries. The principle here is that poor households should not pay a higher share of their discretionary expenditure on health than richer households and that all households should be protected against catastrophic financial losses related to ill health.

Despite this, or perhaps because of it, South Africa has developed a strong culture of giving that has helped to offset this marked societal inequality. The importance of charity and philanthropy is evident from the statistic that the bottom 60% of South Africa's households depend more on social grants and less on income from the labor market to survive (Stats, 2015). Perhaps stark inequality motivates charity and philanthropy in a way that might not have occurred otherwise if not for this visible disparity. In this regard, it should be recalled that South Africa spends US$1091 per capita on health, despite a low national gross domestic product (GDP), representing a large proportion, 8.9%, of their total GDP. It is noteworthy that external resources contribute only 1.8% of health expenditure in South Africa (Health Policy Project, 2016) (1.76% for Jamaica). With the low dependency on external resources for health as a percentage of total health expenditure, a significant component of this relatively large per capita expenditure on health must come from charitable and philanthropic sources, a substantial proportion of which must support the health needs of the vast, impoverished sector of South Africa's population. Finally, a recent development, the imminent creation of the National Health Insurance Bill, designed for all its citizens to equitably access quality healthcare irrespective of social status, is a major step forward in health policy. It remains to be seen if this Bill will make it all the way to implementation in 2024, but the implications for the health and, ultimately, economic welfare of those at the lower end of the social ladder are profound (Roelf, 2024).

For decades, the marked and persistent inequalities in healthcare on the island of Jamaica, to which the author has had to adjust his own practice and expectations of outcomes based on a patient's ability to afford care, have been of growing concern. As Martin Luther King said many years ago, "Of all forms of inequality, inequality in healthcare is the most shocking and inhumane." Much like the efforts being made in South Africa, developing a framework in Jamaica for a socially broad-based and sustainable solution to this persistent problem is the ultimate goal of this work. At a fundamental level, it is also the recognition that societies are least unstable when they perceive that genuine efforts to address inequalities are being made. Jamaica's at times turbulent social history over the past 50 years is itself a testament to this.

Thus, in this second of two articles, potential strategies to increase health-care funding are explored. This is done in recognition of the worrisome fact that governments of countries such as Jamaica will increasingly find it difficult to meet the costs of specialized health care, such as advanced cardiac and neurological care, in populations that are steadily demographically aging.

2. Meeting current needs and growing expectations

As Jamaican and other Caribbean governments struggle to cope with global recessions, most recently caused by the global coronavirus disease 19 (COVID-19) pandemic, they are increasingly less capable of meeting expanding health-care needs. Over the past 40 years, this has led to a growing private health-care industry, as exemplified in Jamaica, where 46.7% of health-care spending is privately sourced (Table 1). Different countries allocate varied percentages of their GDP to healthcare, resulting in wide per capita variations. Female lifespan is often used as a measure of the impact of socioeconomic and health initiatives. Health-care provision and access vary among countries, with countries such as Canada, which have effective social welfare programs, providing most healthcare through government-funded health-care systems (Table 1). Similar systems operate in other countries such as the UK, France, and Sweden. The previously mentioned FFC is an important metric, serving as a safety net for individuals who fall ill and their families, who often bear the financial burden of care. As seen in Table 1, Jamaica ranks quite poorly in FFC, indicating that a health-care event can have potentially catastrophic socioeconomic consequences. This underscores the need for new ways of funding specialized health care – where most of the costs of healthcare now lie – to protect its citizenry from such all-too-common scenarios. This issue is prevalent throughout

Table 1. Comparisons of health care in Jamaica with selected countries of different development

Country	%GDP spent on healthcare (2012) ([b]Global average: 9.36%)	% healthcare private sector accessed (Ali, 2023) ([b]Global average: 39.52%)	Per capita spending (US$) on health ([b]Global average: US$987.18 [2012])	WHO female lifespan (2015)	WHO health ranking (*n*=191 countries)	Fairness of financial contribution (maximum=1) 1997 data[a]	Global philanthropy environment index (GPEI[c])/5 2022 (Philanthropy, 2022)
Jamaica	4.8	46.7	512	77	53	0.921 (rank 115)	3.53
United States	17.9	46.9	8900	81	37	0.954 (rank 55)	4.77
Canada	11.3	29.5	5675	84	30	0.974 (rank 18)	4.38
Kenya	4.5	59.1	98	63	140	0.939 (rank 80)	2.87
South Africa	8.9	51.6	1091	64	175	0.904 (rank 143)	3.80

Notes: [a]WHO: World Health Report 2000 (WHO, 2000); [b]The World Bank Data (Bank, 2023); [c]GPEI: A measure of how well-developed philanthropy is in each country listed above.
Abbreviations: WHO: World Health Organization; GDP: Gross domestic product.

the developing world. Despite underperforming in terms of financial allocations, Jamaica's 53rd ranking in health-care efficiency is quite impressive. This ranking speaks to a comparably high degree of efficiency in resource allocation and the quality of its primary health-care system and public health systems (Moody, 1978; Riley, 2005). The Global Philanthropy Environment Index (GPEI), listed in Table 1, was created by the Lilly Family School of Philanthropy at Indiana University Purdue. It evaluates countries on a five-point scale (1 – 5) across six key factors that comprehensively measure philanthropy: (i) Ease of operating a philanthropic organization; (ii) tax incentives on giving; (iii) cross-border philanthropic flows; (iv) political environment; (v) economic environment; and (vi) sociocultural environment for philanthropy. As presented in Table 1, Jamaica has room for further improvement in this objective measure of giving (Philanthropy, 2022).

Despite Jamaica's 53rd ranking, many specialized health care needs are not adequately met as the majority of the population does not have the financial resources to obtain private care. Government facilities, while excellent at providing primary healthcare and emergency care, lack the resources to offer comfortable private rooms and up-to-date management of several specialized health conditions. This lack of resources has led to a growing disparity in the quality of care available to different segments of the population, based principally on the ability to pay, either out-of-pocket or through insurance. Countries with health-care systems that are efficient, accessible, and cost-effective tend to exhibit a mix of public and private sector involvement (WHO, 2000).

No formal market research was conducted before these private medical institutions were developed in Jamaica; they emerged based on the individual entrepreneurial ambitions of physicians and private citizens. Over time, more advanced imaging and laboratory facilities became available, differentiating the range of services in private settings from those in government hospitals. In 2016, 11 institutions achieved the regulatory status of private hospitals on the island, but more recently, this number has fallen to only four due to tightened legislation, although the overall number of private facilities has increased (Johnson, 2020).

Patients who utilize government facilities often access private investigative and surgical facilities not available in the public sector. Furthermore, in recent years, formal public–private partnerships (PPPs) have been formed to access these private investigative services, paid for by the government, which therefore does not have to make the capital outlays or deal with expensive ongoing maintenance (Linton, 2022). However, the Vision 2030 Jamaica National

Development Plan, drafted in 2009, indicated that private hospitals in Jamaica only provided 5% of total hospital services, although this may have increased somewhat since then (The Health Sector Task Force, 2009).

How, then, can countries such as Jamaica, which have effective primary and public health-care systems and have created environments that prolong life, deal with the health burdens associated with longevity when the costs are multiples of the expenditure previously needed to eliminate infectious diseases and substantially increase lifespan? (Table 1) Additionally, why should they do it when the additional cost is so high? And who pays? One point that is not immediately apparent is that, in addition to increasing the average lifespan by another 3 – 6 years, there is a substantial improvement in the quality of life in these final years when health-care systems can meet these needs. In this regard, a recently developed index, health-adjusted life expectancy (HALE), represents the number of years in full health that an individual, usually at birth or aged 60 years, should live if exposed to age-specific mortality and currently existing health status (morbidity) conditions. The HALE index has greatly helped monitor trends and analyze health inequalities between populations. HALE improved across the world between 1990 and 2013 by 5.5 years due to improving living standards, advances in medical technology, health education, and public health interventions. Significant disparities, however, have been identified across countries (WHO, 2020). For example, in South Africa, the HALE fell by 3.96 years during this period (mainly due to HIV), and in Kenya, there was a gain of 1 – 2 years. In Jamaica, the gain was 0 – 1 years. For comparison, during this period, the US had a gain of 3 – 4 years. To put these figures in context, in the US, the average life expectancy is 84.1 years, and the average HALE is 78.9 years. Women live 2.6 years longer than men (85.3 vs. 82.7 years), on average, and enjoy good health for almost 2 years longer (79.8 vs. 77.9 years). In the US, Caucasians live an average of 84.2 years, with 79.3 years in good health; Afro-Americans live an average of 83.1 years, but just 76.1 years in good health (Stibich, 2020). In comparison, Jamaica's HALE is 66 years versus a life expectancy of 74.5 years. It should be apparent that increasing HALE means more years of potential productivity and fewer years of being a burden on the health system and family.

Countries such as Jamaica need good fiscal leadership and, given the rapidly growing cost of healthcare, potentially significant philanthropic efforts to achieve HALE and life expectancy levels closer to those of developed countries. While non-governmental organizations and charities have contributed to healthcare, including specialized healthcare, much more is necessary for Jamaica to keep up with rapidly growing needs and expectations. Examining how healthcare has been funded in other parts of the world and the contribution of philanthropy (meaning "love of humankind" in Greek) in other countries provides important potential models. In addition, exploring whether home-grown philanthropy and other not-for-profit mechanisms can be feasible methods to help fund specialized health care in lower- and middle-income countries (LMICs) such as Jamaica is essential. International donors tend to concentrate their efforts on low-income regions, and as such, upper-middle-income countries such as Jamaica do not tend to benefit as much from these funding sources (McCoy *et al*., 2009).

A general limitation identified in this review is the marked paucity of relevant literature emanating from middle-income developing countries such as Jamaica. Consequently, most insights into local peculiarities are gleaned from global PPPs between major foundations, such as the Bill and Melinda Gates Foundation, and these countries (Buse & Harmer, 2007; Nishtar, 2004).

Ultimately, the aim is to propose culturally and economically appropriate ways of developing successful partnerships in Jamaica. The true innovation will lie in the *de novo* participation of the wealthy in the arena of specialized healthcare and in scaling this to bring value to all citizens in need of such care (Starr & Hattendorf, 2015). As discussed, the model of total access for all, as funded by developed welfare states – which, although nowadays under great pressure, typically puts healthcare at the center of their political agenda (Moran, 2000) – may not be feasible or sustainable in less economically endowed countries such as Jamaica.

3. Relevant conceptual frameworks

3.1. Innovation

Innovation is not solely technological; sustainable innovation is required across policy, technology, finance, service, and research. However, change is often difficult in regions where the status quo is strongly maintained. For instance, in Ghana, which has a similar level of infrastructural development as Jamaica, deficiencies in the health innovation environment have limited its potential (Al-Bader *et al*., 2010). Innovation involves recognizing the wide variety of stakeholders in the process and the interactions and knowledge exchanges among them (Lundvall, 2010). It should be noted that impediments to innovation in health care are not unique to the developing world (McMahon, 2008).

It is necessary to explore innovation both as a single event (disruption) or as incremental advancement, as

well as to explore the concept of change, particularly in terms of effecting behavioral change. For example, the author has recently signed an agreement to consult for a large Jamaican pharmaceutical distribution company. The specific goal is to set up a neurosciences division and expand the range of pharmaceuticals for patients with neurological conditions, aligning several stakeholders and leveraging the corporation's existing supply chain for affordable generics. Innovation, regardless of its pace, is always a change, but not all change is innovative.

3.2. Social capital

Social capital, a sociological concept, describes the connections within and among social networks and the impact these social relationships have on productivity (Putnam, 2000). Simply put, "it is a public good that generates positive externalities by facilitating cooperation for the achievement of common goals" (Kawachi *et al.*, 1997, p. 1491-1498). No stronger connection exists than in the area of health (Szreter & Woolcock, 2004). Caribbean societies are well-known for their economic disparities, underscored by data from the US indicating a 14.6-year difference in lifespan between males in the top 1% of income and those in the bottom 1% (Dizikes, 2016).

Social capital and human capital are interrelated and affect health outcomes (Miller *et al.*, 2006). Human capital itself requires definition and distinction from social capital, as it speaks to the innate abilities of individuals or populations that promote economic activity. The benefits of a stronger economic environment toward fostering better healthcare are partially reflected in Table 1. However, social capital is eroded by inequality. Since reduced social capital is associated with poorer health and well-being outcomes (Kawachi *et al.*, 1997), measures to address inequality should produce a complementary improvement in health and well-being, as an influential model suggests (OECD & CERI, 2010). Indeed, countries with greater egalitarianism have less variance in health (Islam *et al.*, 2006). Despite this appealing model (Miller *et al.*, 2006), a major limitation in the work on social capital generation is the lack of clear evidence of benefit from attempts to improve social capital toward greater health-care equality (Uphoff *et al.*, 2013).

Another relevant comparison is the East African country of Kenya, which is quite similar to Jamaica in several ways. Despite its poor standing in the GPEI, Kenya, has a longstanding culture of giving called *Harambee*, rooted in self-help and cooperative work as a key driver for their giving. There is a wide range of individual and community giving, with religion being the second biggest motivation for giving, second to personal attachment to a cause (CA Foundation, 2019). As previously discussed, there is a difference between charity and philanthropy. Less well-off people can make small donations of money and contribute their spare time (charity), but it is those of high net worth who can make sustained and significant financial commitment to a cause, addressing the underpinnings of a social condition (philanthropy). Kenya does quite well from the perspective of charity. Kenya's growing middle classes contribute 22% of their monthly income, typically through informal gifts and support to family, friends, and neighbors. Charitable giving, while generous, does not result in financial hardships, suggesting that there is a capacity to give more. Indeed, in Kenya, as stated in the Charities Aid Foundation (CAF) 2019 World Giving Index, more than half of people donated money to charity, compared to less than a third in 2010. In another metric used by the CAF, helping a stranger in the past month – an indirect measure of social capital – 68% of Kenyans had done so, placing Kenya 4th in the world in this measure of charity and ahead of highly charitable and philanthropic countries such as Canada (9th) and New Zealand (10th) (CA Foundation, 2019).

3.3. Social entrepreneurialism and corporate social responsibility (CSR)

While the author views philanthropy as the main vehicle for funding specialized centers of excellence in Jamaica, it is also necessary to consider the concept of social entrepreneurialism. In a social enterprise, the business itself is formed to address a specific social condition. Profit is not the end goal, as it is in typical for-profit businesses, but rather a means to an end – the alleviation of a social condition. Business can thus be a force for doing good. Dees *et al.* (2004, p. 301) suggest that a social entrepreneur is one who develops a "strategic service vision, a competitive strategy, a strategy for building networks and partnerships, leads, retains, and rewards people, manages (their board) entrepreneurially, treats donors as investors, works with (different) communities, develops viable earned income strategies, considers the scale of the project and strategies for success, and is able to manage organizational change." As defined by Say (1855, p. 3): "The entrepreneur shifts economic resources out of an area of lower and into an area of higher productivity and greater yield."

Entrepreneurs thus create value, typically understood in terms of money. However, in social entrepreneurship, value creation is measured by the alleviation of a social condition. "The entrepreneur always searches for change, responds to it, and exploits it as an opportunity." (Drucker, 2014). Metaphorically, identifying opportunity was best characterized by Wayne Gretzky of hockey fame, when he said, "I skate to where the puck is going to be, not where it's been." (Kirby, 2014).

Part of the return on investment of social entrepreneurialism is facilitating or using change to help people. It differs from CSR, which aims to improve the social footprint of a corporation that exists for another purpose. Indeed, CSR and social entrepreneurialism can both be effectively used in different settings. As an example of CSR, the author has aligned the interests of the previously mentioned major distribution company with those of the largest public hospital in Jamaica, where long-term electroencephalography monitoring in the intensive care unit (ICU) setting has recently been started (Parenthetically, this equipment was a donation by US-based colleagues and the author). The ultimate outcomes are improved ICU outcomes, reduced ICU stays, and improved cost efficiency. The distribution company will support the disposables used for this service in this public hospital while benefitting from the public relations exposure and, of course, as a supplier of new brain-related medications, will also benefit financially. Although nothing new in principle, this exemplifies the potential opportunity for the sustained involvement of corporations in supporting expensive specialized healthcare in the public sector in countries such as Jamaica, where the traditions of charity are strong but those of philanthropy are not yet established.

The earliest example of a social enterprise in Jamaica was the formation of mutual building societies, established in the late 19th century to provide homes to those in need at a time when the four C's – credit, collateral, capital, and color (skin color) – limited access to homeownership. The Social Enterprise Boost Initiative, launched in Jamaica in 2012, has helped fund successful social enterprises on the island. Striking to the author is the complete absence of social enterprises in the health-care space. This may be partly due to the widely held perception of the complexity of health care and its often highly capital-intensive requirements. As the primary purpose of social enterprises is to create social value, from a national perspective, conventional GDP measures do not assess their overall contribution. Alternative tools, such as the social return on investment (Salverda, n.d), have been developed to provide a broader conceptualization of value, including social, economic, and environmental benefits. Tools such as these provide a better representation of the value created by social enterprises.

Charities can be transformed into sustainable social enterprises without losing their effect; in fact, through growth, they can increase their impact on social conditions. The Charities Act of Jamaica does not preclude making a profit if individuals do not personally benefit and the organization invests in a public good. In furtherance of this line of thought, the Jamaica Social Exchange was launched in January 2017, reinforcing the profile of a sector with enterprises as entrepreneurial as any on an international stock exchange. This initiative allows smaller or larger investor to become involved in the process of social change while also deriving a financial return on their capital investment. When one invests in a social enterprise, one is investing in a growth model that benefits both the financial and the social economy. Growth is measured differently, not only in terms of financial return. Government policies can influence the viability and sustainability of not only commercial but also social enterprises. Conceptually, a social enterprise is unique in generating shared value, whereby all stakeholders can benefit. Ultimately, profitability determines sustainability. At present, there are approximately 10 million social enterprises worldwide, accounting for 3% of all businesses globally, generating US$2 trillion in annual turnover and creating 200 million jobs. (World Economic Forum, 2024).

Thus, in addition to philanthropy, the social enterprise model, though not yet utilized locally in the context of healthcare, could be another potential method of bringing private capital into specialized healthcare in Jamaica. However, despite the creation of appropriate frameworks, it has not as yet proved to be a very attractive model for local investors.

3.4. A summary of different ways of "giving"

Different ways of "giving" are summarized as follows:

- Charity: Involves voluntary giving, typically for the immediate relief of suffering through donations
- Philanthropy: Strategic giving to address societal issues through sustained donations to identified causes
- CSR: Refers to a company's contribution to economic, social, and environmental sustainability in ways that also benefit their primary business purpose (e.g., the hotel industry looking after the quality of beaches and coral reefs)
- Social entrepreneurialism: Uses business principles and innovative thinking, usually associated with for-profit entrepreneurship, to address socially important issues using sustainable business models
- Not-for-profit organizations: Focused on addressing societal needs without generating profit, typically relying on donations or grants.

4. Barriers and challenges

4.1. Corruption

Philanthropy involves financial commitments that can be easily misappropriated, which may explain why external charitable aid during the COVID-19 pandemic often came

in the form of hospital beds, physiological monitors, and ventilators instead of cash. External funding agencies are generally less comfortable making sustained investments in business models in developing countries, preferring one-off charitable donations. Local investors are more likely to understand the local context and the cultural and logistical intricacies that might deter foreign entities.

Corruption is defined as the misuse of public office, public resources, or public responsibility for private – personal or group – gain (Szeftel, 2000). Studies have estimated that the cost of corruption is akin to a 20% regressive tax that foreign investors must face (Christie, 2017). Jamaica has improved its standing, ranking 44th out of 180 countries (1st being Denmark) in the 2022 Corruption Perceptions Index of Transparency International (2022). Ultimately, the impact of corruption is to increase the cost of any endeavor, including philanthropic efforts. This results in a lowering of social capital, which has profound implications for health care.

4.2. Policy

Recurring changes to policies on health-care funding in Jamaica over the past 25 years underscore the economic vulnerability of smaller democracies to the effects of inconsistent policies. There is a great need for smaller countries to achieve consensus on long-term directions for essential services such as healthcare, which should not be used politically as leverage for winning elections. However, in the past decade, an overall alignment on macroeconomic policies between the two major political parties has led to improvements in policy consistency. Policies that make philanthropy more feasible have been and are being developed but need to be better known and used to mutual benefit. Under the Charities Act (Ministry of Finance, 2013), there are 290 registered charities in Jamaica (Ministry of Finance, 2014b), some in healthcare. However, there is a dearth of foundations in specialized health care. The poor performance of state-owned enterprises in general (Darcy & Russell, 2014) is emphasized by the International Monetary Fund's report on Jamaica (IMF, 2015, p. 2), which states that ".concrete efforts are needed to modernize the public sector and improve the efficiency of public services." This represents an opportunity, as consistently articulated by Tufton, Jamaica's current Minister of Health, for effective PPPs to improve the quality and efficiency of healthcare and to facilitate innovations in specialized care in a sustainable way, driven by commercial levels of efficiency. Better standards of corporate governance (Darcy & Russell, 2014) and a fairly recently enacted document to support the role of PPPs in Jamaica (Ministry of Finance, 2014a) should make these partnerships feasible. However, old habits, longstanding social inequalities, lack of accountability, and a pervasive lack of societal trust (Powell, 2010) undermine Jamaica's fund of social capital and represent hurdles to success.

4.3. Factoring in the rapid change in health technology

The rapid integration of technological advances into healthcare includes telemedicine platforms and a host of digital endpoints for improving individual and population-based health. Many of these advances, supported by artificial intelligence, will find applications in LMICs. These technologies are not only capable of improving care quality, safety, and efficiency but, although initially capital-intensive and time-consuming to integrate, can ultimately be cost-saving (Ali & Clarke, 2023; Ali *et al.*, 2021).

5. Putting it all together

As presented in the GPEI information in Table 1, there is room for further improvement in Jamaica's philanthropy. In Jamaica and similar economies, the challenge is how to unite social entrepreneurialism or other models with philanthropy in a way that motivates and incentivizes funders. In contrast to traditional, hands-off charitable grants awarded to non-profit organizations, venture philanthropists generally enter into long-term relationships with social enterprises or non-profit organizations. They believe that these entities can benefit from sustained engagement, substantial financial investments, and strategic assistance. The investments in strategic assistance and capitalization are designed to build organizational systems and capacity (Van Slyke & Newman, 2006).

A Venn diagram visually positions these mechanisms for increasing healthcare funding in relation to the key primary concepts discussed previously (Figure 1).

6. Summary and conclusion

Jamaica's recent favorable economic growth trajectory, improving educational metrics, greater employment, more leisure time, and greater access to information through rapidly growing internet connectivity are leading to greater expectations from its population for better healthcare. From the perspective of Jamaica's health-care providers, young doctors and nurses continue to be drawn to North America. This is not difficult given its proximity, the large Jamaican diaspora in North America, and the commonality of a shared language, English. This continuing brain drain remains a challenge in scaling and improving Jamaica's healthcare. Another growing challenge is the economic impact of climate change and the effects of more severe hurricanes and rising temperatures, as well as direct impacts such as beach erosion, which have obvious

implications for the tourism industry on which Jamaica heavily depends. Indeed, the tourism sector also requires a robust health-care infrastructure. With millions of tourists coming to its shores, the Jamaican health-care system must have the capacity and responsiveness to support their needs. Yet, seen from the perspective of Jamaica's history of colonialism and slavery, the change in Jamaica's health metrics since its independence in 1962 has been nothing short of remarkable. This progress applies across all aspects of healthcare, including public health, primary healthcare, more advanced tertiary care, and, health education. However, much more remains to be achieved as the sophistication and expectations of the population continue to grow, leading to what has been described as " a revolution of rising expectations." Ignoring these rising expectations may be at a society's great peril, as articulated by Alexis de Tocqueville in his book *L'Ancien Regine et la Revolution* (1856). He noted, "First, a modest increase in prosperity and freedom raises the average person's expectation of what is possible in life. Second, greater access to resources, especially education, and information, raises that person's awareness of oppression and his unwillingness to tolerate it." (McElroy, 2016). As living standards, opportunity, and hope rise, populations may no longer be willing to tolerate suboptimal and unequal health care. Given the competing demands in small economies such as Jamaica, it will require innovative approaches and the involvement of all sectors of the economy, both public and private, in partnership to fund the continual advances that are now a feature of modern specialized medical care (Figure 2 below).

Philanthropy, like income taxation in uncorrupt countries, serves as a countervailing force against economic inequality. Perhaps driven by *noblesse oblige*, public goods are funded by wealthy donors. Furthermore, the more unequal the income distribution, the larger the share of their incomes the rich contribute. If this is so, then philanthropy mitigates income inequality by turning the increased financial resources of the wealthy few into advancements in knowledge and public facilities that raise the quality of life for everyone in society (Duquette, 2018). Facilitating philanthropy and other mechanisms, as discussed in this review, should become a greater focus of governments in countries such as Jamaica if they aspire to provide equal and fair access to advanced specialized healthcare. This can only happen if policy frameworks are established to make it happen. Indeed, the government's active involvement becomes necessary at an even higher policy level: to refine – and monitor – the balance of the social-health spending divide, recognizing the major contribution of social determinants such as income, housing, education, and social welfare programs, including leisure, to overall population health and well-being (OECD, 2017; "Quantifying Health Systems' Investment. In Social Determinants Of Health, By Sector, 2017 – 2019," 2020). This approach would further broaden the range of opportunities for philanthropy to impact population health in a meaningful way. For the wealthy in Jamaica, philanthropy should not only be a mechanism for lessening taxation but also for reducing social tensions. In the health-care space, it can create facilities that can be lifesaving in emergent settings for everyone, including the wealthy and their families, who presently prefer to obtain their healthcare in nearby locations such as Florida.

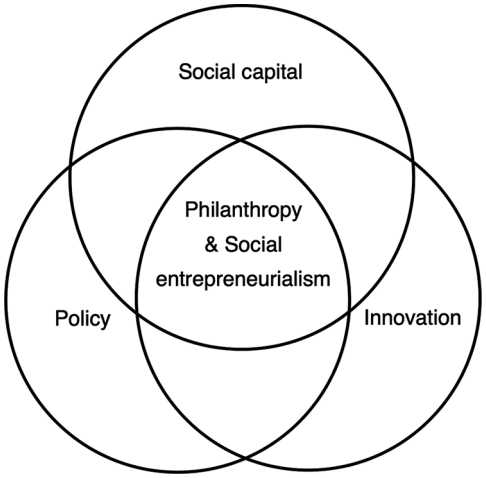

Figure 1. The principal drivers of additional health-care funding and their contextual siting

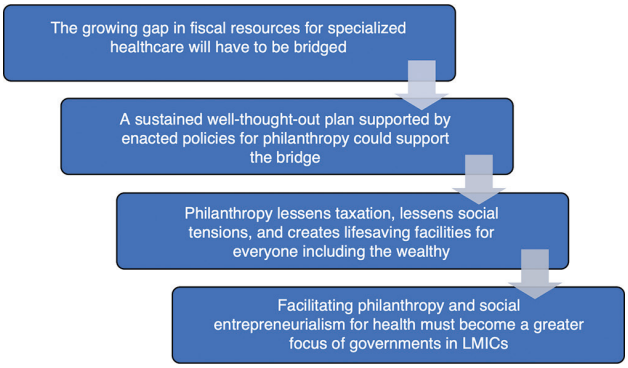

Figure 2. Sustaining equitable healthcare in low- and middle-income countries

Conversely, however, by reducing government revenues, tax concessions for philanthropy reduce the fiscal resources available to governments, potentially requiring other taxpayers to bear an increased tax burden (or resulting in less government expenditure on other policy priorities) (OECD, 2020). A sustained commitment to understanding and creating a well-thought-out place for philanthropy and giving in Jamaica and similar countries must be developed

to bridge the large and growing gap in fiscal resources that specialized healthcare increasingly demands.

Ultimately, this fine balance in the way scarce funding is spent includes the increasingly recognized social-health divide (Papanicolas *et al.*, 2019). While it was previously thought that social spending reduces the need for health spending, the relationship appears more positive in high-income countries, where more social spending is associated with more health spending at a national level. Therefore, more health-care funding will still need to be found as expectations increase and specialization becomes necessary.

7. Proposed practical strategies

In the US, an interesting recent development is the model of a public benefits corporation (PBC). A PBC is a for-profit corporation that produces one or more public benefits and operates in a sustainable manner. It typically focuses on artistic, cultural, economic, educational, environmental, literary, medical, religious, or scientific activities. The for-profit purpose implies that the corporation will be run with the rigor expected of any other for-profit corporation and will have the same requirements and expectations from their shareholders: an enhanced level of accountability and transparency compared to a non-profit organization, which adds to its overall appeal (Wong, 2023). Consequently, it is more attractive as an investment opportunity. Developing the legal framework for a similar structure in Jamaica may make investing in specialized health-care more attractive to Jamaican entrepreneurs. These individuals may be interested in engaging in the health-care space but lack prior experience and may prefer sustained engagement over charitable or non-profit formats, which have less accountability than they are accustomed to.

In line with this, a practical contribution could be the formation of a Jamaican Philanthropic Society for Health. A relevant concept in this discussion is that of normative organizations, developed by Etzioni (1975). Normative organizations, also called voluntary organizations, allow people to pursue their moral goals and commitments. Members are not paid but instead contribute their time or money because they like or admire what the organization does and value the opportunity to be part of its activities. The members of such groups inspire and energize each other, working together to achieve social goals of common interest. Jamaica is already one of the most heavily taxed countries in the Caribbean and Latin American region, with a tax-to-GDP ratio of 27.9% compared to the regional average of 21.7% (OECD, 2023). Additional taxation would be a major disincentive to contributing philanthropically and participating in person. This is a reason to consider philanthropy as a more satisfying way for high-net-worth individuals to participate in funding state projects such as specialized health-care. However, Jamaica's tax efficiency has also been improving over the years, as has been noted in many other middle-income countries in the process of development (Ortiz-Ospina & Roser, 2016). The tax efficiency is now approximately 23.5% of GDP, comparing favorably to the world average (19.3%) and higher than the levels collected in the countries of the Latin American and Caribbean Region (18.4%), the LMICs (18.3%), and other Caribbean Community countries (19.3%) (Arturo Jacobs *et al.*, 2012). Despite this growing efficiency, the cost of specialized healthcare would still be a disproportionately large burden on the available revenues from taxation.

Third, a national insurance health scheme similar to what South Africa is implementing may be an effective way of addressing the inequalities in health-care affordability that presently prevail, increasing access to better healthcare for those who cannot afford it. This subject has been discussed in the local media but has not gained the necessary traction for advancement (Linton, 2019). It is hoped that the South African model will prove successful and catalyze a similar initiative in Jamaica and other small island economies. While not a mechanism to increase inflows of new funding sources, it enables broad-based societal contributions to develop ways of paying for and therefore offsetting, the final cost of specialized healthcare.

These innovations will require government buy-in for the creation of relevant policies to allow their development. In individual countries, it will require access to decision-makers, relationship-building, and the assembly of key stakeholders to achieve the critical mass and momentum necessary to see these major innovations through. Finding an influential champion to take this on will likely be the first critical step in this journey. A potential additional benefit is that an improved specialized healthcare infrastructure could result in a lucrative medical tourism industry. Clients from North America could access high-quality care geographically close to home instead of making long trips to Asia for care that is either unaffordable (as in the US) or subject to long waiting lists (as in Canada) in their home country (Béland & Zarzeczny, 2018). There is currently growing interest in this space.

Quality improvements can also greatly help control the cost of care. Data should be analyzed, patient-centered goals set, checklists used, and standardized protocols created to lessen human error and track progress. As the famous management consultant Peter Drucker once said, "If you cannot measure it, you cannot manage it." (Drucker, 2007, p. 40)." This increasingly applies to the complex world of healthcare administration. More efficient use of resources can help improve life expectancy even without increased expenditure. Inefficient countries would reap the highest benefits from such

spending reorganization (Zarulli *et al*., 2021). Implementing these management principles would help contain the high costs associated with specialized healthcare and should be done hand-in-hand with efforts to raise capital.

Finally, the author has almost completed a qualitative study examining the perspectives of Jamaica's high-net-worth entrepreneurs toward investing in the specialized health-care space, with a particular focus on philanthropy. The aim is to determine to what extent there are Jamaican investors who can contribute enough and share the vision to do so. It is thus hoped that the research findings will help to direct future efforts to attract capital for specialized health-care, where the commitment will not be primarily for a financial return on investment.

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References

Al-Bader, S., Daar, A.S., & Singer, P.A. (2010). Science-based health innovation in Ghana: Health entrepreneurs point the way to a new development path. *BMC International Health and Human Rights*, 10(Suppl 1):S2.

https://doi.org/10.1186/1472-698x-10-s1-s2

Ali, A. (2023). Epilepsy in the Caribbean. 3rd ed., Vol. 3. Netherlands: Wolters Kluwer.

Ali, A., & Clarke, D.F. (2023). Digital measures in epilepsy in low-resourced environments. *Expert Review and Pharmacoeconomics and Outcomes Research*, 24:705-712.

https://doi.org/10.1080/14737167.2023.2270163

Ali, A., Dindoust, D., Grant, J., & Clarke, D. (2021). Delivering epilepsy care in low-resource settings: The role of technology. *Expert Review of Medical Devices*, 18:13-23.

https://doi.org/10.1080/17434440.2021.2013198

Arturo Jacobs, J.W., Paniagua, L.F., & McMorran, R.T. (2012). Status of Recent Tax Reform in Jamaica and Benchmarking Tax System Performance (Leadership in Public Fianncial Management. Available from: https://pdf.usaid.gov/pdf_docs/PA00JD85.pdf [Last accessed on 2021 Mar 28].

Béland, D., & Zarzeczny, A. (2018). Medical tourism and national health care systems: An institutionalist research agenda. *Globalization and Health*, 14(1):68.

https://doi.org/10.1186/s12992-018-0387-0

Buse, K., & Harmer, A.M. (2007). Seven habits of highly effective global public-private health partnerships: Practice and potential. *Social Science and Medicine*, 64(2):259-271.

https://doi.org/10.1016/j.socscimed.2006.09.001

CA Foundation. (2019). CAF World Giving Index. Available from: https://www.cafonline.org/about-us/publications/2019-publications/caf-world-giving-index-10th-edition [Last accessed on 2021 Apr 14].

Christie, G. (2017). Jamaica's Future Choked by Cancer of Corruption. Jamaica Observer. Available from: https://www.jamaicaobserver.com/columns/Jamaica-s-future-choked-by-cancer-of-corruption_93609 [Last accessed on 2021 Apr 19].

Colombo, J.R. (1991). The Dictionary of Canadian Quotations. Queensland: Stoddart.

Darcy, L., & Russell, C. (2014). Finding Balance 2014: Benchmarking the performance of State Owned Enterprisess in Island Countries [Report]. Asian Development Bank. Available from: https://adb.org/sites/default/files/pub/2014/finding-balance-2014.pdf [Last accessed on 2016 May 07].

Dees, J.G., Emerson, J., & Economy, P. (2004). Strategic Tools for Social Entrepreneurs: Enhancing the Performance of Your Enterprising Nonprofit. Vol. 207. United States: John Wiley and Sons.

Dizikes, P. (2016). Rich, Poor have Huge Mortality Gap in US. Available from: https://news.mit.edu/2016/study-rich-poor-huge-mortality-gap-us-0411 [Last accessed on 2016 May 07].

Drucker, P. (2014). Innovation and Entrepreneurship. United Kingdom: Routledge.

Drucker, P.F. (2007). The Practice of Management. Butterworth-Heinemann. Available from: https://books.google.com.jm/books?id=b_jJyfjmDUMC [Last accessed on 2024 Mar 24].

Duquette, N.J. (2018). Inequality and philanthropy: High-income giving in the United States 1917-2012. *Explorations in Economic History*, 70:25-41.

https://doi.org/10.1016/j.eeh.2018.08.002

Etzioni, A. (1975). A Comparative Analysis of Complex Organizations: On Power, Involvement, and their Correlates.

New York: Free Press.

Health Policy Project. (2016). Health Financing Profile: South Africa. Health Policy Project. Available from: https://www.healthpolicyproject.com/pubs/7887/southafrica_hfp.pdf [Last accessed on 2024 Jan 09].

IMF. (2015). IMF Tenth Review of Jamaica [Report]. Available from: https://www.imf.org/external/pubs/ft/scr/2015/cr15343.pdf [Last accessed on 2016 May 15].

Islam, M., Merlo, J., Kawachi, I., Lindström, M., & Gerdtham, U.G. (2006). Social capital and health: Does egalitarianism matter? A literature review. *International Journal for Equity in Health*, 5:3.

https://doi.org/10.1186/1475-9276-5-3

Johnson, J. (2020). "Laws with Bite" - Tufton Launches Inspections of Uncertified Private Hospitals. The Gleaner. Available from: https://jamaica-gleaner.com/article/lead-stories/20200504/laws-bite-tufton-launches-inspections-uncertified-private-hospitals [Last accessed on 2024 Jan 10].

Kawachi, I., Kennedy, B.P., Lochner, K., & Prothrow-Stith, D. (1997). Social capital, income inequality, and mortality. *American Journal of Public Health*, 87(9):1491-1498.

https://doi.org/10.2105/ajph.87.9.1491

Kirby, J. (2014). Why businesspeople won't stop using that Gretzky quote. Available from: https://macleans.ca/economy/business/why-business-people-wont-stop-using-that-gretzky-quote/ [Last accessed on 2024 August 5]

Leora, I.H., Carol, C., Harmony, N.A., & James, R.K. (2020). Quantifying health systems' investment in social determinants of health, by sector, 2017-19. *Health Affairs*, 39(2):192-198.

https://doi.org/10.1377/hlthaff.2019.01246

Linton, L. (2019). Dr. Tufton Tables National Health Insurance Plan Green Paper. Jamaica Information Service. Available from: https://jis.gov.jm/dr-tufton-tables-national-health-insurance-plan-green-paper/#:~:text=and%20Wellness%2C%20Dr.-,the%20Hon.,financial%20protection%20to%20the%20population [Last accessed on 2024 Feb 03].

Linton, L. (2022). Ministry Signs Contracts with Private Health Facilities to Perform Elective Surgeries. Jamaica Information Service. Available from: https://jis.gov.jm/ministry-signs-contracts-with-private-health-facilities-to-perform-elective-surgeries/#:~:text=the%20full%20story,the%20project%20code%20care%20initiative [Last accessed on 2024 Jan 10].

Lundvall, B. (2010). National Systems of Innovation: Towards a theory of Innovation and Interactive Learning. London, UK: Anthem Press.

McCoy, D., Chand, S., & Sridhar, D. (2009). Global health funding: How much, where it comes from and where it goes. *Health Policy Planning*, 24(6):407-417.

https://doi.org/10.1093/heapol/czp026

McElroy, W. (2016). The Revolution of Rising Expectations. The Future of Freedom Foundation. Available from: https://www.fff.org/explore-freedom/article/revolution-rising-expectations [Last accessed on 2021 Apr 03].

McMahon, A. (2008). The Politics of Innovation: A Critical Analysis of the Conditions in Which Innovations in Health Care May flourish. Thesis. Available from: https://usir.salford.ac.uk/14888/1/490160.pdf; https://usir.salford.ac.uk/id/eprint/14888 [Last accessed on 2016 May 11].

Miller, D.L.S., Scheffler, R., Rosenberg, R., & Rupp, A. (2006). Social capital and health in Indonesia. *World Development*, 34(6):1084-1098.

Ministry of Finance. (2014a). PPP Policy for Government of Jamaica. Available from: https://www.mof.gov.jm/documents/documents-publications/search.html?searchword=PPP&ordering=newest&searchphrase=all [Last accessed on2022 May 15].

Ministry of Finance. (2014b). Registered Charities Jamaica. Available from: https://www.jamaicatax.gov.jm/charities [Last accessed on2022 May 15].

Moody, C. (1978). Primary Health Care, the Jamaican Perspective: A Reference Manual for Primary Health Care Concepts and Approaches in Jamaica. Ministry of Health. Available from: https://books.google.com.jm/books ?id=smdgaaaamaaj [Last accessed on 2024 Mar 22].

Moran, M. (2000). Understanding the welfare State: The case of health care. *The British Journal of Politics and International Relations*, 2(2):135-160.

https://doi.org/10.1111/1467-856X.00031

Nishtar, S. (2004). Public-private "partnerships" in health-a global call to action. *Health Research Policy and Systems*, 2(1):5.

https://doi.org/10.1186/1478-4505-2-5

OECD, & CERI. (2010). Social Capital, Human Capital and Health: What is the Evidence? Available from: https://www.oecd.org/edu/ research/45760738.pdf [Last accessed on 2016 May 07].

OECD. (2017). Tackling Wasteful Spending on Health. Available from: https://www.oe.cd/tackling-wasteful-spending-on-health [Last accessed on 2024 May 01].

OECD. (2020). Taxation and Philanthropy POLICY BRIEF. Available from: https://www.oecd.org/tax/tax-policy/policy-brief-taxation-and-philanthropy.pdf [Last accessed on 2024 Jan 09].

OECD. (2023). Revenue Statistics in Latin America and the Caribbean 2023-Jamaica. OECD. Available from: https://www.oecd.org/tax/tax-policy/revenue-statistics-latin-america-and-caribbean-jamaica.pdf [Last accessed on 2024 Mar 23].

Ortiz-Ospina, E., & Roser, M. (2016). Taxation. Our World in

Data. Available from: https://ourworldindata.org/taxation [Last accessed on 2021 Mar 29].

Papanicolas, I., Woskie, L.R., Orlander, D., Orav, E.J., & Jha, A.K. (2019). The relationship between health spending and social spending in high-income countries: How does The US compare? *Health Affair* (*Millwoods*), 38(9):1567-1575.

https://doi.org/10.1377/hlthaff.2018.05187

Philanthropy. (2022). Global Philanthropy Indices. Available from: https://globalindices.iupui.edu/environment-index/index.html [Last accessed on 2024 Feb 24].

Powell, L. (2010). Are we Experiencing an Epidemic of Distrust? Gleaner. Available from: https://jamaica-gleaner.com/gleaner/20100407/cleisure/cleisure3.html

Putnam, R. (2000). Bowling Alone. United States: Simon and Schuster.

Riley, J.C. (2005). Poverty and Life Expectancy: The Jamaica Paradox. Cambridge: Cambridge University Press.

Roelf, W. (2024). South Africa's Ramaphosa will Sign Health Insurance Bill into Law. Available from: https://www.reuters.com/world/africa/south-africas-ramaphosa-says-he-will-sign-national-health-insurance-bill-2024-02-15 [Last accessed on 2024 Feb 29].

Salverda, M. (n.d). Social Return on Investment. Better Evaluation. Available from: https://betterevaluation.org/approach/sroi [Last accessed on 2017 Jan 08].

Say, J. (1855). A Treatise on Political Economy. Available from: https://www.econlib.org/library/say/sayt.html [Last accessed on 2017 Mar 19].

Starr, K., & Hattendorf, L. (2015). The Doer and the Payer: A Simple Approach to Scale. from: https://ssir.org/articles/entry/the_doer_and_the_payer_a_simple_approach_to_scale Last accessed on 2022 May 20].

Statista. (2022). 20 Countries with the Biggest Inequality in Income Distribution Worldwide in 2021, Based on the Gini Index. Available from: https://www.statista.com/statistics /264627/ranking-of-the-20-countries-with- the-biggest-inequality-in-income-distribution /#:~:text=Gini%20Index%20%2D%20countries%20with%20the%20 biggest%20inequality%20in%20 income%20distribution%202021 &text=south%20africa%20had% 20the%20highest,in%20second%20 and%20third%2C%20respectively [Last accessed on 2024 Jan 09].

Stats SA. (2015). How unequal is South Africa? Republic of South Africa: Stats SA. Available from: https://www.statssa.gov.za/?p=12930 [Last accessed on 2024 Jan 10].

Stibich, M. (2020). Healthy Life Expectancy and How Its Calculated. Available from: https://www.verywellhealth.com/understanding-healthy-life-expectancy-2223919 [Last accessed on 2021 Feb 21].

Szeftel, M. (2000). Clientelism, corruption and catastrophe. *Review of African Political Economy*, 27(85):427-441.

https://doi.org/10.1080/03056240008704476

Szreter, S., & Woolcock, M. (2004). Health by association? Social capital, social theory, and the political economy of public health. *International Journal of Epidemiology*, 33(4):650-667.

https://doi.org/10.1093/ije/dyh013

The Health Sector Task Force. (2009). Vision 2030 Jamaica National Development Plan. Available from: https://www.vision2030.gov.jm/wp-content/uploads/sites/2/2020/12/microsoft-word-health.pdf [Last accessed on 2024 Jan 10].

The World Bank. (2023). World Health Organization Global Health Expenditure Database. Available from: https://data.worldbank.org/ indicator/sh.xpd.chex.gd. [Last accessed on 2024 Mar 22].

Transparency International (2022). Corruption Perceptions Index. Available from: https://www.transparency.org/en/cpi/2022?gclid=cjwkcaia-vosbhaae iwaiwr0tweq69gmhz5cij36qyt-yhwnekqsm0cclrgi_67qfqgv_zm 7tjq4xrocbvuqavd_bwe&gad_source=1 [Last accessed on 2024 Jan 09].

Uphoff, E.P., Pickett, K.E., Cabieses, B., Small, N., & Wright, J. (2013). A systematic review of the relationships between social capital and socioeconomic inequalities in health: A contribution to understanding the psychosocial pathway of health inequalities [Journal Article]. *International Journal for Equity in Health*, 12(1):1-12.

https://doi.org/10.1186/1475-9276-12-54

Van Slyke, D.M., & Newman, H.K. (2006). Venture philanthropy and social entrepreneurship in community redevelopment [Article]. *Nonprofit Management and Leadership*, 16(3):345-368.

https://doi.org/10.1002/nml.111

WHO. (2000). The World Health Report 2000-Health Systems: Improving Performance. Available from: https://www.who.int/whr/2000/en [Last accessed on 2021 May 06].

WHO. (2020). Health Adjusted Life Expectancy (HALE). Available from: https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator- group-details/GHO/healthy-life-expectancy-(hale) [Last accessed on 2023 Dec 26].

Wong, B. (2023). Advantages of Turning your Business into a Public Benefit Corporation. Legal Zoom. Available from: https://www.legalzoom.com/articles /advantages-of-turning-your-business-into -a-public-benefit-corporation [Last accessed on 2024 Feb 03].

World Economic Forum. (2024). 10 million reasons for the private sector to invest in social enterprise. Available from: https://www.weforum.org/agenda/2024/01/10-million-reasons-for-the-private-sector-to-invest-in-social-enterprise/ [Last accessed on 2024 August 17].

Zarulli, V., Sopina, E., Toffolutti, V., & Lenart, A. (2021). Health care system efficiency and life expectancy: A 140-country study. *PLoS One*, 16(7):e0253450.

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ACCSCIENCE PUBLISHING

Global Health Economics and Sustainability

PERSPECTIVE ARTICLE

Sustainability of specialized healthcare in economies like Jamaica: Overcoming historical constraints

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Abstract

Small island economies designated as upper-middle-income economies find themselves in the somewhat awkward position of not being viewed as in desperate need of financial support for their healthcare and thus receive severely limited external aid for healthcare. Consequently, countries like Jamaica have had to be self-reliant in funding their health-care systems. This challenge has prompted an early and sustained focus on primary healthcare, recognizing that prevention is better than cure. However, with the success of this strategy and the change in the disease profile from infectious concerns to chronic non-communicable diseases associated with aging, the cost of healthcare has markedly increased. Rapid technological advances in the diagnosis and treatment of specialized conditions have further escalated health-care costs. Funding these increasing health-care costs sustainably is a significant challenge for Jamaica and similarly developed smaller economies, especially given the numerous other demands for scarce funds. One potential solution to this chronic problem is to develop sustainable funding sources within the country, such as through local entrepreneurs and philanthropy. Partnerships for health can be forged, where philanthropic investments play a critical role. This article is the first in a series of two. It explores a relationship between the historical context and the current status of healthcare in Jamaica, which is evaluated in further detail, identifying the existing deficiencies that stem from chronic underinvestment. The second article will discuss the principles of giving, with a focus on philanthropy. Future endeavors will include a formal qualitative study of Jamaica's wealthiest entrepreneurs to assess their interest in philanthropy and their potential to invest philanthropically in specialized healthcare in Jamaica.

Keywords: Healthcare; Small island economies; Middle-income economies; Philanthropy; Social capital; Inequality; Social entrepreneurialism; Innovation; Policy

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1. Introduction

> "Of all forms of inequality, inequality in healthcare is the most inhumane."
> - Martin Luther King

Healthcare is a fundamental human right. However, providing it to those in need remains a significant challenge in lower- and middle-income countries (LMICs), which

must continually balance delivering effective health-care services with limited financial resources. The sustainability of healthcare in LMICs demands innovative approaches that create equitable access to quality medical services with minimal financial investment (Zimlichman *et al.*, 2021). Addressing the immense complexities of health-care sustainability in LMICs will illuminate the persistent, pervasive, and pernicious challenges these countries face and the innovative strategies required to address them (Broomberg, 1994).

The world remains, in many ways, unequal, most often spoken of in terms of inequality in access to financial capital and opportunity (Dzau *et al.*, 2022). This inequality extends to health and healthcare, varying between countries and even within countries, particularly in smaller developing countries with significant income disparities. Across the spectrum of nations, and in the frequently mentioned North-South divide, health-care issues differ (Abu-Zidan & Rizk, 2005). In low-income countries, health problems often stem from trauma and infectious diseases related to inadequate public health infrastructure, leading to poor sanitation and limited access to clean water. Such conditions typically result in the proliferation of disease vectors, such as rats or mosquitoes, causing infectious diseases such as malaria and diarrheal syndromes that often claim the lives of young children or infants, significantly reducing lifespans and quality of life (WHO, 2000a).

As countries like Jamaica develop and improve infrastructure, sanitation, and education, infectious diseases cease to be the primary causes of morbidity and mortality, replaced by chronic noncommunicable diseases such as diabetes mellitus, hypertension, and obesity. These diseases bring well-known, potentially economically devastating consequences, including stroke, heart attacks, and joint disorders (Boume & McGrowder, 2009). In addition, as basic infrastructural and infectious issues are addressed, population demographics shift, and older individuals suffer from diseases associated with aging, including Alzheimer's disease, Parkinson's disease, epilepsy, and osteoarthritis. Lifestyle-related health issues from inactivity, smoking, and alcohol consumption also become prevalent. This shift has been evident in Jamaica, a small island state in the English-speaking Caribbean (Figueroa, 2001).

In Jamaica, an upper-middle-income country, efforts since the 1950s to control infectious diseases by improving infrastructure, water distribution, and immunization against several childhood infectious diseases such as polio, measles, and tetanus have been remarkably successful. These efforts have contributed to a rapid increase in lifespan over the past 70 years (Moody, 1978; Riley, 2005) (Figure 1).

This increase in lifespan has resulted in a change in the disease profile to those more associated with aging and lifestyle choices, representing the "price" of progress (Wilks *et al.*, 1998). Predictably, these disorders have increasingly contributed to health-care costs and now account for most deaths in Jamaica, where the leading causes of death are stroke, diabetes, and ischemic heart disease (Figure 2).

2. History of healthcare in Jamaica

The discussion on the optimal provision of healthcare in Jamaica began almost 200 years ago. During the time of slavery, enslaved people received varying degrees of care at the discretion of the planter. Typically, this provision involved the contractual employment of a medical practitioner who would visit the estate and provide care to the sick enslaved people. Estates often had "hot houses," which were small hospitals on the estate where patients were looked after by black doctors who were not formally licensed (Craton, 1974). With emancipation, many freed slaves continued to work on the estate as "apprentices," allowing them to avail themselves of the medical care provided there. However, once they left the estate, or for those who left immediately after emancipation, they had no access to this care and had to seek medical attention from private medical practitioners at significant personal cost (*Kingston Public Hospital*, 2022). The persisting lack of concern about health-care disparities in countries like Jamaica, with a colonial past rooted in slavery, may be partly attributed to the plantation owners being freed from the responsibility for the health and welfare of their former slaves, and not being required to provide for this benefit when re-engaging them as employees.

Certainly, the disparity as it exists now is not viewed positively by anyone in Jamaican society, but its persistence is an issue of much discussion. It is quite evident that employers in the retail and tourist industries care about their employees' health. However, the fact that this concern does not necessarily extend to the wider populace may indicate that the scale is too great for them to feel they can usefully participate in addressing it. It remains the perception that it is the government's or the individual's responsibility. Two hundred years ago, the emancipation of slaves also meant a significant loss of reliable income for the approximately 200 medical practitioners in Jamaica at that time, leading to great concern about their financial well-being, especially for rural doctors. This loss of income resulted in a marked reduction of medical practitioners on the island by 1900 (Craton, 1974). Years of battle ensued as liberal Jamaicans, including some medical practitioners, sought to establish a medical college in Jamaica that would train and license physicians, including local black doctors. There was substantial pushback both locally and in the

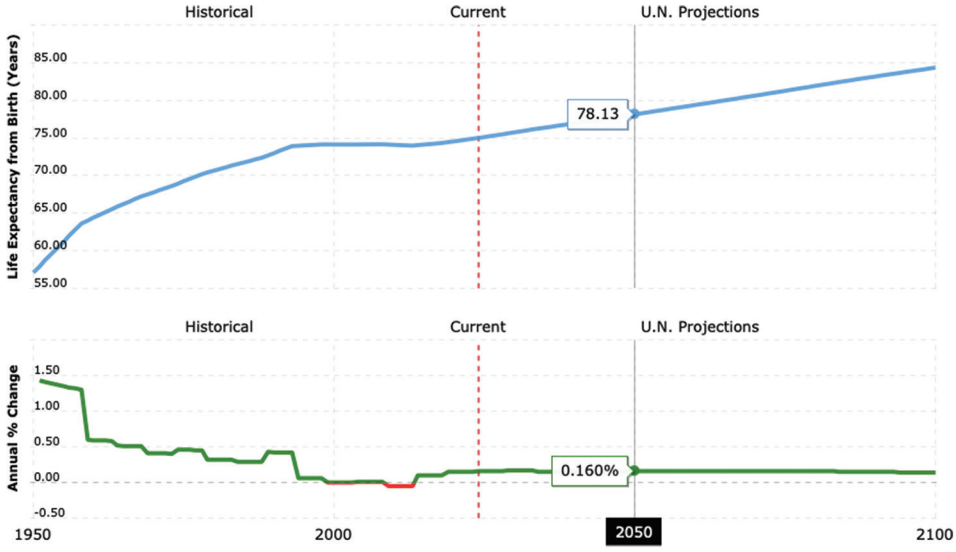

Figure 1. Lifespan over the years: Jamaica life expectancy 1950 – 2100 (Macrotrends, 2023)
Abbreviation: U.N.: United Nations.

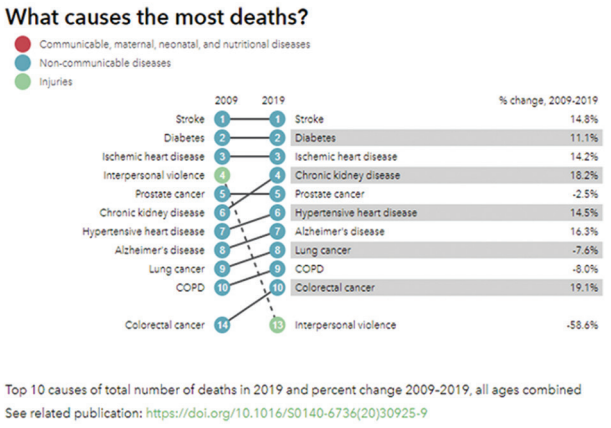

Figure 2. Causes of death in Jamaica, 2009 – 2019 (Institute for Health Metrics: Jamaica) (IHME, 2023)
Abbreviation: COPD: Chronic obstructive pulmonary disease.

"metropole," the UK, with the conservative faction seeking to maintain ethnic and social hierarchies and the liberal lobby advocating for a more integrative and open approach. The plantocracy primarily aligned with the conservative camp, seeking to maintain the social hierarchy to which they were accustomed. Ultimately, some autonomy from the UK was achieved, and later, the Medical Association of Jamaica was established, becoming the first professional organization launched in Jamaica. It became the first overseas branch of the British Medical Association in 1877 (Medical Association of Jamaica, 2024).

For many years thereafter, most physicians went to the UK for their medical training, including postgraduate medical education. In 1948, the same year that the National Health Service was established in the UK—partly to appease a population increasingly disgruntled, leading to events such as the 1938 riots (the year modern Jamaica began, as stated by a former prime minister in his autobiography [Seaga, 2009])—the colonial government finally formed a medical school in Jamaica. The University College of the West Indies enrolled prospective Caribbean medical students who would obtain their medical training and, for several decades, a University of London degree (*The University of the West Indies*, 2023). Postgraduate training continued to be conducted in the UK, although from the 1970s, the United States (US) and Canada became the favored sites for postgraduate training, along with Jamaica itself, where postgraduate training in several specialties also began. Despite these developments, Jamaica's proximity to North America and its status as an English-speaking country have led to a constant brain drain. Many health-care professionals, particularly doctors and nurses, are actively recruited to North America, attracted by better working conditions, opportunities for career advancement, and higher salaries. This brain drain has had a profound and ongoing impact on Jamaica's health-care system (Lofters, 2012).

3. Current economic issues in healthcare in Jamaica

The issue is not only how long we will live but also what our quality of life will be in our later years. How useful is the gain in years of life if they are spent in pain and suffering and as a financial drain on one's own resources and those of our families? Apart from novel viral agents

such as the chikungunya and Zika epidemics in the past decade and the COVID-19 pandemic, good public health has mostly eradicated the scourge of infectious diseases in upper-middle-income countries like Jamaica (Planning Institute of Jamaica & Statistical Institute of Jamaica, 1997). In the UK, 16.1% of healthcare is privately sourced versus 29.5% in Canada and 46.9% in the US. This latter figure is comparable to Jamaica's, where 46.7% of healthcare is privately sourced. Healthcare represents roughly 10 – 12% of GDP in Canada and most European countries and almost 18% in the US. By comparison, in 2015, only 4.8% of Jamaica's GDP could be allocated to healthcare. Despite the small per capita allocation of just US$512, Jamaica ranks 53rd of 191 countries in the World Health Organization (WHO) health-care ranking, underscoring the comparatively low cost of meeting the relatively basic health needs that prolong life (Table 1).

Several measures are applied to evaluating a national health system, with three being the most important: Efficiency, responsiveness, and fairness of financial contribution (FFC). First, consider efficiency, Jamaica is highly efficient, ranking eighth globally regarding the amount spent per capita vs outcomes. This efficiency significantly contributes to Jamaica's relatively good WHO ranking. Canada is 35th, France 4th, and the US a distant 72nd, primarily due to the disproportionate percentage of GDP and the absolute amount of money spent per person (WHO, 2000a). This implies that with proper management of primary healthcare, sanitation, and infrastructure, such as clean water supply, electricity, and personal safety, individuals can achieve a good lifespan.

However, regarding another important measure of the health system's adequacy, responsiveness, or the ability of a person to access medical care in a timely manner, Jamaica performs poorly. The limited number of specialists on the island results in very long waiting lists. In this regard, the US ranks 1st, with significant redundancy in the system to accommodate urgent needs (WHO, 2000a), although even this system was severely tested in the COVID-19 pandemic.

The third intrinsic factor determining the standing of a health-care system is FFC. The goal of FFC is fairness in financing and financial risk protection. FFC, a term created and included in the World Health Report 2000 of the WHO (2000b), defined fairness as an equal burden where every household contributes an equal share of its capacity to pay to the health system. In essence, it is an index of inequality in the burden of health costs across households in different countries.

The principle here is that poor households should not pay a higher share of their discretionary expenditure on health than richer households and that all households should be protected against catastrophic financial losses related to ill health. In this regard, the US does not perform as well as many other Organization for Economic Co-operation and Development (OECD) countries, ranking 55th in the world (Table 1), principally because of the high cost of healthcare in that country. In 2018, 8.5% of the US population was uninsured (U.S. Census Bureau, 2019). Many more are also underinsured, and these subpopulations are at great risk of developing and suffering complications from chronic medical conditions that would, under other circumstances, be prevented or controlled by regular medical attention.

When uninsured or underinsured individuals do get sick and must access care, they are financially vulnerable and often suffer massive financial losses, either personally or affecting their families. Jamaica also performs poorly in this measure, ranking 115th, although the situation

Table 1. Health-care comparison in selected countries of varying development (*N*=191)

Country	% GDP spent (2012)	% privately sourced	Per capita spending (US$)	WHO female lifespan (2015)	WHO health ranking	Fairness of financial contribution (maximum=1) 1997 data[#]	Global Philanthropy Environment Index (GPEI*)/5 2022 (Philanthropy, 2022)
Jamaica	4.8	46.7	512	77	53	0.921 (rank 115)	3.53
USA	17.9	46.9	8,900	81	37	0.954 (rank 55)	4.77
Qatar	1.8	22.5	1,890	80	44	0.944 (rank 70)	2.07
France	11.9	22.2	5,084	85	1	0.971 (rank 27)	4.67
Sweden	9.6	18.9	5,657	84	23	0.976 (rank 13)	4.30
UK	9.6	16.1	4,448	83	18	0.977 (rank 9)	4.18
Canada	11.3	29.5	5,675	84	30	0.974 (rank 18)	4.38
Kenya	4.5	59.1	98	63	140	0.939 (rank 80)	2.87
South Africa	8.9	51.6	1,091	64	175	0.904 (rank 143)	3.80

Notes: [#]WHO World Health Report 2000 (WHO, 2000b); *GPEI: A measure of how well-developed philanthropy is in each country listed above.

may have changed since this data were collected in 1997. This index underscores the vulnerability of many in its population to the potential for extreme economic impacts from intercurrent health events. In the absence of infectious disease, most of these acute events are complications of chronic non-communicable diseases. These events typically require specialized care with expensive technologies and are both human resource and capital intensive.

Increasing lifespan also brings with it the physical consequences of aging. Degenerative disorders are the main areas of health expenditure in the developed world; for example, dementia costs the world US$604 billion/year) (WHO & ADI, 2012). Using dementia as an example, there are nearly 35.6 million cases globally, a number projected to double by 2030 (65.7 million) and triple by 2050 (115.4 million). Currently, 58% of those with dementia live in LMICs, and by 2050, more than 70% of those afflicted will be in these economically disadvantaged countries (WHO & ADI, 2012). Indeed, as shown in Figure 2, Alzheimer's disease is increasing in prevalence and is now the seventh most common cause of death in Jamaica.

This increase in dementia cases must be viewed in the context that extreme longevity is not only possible in Jamaica but also a regular occurrence. Recently, Jamaica had the oldest living person in the world, at the age of 117 years, and over 200 centenarians, with two over the age of 110 years, amongst its population (Jamaica Observer, 2021). Aging, especially advanced aging, brings with it the inevitability of multiple medical comorbidities, adding complexity and cost to the life course of such individuals. Quality of life often deteriorates in the absence of multidisciplinary specialized care (Foley, 2023; Yang *et al.*, 2022).

4. Summary

At this time, several impediments exist to advancing specialized healthcare in countries like Jamaica, including the pernicious legacy of its colonial past and slavery. One of the most significant impediments may well be the natural selection that conferred a survival advantage to those slaves and their descendants who were able to conserve sodium and energy (thrifty gene hypothesis) in settings of scarcity (Rossier *et al.*, 2017). These genetic advantages become disadvantages in settings of abundance and inactivity, leading to the metabolic syndrome associated with central obesity and its consequences (Hoh *et al.*, 2019).

Tremendous strides have been made in primary healthcare, resulting in better health in childhood and early adulthood. The shift from infections to chronic non-communicable diseases and their numerous complications has placed an increasing burden on already strained health services. Ironically, this burden is aggravated by recurrent epidemics and pandemics of viral illnesses, which have contributed to increased inactivity and overeating, as observed during the recent COVID-19 pandemic. Economic inequalities in these countries result in specialized healthcare often having to be paid for out-of-pocket or by private insurance, which may not be possible for many people, predisposing them to significant risks of economic compromises. Various economic models of health-care systems exist in developed countries, such as those in North America. In some cases, specialized healthcare has benefitted from philanthropic and related mechanisms, helping to reduce the economic burden on government health-care systems and, ultimately, on patients (Bishop *et al.*, 2010).

Conceptual innovations for increasing funding, including not-for-profit funding relevant to upper-middle-income countries like Jamaica, will be explored in a separate publication. This forthcoming publication will delineate the social importance of addressing this issue across all sectors of the economy and social strata (Frumkin, 2010; Islam *et al.*, 2006). Together, the present perspective article and the separate publication will frame the context for the research question that has emerged from this background: "Why do Jamaica's high-net-worth entrepreneurs not engage significantly in specialized health-care philanthropy?" Answering this question will provide crucial insights into whether Jamaica's unmet needs in specialized health-care funding can, at least in part, be bridged by philanthropy.

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Conflict of interest

The author declares that he has no competing interests.

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References

Abu-Zidan, F.M., & Rizk, D.E.E. (2005). Research in developing countries: Problems and solutions. *International Urogynecology Journal*, 16(3):174-175.

https://doi.org/10.1007/s00192-004-1278-x.

Bishop, M., Green, M., & Clinton, B. (2010). Philanthrocapitalism: How Giving Can Save the World. United Kingdom: Bloomsbury Publishing. Available from: https://books.google.com.jm/books?id=by37ehey-lgc [Last accessed on 2024 Apr 01].

Boume, P.A., & McGrowder, D.A. (2009). Health status of patients with self-reported chronic diseases in Jamaica. *North American Journal of Medicine and Science*, 1(7):356-364.

https://doi.org/10.4297/najms.2009.7356.

Broomberg, J. (1994). Managing the health care market in developing countries: Prospects and problems. *Health Policy Plan*, 9(3):237-251.

https://doi.org/10.1093/heapol/9.3.237

U.S. Census Bureau. (2019). Health Insurance Coverage in the United States: 2018. Report Number: P60-267(RV). Available from: https://www.census.gov/library/publications/2019/demo/p60-267.html [Last accessed on 2024 Apr 06].

Craton, M. (1974). Death, disease and medicine on Jamaican slave plantations; The example of worthy park, 1767-1838. *Social History*, 9(18):237-255.

Dzau, V.J., Mate, K., & O'Kane, M. (2022). Equity and quality-improving health care delivery requires both. *JAMA*, 327(6):519-520.

https://doi.org/10.1001/jama.2022.0283.

Figueroa, J.P. (2001). Health trends in Jamaica. Significant progress and a vision for the 21st century. *West Indian Medical Journal*, 50(Suppl 4):15-22.

Foley, K.M. (2023). Foreword. In: Goldstein, N.E., Woodrell, C.D., & Morrison, R.S. (eds.). Evidence-based Practice of Palliative Medi*cine*. 2nd ed. Amsterdam: Elsevier, p.xviii.

https://doi.org/10.1016/B978-0-323-84702-5.00086-5.

Frumkin, P. (2010). The Essence of Strategic Giving: A Practical Guide for Donors and Fundraisers. Chicago: University of Chicago Press. Available from: https://search.ebscohost.com.idpproxy.reading.ac.uk/login.aspx?direct=true&db=nlebk&an=336770&site=eds-live&custid=s6477394 [Last accessed on 2016 Feb 10].

Hoh, B.P., Abdul Rahman, T., & Yusoff, K. (2019). Natural selection and local adaptation of blood pressure regulation and their perspectives on precision medicine in hypertension. *Hereditas*, 156:1.

https://doi.org/10.1186/s41065-019-0080-1.

IHME. (2023). What Causes the Most Deaths in Jamaica? Available from: https://www.healthdata.org/research-analysis/health-by-location/profiles/jamaica [Last accessed on 2023 Dec 26].

Islam, M.K., Merlo, J., Kawachi, I., Lindstrom, M., & Gerdtham, U.G. (2006). Social capital and health: Does egalitarianism matter? A literature review. *International Journal for Equity in Health*, 5:3.

https://doi.org/10.1186/1475-9276-5-3.

Medical Association of Jamaica. (2024). Who We Are. Available from: https://www.majdoctors.com/about-us [Last accessed on 2024 Apr 01].

Planning Institute of Jamaica & Statistical Institute of Jamaica. (1997). Jamaica Survey of Living Conditions. Jamaica: Planning Institute of Jamaica.

Kingston Public Hospital. (2022). Available from: https://en.wikipedia.org/wiki/kingston_public_hospital [Last accessed on 2023 Dec 26].

Lofters, A.K. (2012). The "brain drain" of health care workers: Causes, solutions and the example of Jamaica. *Canadian Journal of Public Health/Revue Canadienne de Santé Publique*, 103(5):e376-e378.

https://doi.org/10.1007/BF03404445

Macrotrends. (2023). Jamaica Life Expectancy 1950-2023. Macrotrends. Available from: https://www.macrotrends.net/countries/jam/jamaica/life-expectancy [Last accessed on 2023 Dec 26].

Moody, C. (1978). Primary Health Care, the Jamaican Perspective: A Reference Manual for Primary Health Care Concepts and Approaches in Jamaica. Ministry of Health. Available from: https://books.google.com.jm/books?id=smdgaaaamaaj [Last accessed on 2024 Mar 22].

Jamaica Observer. (2021). Over 200 Centenarians to be Recognised Today. Jamaica Observer. Available from: https://www.jamaicaobserver.com/2021/05/19/over-200-centenarians-to-be-recognised-today [Last accessed on 2024 Apr 01].

Philanthropy. (2022). Global Philanthropy Indices. Available from: https://globalindices.iupui.edu/environment-index/index.html [Last accessed on 2024 Feb 24].

Riley, J.C. (2005). Poverty and Life Expectancy: The Jamaica Paradox. Cambridge: University Press.

Rossier, B.C., Bochud, M., & Devuyst, O. (2017). The hypertension pandemic: An evolutionary perspective. *Physiology* (*Bethesda*), 32(2):112-125.

https://doi.org/10.1152/physiol.00026.2016

Seaga, E. (2009). Edward Seaga My Life and Leadership. Vol. 1. United States: McMillan Publishers.

The University of the West Indies. (2023). Available from: https://www.mona.uwi.edu [Last accessed on 2023 Dec 26].

WHO. (2000a). World Health Organization Assesses the World's Health Systems. Available from: https://www.who.int/news/

item/07-02-2000-world-health-organization-assesses-the-world's-health-systems [Last accessed on 2023 Dec 26].

WHO. (2000b). The World Health Report 2000-Health Systems: Improving Performance. Available from: https://www.who.int/whr/2000/en [Last accessed on 2021 Jun 10].

WHO & ADI. (2012). Dementia: A Public Health Priority. Available from: https://www.who.int/mental_health/publications/dementia_report_2012/en [Last accessed on 2024 Mar 01].

Wilks, R., Bennett, F., Forrester, T., & McFarlane-Anderson, N. (1998). Chronic diseases: The new epidemic. *West Indian Medical Journal*, 47(Suppl 4):40-44.

Yang, C., Lee, D.T.F., Wang, X., & Chair, S.Y. (2022). Effects of a nurse-led medication self-management intervention on medication adherence and health outcomes in older people with multimorbidity: A randomised controlled trial. *International Journal of Nursing Studies*, 134:104314.

https://doi.org/10.1016/j.ijnurstu.2022.104314

Zimlichman, E., Nicklin, W., Aggarwal, R., & Bates, D.W. (2021). Health care 2030: The coming transformation. NEJM Catalyst Innovations in Care Delivery, 2(2):1-11.

https://doi.org/10.1056/CAT.20.0569

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ORIGINAL RESEARCH ARTICLE

The health consequences of child marriage among rural women: Evidence from Igbo-Eze North, South-east Nigeria

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Abstract

Child marriage has emerged as a significant social issue due to its profound health consequences, particularly within rural communities. This study aims to investigate the health consequences associated with child marriage among rural women. Employing a phenomenological approach, this qualitative study collected information from women with firsthand experiences in the communities of Etteh and Enugu Ezike, both situated in the Igbo-Eze North Local Government Area of Enugu State. Data were collected through in-depth interviews conducted with 20 women selected through purposeful sampling. The sample encompassed married women aged 18 – 45 years, with a specific focus on those married before the age of 18. The findings revealed a significant association between child marriage and adverse physical health outcomes, including heightened rates of maternal mortality, inadequate prenatal care, and increased vulnerability to infectious diseases. Moreover, mental health assessments indicated a higher prevalence of anxiety, depression, and post-traumatic stress disorder among women who experienced child marriage. Reproductive health implications were also observed, with a higher incidence of obstetric complications and adverse birth outcomes among this cohort. This study sheds light on the intricate web of health consequences associated with child marriage among women in Nigerian rural communities. The findings underscore the urgency for social work interventions that address the unique challenges faced by young girls in rural communities. Recognizing the long-term repercussions of child marriage is essential for informing evidence-based strategies aimed at improving the health and well-being of affected women and promoting sustainable development in the region.

Keywords: Child; Child marriage; Health consequences; Rural women; Social work

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1. Introduction

Child marriage persists as a deeply rooted social concern, casting a shadow over the health and well-being of countless women globally. Despite concerted international efforts to combat this pervasive issue, the practice continues to endure, particularly in developing regions where cultural norms, economic hardships, and societal structures perpetuate early unions (UNICEF, 2021). The United Nations' Sustainable Development Goal 5, outlined in 2015, incorporates the objective of abolishing detrimental practices,

with a particular focus on eradicating child marriage (United Nations, 2015). This objective is consistent with the principles of the Child Rights Act of 2003 in Nigeria, which concerning child protection, affirms the entitlement of every child to live, grow, develop, and participate optimally in a manner congruent with human dignity and safeguarding. Despite these efforts to eradicate child marriage, available statistics revealed that 30.3% of girls in Nigeria are married before their 18th birthday and 12.3% are married before the age of 15. Moreover, child marriage is particularly common among Nigeria's poorest rural households (World Bank, 2017). Similarly, Madhumita (2022) reported that the proportion of women who married before the age of 18 years in Nigeria's rural areas is more than double that in urban regions. In addition, another study reveals a higher percentage of girls in Nigeria married before their 18th birthday, accounting for 44% (Save the Children International, 2021). These figures imply a continuous increase in child marriage attributed to poverty, ignorance, and illiteracy prevailing in Nigeria's rural communities.

Child marriage contradicts Sustainable Development Goal number 5, as it infringes upon children's human rights, restricts their choices and opportunities, and exposes them to the risks of violence, exploitation, and abuse (UNICEF, 2021). In Enugu State, the Enugu traditional rulers' council has outlawed girl-child marriage ("It's an obnoxious practice", 2021, para. 1) aiming to eliminate this practice in the region. Nigeria, with its status as the most populous country in Africa, grapples with the intricate ramifications of child marriage (Osakinle & Tayo-Olajubutu, 2017), particularly within its rural communities where poverty and limited educational opportunities contribute to its perpetuation (Putri *et al.*, 2021; Banlanjo & Ngalim, 2021).

The phenomenon of child marriage, defined as the union of individuals below the age of 18, poses significant challenges to the social work profession and the broader global community (UNICEF, 2014). It intersects with various social determinants, influencing and perpetuating cycles of poverty, inequality, and gender-based violence. Child marriage not only curtails the educational and economic opportunities of young girls but also jeopardizes their physical, mental, and reproductive health (UNICEF, 2021; Lebni *et al.*, 2023). Despite the severity of these consequences, a comprehensive understanding of the specific health challenges faced by rural Nigerian women who enter marriage before the age of 18 is notably absent from the literature.

The imperative to address the health consequences of child marriage is underscored by the social work profession's commitment to promoting social justice and advocating for the well-being of vulnerable populations. Child marriage, with its profound and lasting impact on women's health, necessitates nuanced exploration to inform evidence-based interventions and policies. While existing research has highlighted the broader implications of early marriage, a focused examination of the health outcomes experienced by rural women is essential due to the unique sociocultural context of the country (Lebni *et al.*, 2023; Hotchkiss *et al.*, 2016).

Maternal mortality rates are disproportionately high among women married during adolescence (Chandra-Mouli *et al.*, 2018). Several studies have demonstrated a direct correlation between early marriage and increased maternal mortality, highlighting the urgent need for targeted interventions to address this pressing concern (Ahmed *et al.*, 2019; Raj *et al.*, 2014; Kohno *et al.*, 2020; Marshall, 1996). Regarding prenatal care, research indicates that child brides often face significant barriers to accessing adequate health-care services during pregnancy (Santhya *et al.*, 2019; Modak, 2019). Factors such as limited autonomy, socio-economic challenges, and restricted mobility contribute to reduced utilization of prenatal care services among this demographic (Nour, 2009; Kidman, 2016). Moreover, child marriage heightens the vulnerability of young girls to infectious diseases, with studies illustrating the association between early marriage and increased susceptibility to health risks, including sexually transmitted infections and HIV/AIDS (Raj *et al.*, 2014; Kidman, 2016; Joint United Nations Program on HIV/AIDS Campaign, 2004).

Studies consistently demonstrate elevated levels of anxiety among women subjected to child marriage, with factors such as lack of autonomy, marital conflict, and social isolation contributing to heightened psychological distress (Raj *et al.*, 2014; Kidman & Palermo, 2015). Furthermore, depression emerges as a prevalent mental health concern among child brides, characterized by feelings of hopelessness, low self-esteem, and impaired social functioning (Nour, 2009; Santhya *et al.*, 2019). The intersectionality of poverty, gender inequality, and early marriage exacerbates the risk of depressive symptoms among affected women (Kidman, 2016; Kamal & Ulas, 2021). Moreover, research indicates a significant association between child marriage and post-traumatic stress disorder (PTSD) symptoms, stemming from experiences of coercion, domestic violence, and sexual abuse within the marital context (Santhya *et al.*, 2018; Kottegoda *et al.*, 2008). Trauma resulting from early marriage perpetuates long-lasting psychological repercussions, affecting women's overall well-being and quality of life (Kidman & Palermo, 2015).

Obstetric complications, such as obstructed labor, fistula formation, and pregnancy-induced hypertension, are prevalent among girls who enter marriage before reaching physical maturity. Child marriage often leads to inadequate pelvis development, increasing the risk of obstructed labor and related complications. The vulnerability of young girls to adverse maternal health outcomes is exacerbated by limited access to healthcare and skilled birth attendants (Raj *et al.*, 2014). Adverse birth outcomes, including preterm births, low birth weight, and neonatal mortality, are closely associated with child marriage. In addition, regarding the sense of loss and solitude in child marriage, victims of child marriage may benefit from forming homophilic relationships to aid in the mental healing process (Vacca *et al.*, 2021). Young girls face heightened risks during pregnancy, resulting in an increased likelihood of delivering preterm or underweight infants. Factors such as maternal malnutrition, inadequate prenatal care, and limited decision-making autonomy contribute to adverse birth outcomes in this demographic (Nasrullah *et al.*, 2014).

Social work, as a profession rooted in advocacy and empowerment, is well-positioned to contribute to understanding and alleviating the health disparities arising from child marriage. This study responds to the call for targeted research in social work to inform practice and policy interventions that address the specific needs of marginalized populations (Salim & Lombard, 2020). By shedding light on the health consequences of child marriage in rural Nigerian communities, this research aligns with the profession's commitment to social justice and the promotion of health equity.

The study holds profound significance for the social work discipline, public health, and broader social development initiatives. By unraveling the intricate health consequences of child marriage among rural Nigerian women, the findings contribute to the evidence base necessary for developing context-specific interventions and policies. The unique sociocultural context of Nigeria, characterized by diverse ethnic traditions, necessitates a focused exploration to inform interventions that are culturally sensitive and responsive to the needs of the affected population.

Moreover, the study's emphasis on rural areas aligns with the principles of rural social work, recognizing the distinct challenges faced by individuals residing in these settings (Hicks & Murray, 2009). Rural communities often confront barriers to accessing healthcare, education, and economic opportunities, exacerbating the health disparities experienced by women who marry early. The insights gained from this research can inform the development of social work interventions that not only address the health consequences of child marriage but also consider the broader sociocultural and economic factors contributing to its persistence in rural Nigerian communities. To explore the health consequences of child marriage, the study is guided by the following specific objectives: (i) to assess the physical health consequences of child marriage among rural women, (ii) to investigate the mental health outcomes associated with child marriage, and (iii) to examine the reproductive health implications of child marriage.

Child marriage remains a complex social issue with far-reaching consequences for the health and well-being of women, particularly in the rural communities of Nigeria. While several studies have been carried out on child marriage in different parts of the world, none has focused on its health consequences in rural communities like Etteh and Enugu-Ezike. Therefore, this study seeks to contribute to the growing body of knowledge within the social work discipline and beyond, by addressing the dearth of comprehensive research on the health implications of child marriage among rural Nigerian women.

1.1. Theoretical framework

For a study on child marriage among rural women in Nigerian communities with a focus on health consequences, several social work theories and frameworks can be considered to guide research and interventions. One suitable theoretical framework is the ecological systems theory, developed by Urie Bronfenbrenner in the 1970s (Bronfenbrenner, 1979). This theory provides a comprehensive lens through which to understand the complex interactions between individuals and their social environments.

Child marriage is a multifaceted issue influenced by individual, family, community, and societal factors. The ecological systems theory allows for a nuanced exploration of how these factors interact and influence outcomes. This theory acknowledges the importance of cultural contexts (microsystem and macrosystem) in shaping behaviors and practices. It provides a framework for understanding how cultural norms and values influence the prevalence of child marriage (Ettekal & Mahoney, 2017). By examining multiple levels of influence, the theory identifies potential intervention points. Understanding the microsystemic factors, such as family dynamics, community expectations, and traditional beliefs surrounding child marriage, provides a foundation for developing interventions that resonate with the cultural nuances. This theoretical approach aligns with broader literature advocating for nuanced and context-specific approaches to address child

marriage (Bappenas, 2017). The microsystem, consisting of immediate interpersonal relationships and cultural contexts, plays a pivotal role in perpetuating or challenging child marriage norms.

Furthermore, the mesosystemic influence of institutions and organizations within the community must be considered. Leveraging existing community structures, like age-grade associations, can serve as a platform for initiating conversations, dispelling myths, and fostering change from within. Uche *et al.* (2023) highlight the effectiveness of community-driven initiatives in South-east Nigeria, emphasizing the importance of strategies that navigate socio-economic barriers and promote equitable healthcare services.

The exosystem, representing external influences indirectly impacting individuals, encompasses societal norms and expectations related to gender roles and marriage. By challenging these norms, interventions can disrupt the cycle of child marriage. However, it is essential to approach this challenge with cultural sensitivity, acknowledging the historical significance and context of these norms (Cornwall & Brock, 2005). Cultural competence in intervention strategies, as advocated by Bappenas (2017), ensures that efforts align with local values.

The macrosystem, representing broader cultural patterns, requires a comprehensive approach to shift societal attitudes toward child marriage. This involves collaborating with religious and community leaders, leveraging their influence to advocate for change. International frameworks, such as the Sustainable Development Goals by the United Nations (2015), provide a global platform to address child marriage by emphasizing the elimination of harmful practices.

Social work interventions can target individuals, families, and community levels, as well as advocate for policy changes at the societal level (World Bank, 2017). The theory recognizes that individuals and their environments are dynamic and evolve. This understanding is crucial for comprehending the changing nature of child marriage practices and tailoring interventions to specific developmental stages (Hicks & Murray, 2009).

2. Materials and Methods

2.1. Study design and participants

This qualitative study utilized a phenomenological approach focusing on a population of married women who entered into marriage before reaching the age of 18. Participants were selected based on specific criteria, including having married before the age of 18, currently residing in Etteh and Enugu-Ezike, and expressing a willingness to participate in the research. Etteh and Enugu-Ezike are towns in the Igbo-Eze North Local Government Area of Enugu State. Etteh is characterized multilingual population encompassing Idoma, Igala, and Igbo languages, while the people of Enugu-Ezike predominantly speak Igbo. The choice of study locations was deliberate as these areas exhibit a high prevalence of child marriage in these areas, which are predominantly agrarian communities. Two villages, namely, Ochigide in Etteh and Aguibeje in Enugu-Ezike were purposively selected for the study. Participants were included based on specific inclusion criteria. The authors used a snowball sampling approach, starting with two known participants in the areas, who then helped recruit other participants. An equal number of participants (10) were selected from Etteh (Ochigide) and Enugu-Ezike (Aguibeje), respectively. Before commencing the interview sessions, the authors provided a comprehensive overview of the study's goals and objectives to the participants. Subsequently, explicit consent, both written and oral, was sought and obtained from each participant. Participants had the option to exit the discussion at any time and request the deletion of their data. Consent from participants was secured before recording the conversation. An interview guide was created, outlining all the themes covered during the interviews, including relevant probes to facilitate discussions on the physical health consequences, mental health effects, and reproductive health implications of child marriage. The authors visited the study location following the approval of ethics by the Institutional Review Board of the University of Nigeria (STRACEP) (UNNEC/05/0022/10-ST03/0024).

2.2. Data collection

Data collection was conducted through in-depth interviews (IDIs) facilitated exclusively by the female author. The IDI guide covered three questions with probes: (i) What are the physical health consequences experienced by rural women as a result of child marriage? (ii) How do mental health outcomes manifest in individuals who have undergone child marriage? (iii) What are the reproductive health implications associated with child marriage? These questions guided the study. The interviews deliberately excluded male presence to encourage participants to freely share their experiences. All interviews were recorded using a recorder, and simultaneous note-taking was conducted. The author initially collaborated with participants to select a quiet venue for the interviews, ensuring privacy and creating an atmosphere conducive to open communication. Participants were guaranteed confidentiality and informed that the information was purely for academic purposes.

To validate the effectiveness of the interview questions, the authors piloted them with four participants in another community, received approval, and modified the questions to enhance the depth and breadth of responses.

Participants were given autonomy to determine the location and timing of the interviews. The duration varied, ranging from 45 to 60 min for each participant. The interviews were conducted in the Igbo language and subsequently translated into English by an expert from the English Department at the University of Nigeria, Nsukka. The authors guided the translator, clarifying any ambiguous sections for a more accurate translation. The author ceased interviews on reaching data saturation, defined as the point where no new information emerged (Marshall, 1996). In this case, data saturation was achieved after 20 interviews. Data collection and analysis spanned from June 2022 to November 2022. Due to insecurity (kidnapping and militancy) in the country, conducting and completing the interviews was delayed. Participants were ensured they had the option to halt interviews or decline to respond to particular questions. Verbal consent was obtained from all participants and permission to use a tape recorder was also secured.

2.3. Data analysis

Descriptive coding was employed to assign descriptive labels to segments of data based on their content or meaning, summarizing the key elements without necessarily using participants' exact words (Braun & Clarke, 2006). In the qualitative research design following phenomenology, thematic categories were established after the transcription and analysis of audio-recorded data (Cresswell, 2013). The transcribed interviews were cross-referenced with the notes taken to ensure no responses were overlooked. Subsequently, the data were manually organized into thematic elements.

The decision to utilize themes was driven by the need for a systematic approach to categorizing responses. The authors employed peer debriefing and observer triangulation as methodological strategies (Padgett, 2009). In the context of observer triangulation, independent analyses were manually conducted by the authors, followed by a comprehensive analysis to ensure proper alignment of quotes and themes.

The peer, aided by the interview guide and concept note of the study, contributed to refining the analysis. Following rigorous adherence to these methodologies, the data were organized into three overarching themes: (i) the physical health consequences, (ii) the mental health consequences, and (iii) the reproductive health implications of child marriage. These themes emerged from the analysis, guided by the research objectives. Pseudonyms were used to conceal the identity of participants. They were numbered 1 to 20. Descriptive analysis was used in the study.

3. Results

3.1. Demographic characteristics of the participants

The study included 20 women participants aged ranging from 18 – 45 years. These women all entered marriage before their 18th birthday and were from the Igbo speaking section of the community. Only four participants had secondary education, while the remaining 16 had primary education. Five of the participants were widows, and the remaining 15 were currently married. In Nigeria, primary and secondary education are considered lower level of education (Table 1 presents more details on participants' sociodemographic characteristics).

3.2. Thematic analysis

3.2.1. Theme 1: Physical health consequences of child marriage among rural women

Our study delved into the physical health consequences of child marriage among rural women. Physical consequences of child marriage in this study refer to the immediate health impacts on a young girl's body due to early marriage, encompassing issues such as early and frequent pregnancies, childbirth strain, and the associated health risks of early sexual activity. Participants shared their first hand experiences, shedding light on issues such as maternal mortality, inadequate prenatal care, and susceptibility to infectious diseases. Further narrating the physical health consequences of child marriage among rural women, participants provided poignant accounts. A participant stated:

> "I lost my best friend during childbirth. She was just 16, married off early. The lack of proper healthcare and her young age took a toll. It's a reality we live with—losing mothers too soon" (Participant 5, 30 years).
> Another participant shared her harrowing experience: "I had complications during delivery. The nearest hospital was too far, and by the time I got there, it was too late. I lost my baby (shakes her head). The fear of losing one's child is a constant worry for us, especially the younger women" (Participant 3, 25 years).

It was also revealed that participants suffered from infectious diseases such as HIV/AIDS and outbreaks as a result of early marriage. One participant recounted:

> "My father was in a haste go give out my younger sister who was 12 in marriage to a 53-year-old man without preliminary medical checks. The man infected her with HIV. She is seriously sick at the moment as a

Table 1. Socio-demographic characteristics of participants

Participant	Age at marriage (years)	Current age (years)	Educational qualification	Marital status	Occupation
1	14	32	Secondary education	Currently married	Trader
2	15	45	Secondary education	Currently married	Farmer
3	11	25	Primary education	Currently married	Housewife
4	15	44	Secondary education	Widowed	Trader
5	12	30	Primary education	Currently married	Farmer
6	12	36	Primary education	Widowed	Trader
7	12	35	Primary education	Currently married	Farmer
8	13	18	Primary education	Currently married	Housewife
9	14	41	Primary education	Currently married	Farmer
10	12	37	Primary education	Widowed	Farmer
11	11	24	Primary education	Currently married	Farmer
12	15	35	Primary education	Currently married	Farmer
13	10	18	Primary education	Currently married	Housewife
14	14	35	Secondary education	Widowed	Trader
15	14	41	Primary education	Currently married	Trader
16	13	33	Primary education	Currently married	Farmer
17	12	24	Primary education	Currently married	Farmer
18	12	28	Primary education	Currently married	Farmer
19	11	38	Primary education	Currently married	Farmer
20	11	39	Primary education	Widowed	Farmer

result of this. We did not notice on time and it has developed to full-blown AIDS. My sister is always crying because of my father's attitude that ruined her life" (Participant 15, 41 years).

Another participant expressed the challenges faced during outbreaks:

> "During outbreaks, it is a nightmare here. I nearly died because of the outbreak. I think more health education is needed, especially for the younger women who might not know much" (Participant 2, 45 years).

Participants also disclosed the lack of awareness regarding prenatal care, often resorting to traditional medicine during pregnancy:

> "When I got pregnant at 15, I didn't know what to do. I didn't even know what prenatal care was when I got married. No one told me. Prenatal care was a luxury; I had no access to it. I wish I had known more about taking care of myself and the baby" (Participant 4, 44 years).

Another participant echoed the sentiment:

> "We don't talk about prenatal care here. It's not a priority. Most of us rely on traditional practices. If only there was more awareness, maybe things would be different" (Participant 7, 35 years).

In addition, participants described the physical toll of early pregnancy on their bodies:

> "Becoming pregnant at such a young age brought its own set of challenges. My body wasn't ready, and the risks were high. It was a journey filled with uncertainties. I have been married for 5 years with four children. I am not aware of family planning and how to ``apply it. My body needs rest. Giving birth almost on yearly basis is not good for me but I cannot control it" (Participant 8, 18 years).

Another participant emphasized the strain of early motherhood:

> "Having a child so young affects your body. I feel weaker, and the toll on my health is evident. It's not easy being a mother when you're still a child yourself. Imagine a child nursing a child" (Participant 13, 18 years).

3.2.2. Theme 2: Mental health consequences of child marriage

The authors investigated the mental health outcomes associated with child marriage, focusing on the prevalence

of anxiety, depression, and PTSD among affected women. Participants revealed that they are being taunted by memories, loneliness, PTSD, and others. Here are their responses:

> "The constant uncertainty about the future is overwhelming. I got married so young, and now every decision feels like a burden. Anxiety creeps in when I think about what lies ahead" (Participant 6, 36 years).
>
> "Being married off so young made me feel isolated, while my friends were still in school, I was navigating married life. Loneliness crept in, and I struggled to connect with others in my age" (Participant 11, 24 years).
>
> "The loneliness is intense. It seems that one is in a different phase of life compared to their peers. It's hard to relate, and that isolation takes a toll on your mental well-being" (Participant 16, 33 years).
>
> "I had dreams, aspirations, but they were shattered by early marriage. Depression set in when I realized I couldn't pursue my goals. It's a constant battle with unmet expectations" (Participant 19, 38 years).
>
> "Depression hits when you see others your age thriving in their pursuits, and you're left dealing with responsibilities beyond your years. It's a silent struggle" (Participant 12, 35 years).
>
> "The early days of my marriage still haunt me. The trauma of being forced into such a life at a young age lingers. It's like reliving those moments in my nightmares" (Participant 14, 35 years).
>
> "Post-traumatic stress disorder (PTSD) is real. The memories of being a child bride, the expectations, the fear – it's a heavy burden to carry. It feels like I can't escape my own past" (Participant 3, 25 years).

3.2.3. Theme 3: The reproductive health implications of child marriage

The findings highlighted the significant health implications of child marriage, particularly concerning reproductive health. Reproductive consequences encompass a broader range of effects on the reproductive health and overall well-being of the individuals involved. This situation includes the impact of early marriage on fertility, maternal and child health, and access to reproductive health-care services. Moreover, reproductive consequences extend beyond the immediate physical aspects to encompass social, economic, and psychological dimensions related to family planning and childbearing. Several participants in the study recounted experiencing obstetric complications and adverse birth outcomes due to underage marriage. Others narrated their ordeals resulting from child marriage. According to them, the reproductive consequences include but are not limited to uterine rupture, preterm birth, inability to control urine, and inability to conceive again. Some women during the interview said the following:

> "I faced complications during my first childbirth. It was not easy for me to push out my baby during delivery because my cervix was yet to develop. The toll it took on my body was immense. Child marriage increases the risk and many of us bear the consequences. Till now, controlling urine is still difficult for me" (Participant 20, 39 years).
>
> "Becoming a mother so early brings complications. Our bodies are not fully developed, and it takes a toll during childbirth. My uterine ruptured and I was rushed to a bigger hospital out of this village. Thank God I and my baby survived it but that was the end of reproduction for me. Since then, I had no other child and I am 43 years now.… it is a silent struggle" (Participant 11, 24 years).
>
> "I experienced preterm birth, and it was a scary experience. The body is not fully developed, and it left a negative impact in my life. Child marriage shouldn't force you into such risks. I just wish my father is here to see my problem. He forced me into this because he believed that marrying off girls early ensures their purity and safeguards family honor" (Participant 15, 41 years).

4. Discussion

While the specific context of child marriage among women in the Etteh and Enugu-Ezike communities in Igbo-Eze North Local Government Area of Enugu State brings unique insights, it is valuable to relate these findings to broader research on child marriage and its health consequences across different regions. The distinctive features of the study area, coupled with its unique cultural background, set apart the repercussions of child marriage examined in this study from those observed in other research endeavors. Existing studies corroborate and augment the findings, offering a more comprehensive understanding of the global implications of child marriage on maternal health, mental well-being, and reproductive health.

Research conducted in various regions, including South Asia, Sub-Saharan Africa, and the Middle East, consistently underscores the adverse maternal health outcomes

associated with child marriage. Studies by Raj *et al.* (2014) and Nour (2009) emphasize the increased risk of maternal mortality, obstructed labor, and obstetric complications among young girls. The findings resonate with the rural Nigerian context, indicating that the challenges faced by young girls in maternal health are not isolated but part of a broader global pattern. All the participants agreed that they experienced one health challenge or the other as a result of child marriage.

Research on the mental health implications of child marriage also spans diverse geographical and cultural contexts. Studies in South Asia, such as the work of Raj *et al.*, (2014) align with the Nigerian findings, highlighting the prevalence of anxiety, depression, and PTSD among young girls. The cross-cultural consistency underscores the global nature of the mental health challenges faced by these women. Cultural competence and the need for context-specific interventions are recurring themes in the global literature on mental health and child marriage. Bappenas (2017) argues for a nuanced understanding of cultural factors influencing mental health outcomes, emphasizing the importance of tailoring interventions to the unique cultural contexts of affected populations. The Nigerian study's focus on culturally competent social work interventions aligns with these broader global recommendations.

Research on the reproductive health implications of child marriage resonates with the Nigerian findings, highlighting the multifaceted challenges young girls face globally. The study by Raj *et al.* (2014) emphasizes the increased risk of adverse birth outcomes and obstetric complications among young girls. The global consensus underscores the urgency of addressing reproductive health challenges within the broader context of child marriage.

Our research findings underscore the multifaceted impact of child marriage on women, encompassing adverse outcomes in physical health, mental well-being, and reproductive health. This finding aligns with Rahman *et al.*, (2013) assertion that an intersection exists between reproductive health and mental well-being, particularly evident during pregnancy. According to them, the journey through early pregnancies and childbirth is a pivotal point where reproductive health and mental well-being intersect. The physical toll of childbirth, compounded by the emotional stressors associated with early pregnancies, has a profound impact on the mental health of women. Anxiety, depression, and other mental health issues often emerge as responses to the unique challenges posed during this critical phase.

The need for community-driven reproductive health clinics finds support in studies from Nepal and Bangladesh (Raj *et al.*, 2014). This study advocates for community-based approaches that prioritize accessibility, cultural sensitivity, and community involvement. The Nigerian findings contribute to this global discourse, emphasizing the universal need for interventions that navigate socioeconomic barriers and promote equitable reproductive health-care services.

Furthermore, the application of the ecological systems theory to the study highlights the interconnectedness of various systems influencing the health consequences of child marriage. The study's focus on the Nigerian context enriches the global discourse by providing nuanced insights into the ecological complexities surrounding child marriage and its broader implications on women's health. The ecological perspective reinforces the need for multifaceted interventions that consider the intricate interplay of factors at different systemic levels. Raj *et al.* (2014) and Nour (2009) highlight parental decisions, economic status, cultural beliefs, and peer relationships as contributing factors to the adverse effects of child marriage, emphasizing the family's role in mental health challenges among young girls.

4.1. Relevance of social work practice

Child marriage among rural women poses significant challenges to their physical, mental, and reproductive health. This study, framed within a social work perspective, holds profound implications for the field of social work practice in Nigeria. By exploring the health consequences of child marriage, with a focus on maternal health, mental well-being, and reproductive health, this study contributes to the evidence base necessary for developing targeted interventions and policies that align with the principles of social justice, empowerment, and community engagement.

The findings related to maternal health underscore the urgency for social work interventions that address the unique challenges faced by young girls in rural Nigerian communities. Maternal mortality rates, inadequate prenatal care, and vulnerability to infectious diseases are not merely health issues; they are social issues deeply rooted in cultural norms, gender inequalities, and economic disparities (Kidman, 2016). Social work, as a profession committed to social justice, must advocate for maternal health as a fundamental human right, emphasizing the need for accessible and culturally sensitive health-care services (Glicken, 2011).

The imperative for social work lies in empowering young girls to navigate the complexities of early marriage by promoting their agency and facilitating informed decision-making regarding their reproductive health. Community-based programs, informed by a social work framework, can educate young girls on maternal health, family planning,

and their rights to healthcare. This approach aligns with the profession's commitment to enhancing individual and community well-being (International Federation of Social Work, 2014).

The study's insights into the mental health outcomes associated with child marriage illuminate the critical need for mental health interventions informed by cultural competence and sensitivity. Anxiety, depression, and PTSD are prevalent among young girls, highlighting the intersectionality of mental health challenges and sociocultural factors (Burgess *et al.*, 2022). Social workers, equipped with an understanding of cultural nuances, can play a pivotal role in addressing the mental health needs of young girls. Culturally competent counseling services, community-based support groups, and awareness campaigns can destigmatize mental health issues and provide a safe space for these women to seek help (Chow *et al.*, 2021). Integrating mental health education into existing community programs aligns with the social work principle of holistic and person-centered care, acknowledging the interconnectedness of mental health with broader societal factors (Salim & Lombard, 2020).

The reproductive health implications of child marriage highlight the socioeconomic barriers that young girls face in accessing essential health-care services. Limited resources, economic constraints, and societal expectations contribute to adverse birth outcomes and obstetric complications (UNICEF, 2021). Social work interventions must address these barriers comprehensively, recognizing that reproductive health is not solely a medical concern but a social and economic one.

Implementing community-driven reproductive health clinics, as suggested by the participants, aligns with the social work principle of community engagement and empowerment (Salim & Lombard, 2020). Social workers can collaborate with local leaders to advocate for policies that prioritize reproductive health services, ensuring their accessibility and affordability. Furthermore, financial support programs can alleviate the economic burden on young girls and their families, promoting equitable access to essential reproductive health-care services.

Furthermore, the study prompts social work scholars to critically examine the effectiveness of existing interventions and policies in addressing the health consequences of child marriage. By adopting a research-informed approach, social work academics can contribute to the knowledge base, refining intervention strategies and policy recommendations for optimal impact.

The study's focus on vulnerable populations, such as young girls, underscores the ethical considerations inherent in social work practice. Social workers engaging in interventions related to child marriage must adhere to ethical principles such as cultural competence, informed consent, and the promotion of self-determination (NASW, 2015). Respecting the autonomy and agency of young girls is paramount, ensuring that interventions are culturally sensitive and empowering rather than coercive.

Moreover, social workers must navigate the potential power imbalances inherent in community-based interventions. Collaborative and participatory approaches, involving the community in decision-making processes, align with ethical principles of social justice and inclusivity (International Federation of Social Workers, 2014). Ensuring that interventions prioritize the well-being and dignity of young girls is central to ethical social work practice.

4.2. Study limitation

The study is limited to only women who married before the age of 18. As a result, it did not capture the views of other women who married at the age of 18 years and above who may have similar or different experiences. Future research could explore this demographic to gain a more comprehensive understanding of early marriage, not necessarily classified as child marriage as in the present study. Despite this limitation, the study provided valuable insights into the health consequences of child marriage.

4.3. Recommendations

Based on the study findings, the authors recommend the following actions:

1. Enhancing access to comprehensive reproductive health services: it is imperative for the government to develop and implement programs aimed at providing rural women, particularly those who experienced child marriage, with increased access to comprehensive reproductive health services. These services encompass family planning, prenatal, antenatal, and postnatal care, and education on reproductive health.
2. Establishment of mental health support programs: non-governmental organizations are encouraged to establish community-based mental health support programs tailored for women who have undergone child marriage. These programs should prioritize providing counseling services, raising awareness about mental health, and reducing the stigma associated with seeking mental health support. Counseling as a primary means of psychological support can serve as a therapeutic avenue for women to express their experiences, cope with trauma, and navigate the challenges associated with child marriage.
3. Implementation of educational initiatives on early

marriage risks: awareness campaigns and educational initiatives should be launched within rural communities to educate families and young individuals about the risks and consequences associated with child marriage. Emphasis should be placed on the impact on physical, mental, and reproductive health to discourage early marriages.

4. Promotion of empowerment and education for girls: there is a pressing need to empower young girls in rural areas through education and skill-building programs. Empowered and educated girls are more likely to make informed choices about their lives, thereby delaying marriage until they are physically and mentally prepared.
5. Collaboration with international organizations: Collaboration with international organizations and non-governmental organizations is essential to leverage resources, expertise, and best practices in addressing child marriage.

5. Conclusion

The study reveals that child marriage is a complex and deeply rooted issue with significant implications for the physical, emotional, and reproductive well-being of women in rural Nigerian communities. The detrimental effects of child marriage on physical health include heightened susceptibility to maternal mortality, prenatal problems, and unfavorable birth outcomes. Furthermore, child marriage has far-reaching mental health consequences that extend beyond immediate difficulties, affecting the daily lives of young girls. Anxiety, depression, and persistent consequences of PTSD symptoms negatively affect their overall well-being. Early child marriage also has potential adverse reproductive health consequences.

Furthermore, the findings of this study on child marriage among women in the Etteh and Enugu-Ezike communities in Igbo-Eze North Local Government Area of Enugu State underscore the urgent need for interventions that are not only culturally competent but also challenge existing norms. Echoing the principles of the ecological systems theory by Urie Bronfenbrenner, which emphasizes the multifaceted influences on individual development, it is crucial to delve deeply into the cultural contexts shaping child marriage practices before proposing transformative interventions.

Challenging cultural norms related to child marriage is imperative for sustainable change. This process involves not only recognizing the deeply ingrained cultural factors but also engaging in a dialog that respects and understands these traditions. By approaching interventions with a profound understanding of the cultural landscape, it is possible to foster meaningful change and contribute to the broader global efforts to eliminate child marriage.

The study has significant implications for the practice of social work. Social workers can play a crucial role in delivering treatments that are culturally sensitive and relevant to the community. These interventions aim to address the underlying causes of child marriage, promoting long-term and effective solutions.

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Conflict of interest

The authors declare that they have no competing interests.

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Conceptualization: Okala Agwu Uche
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Methodology: All authors
Writing – original draft: All authors
Writing – review & editing: All authors

Ethics approval and consent to participate

The study was approved by the Institutional Review Board of the University of Nigeria (STRACEP, No.: UNNEC/05/0022/10-ST03/0024).

Consent for publication

We declare that informed consent of human subjects was obtained for publishing their data in this paper.

Availability of data

All the data used are in the manuscript.

References

Ahmed, S., Li, Q., Liu, L., & Tsui, A.O. (2019). Maternal deaths averted by contraceptive use: An analysis of 172 countries. *The Lancet*, 380(9837):111-125.

https://doi.org/10.1016/S0140-6736(12)60478-4

Banlanjo, N.M., & Ngalim, V.B. (2021). Early girl-child marriage practices among the Moghamo rural communities of Cameroon. *European Journal of Educational Studies*, 6(7):395-406.

https://doi.org/10.5281/zenodo.3526131

Bappenas. (2017). Ringkasan Metadata Tujuan Pembangunan Berkelanjutan (TPB)/Indikator Sustainable Development Goals (SDGs) Indonesia. Kementerian PPN/Bappenas. Available from: https://sdgs.bappenas.go.id/wpcontent/uploads/2017/09/buku_ringkasan_metadata_indikator_tpb.pdf [Last accessed on 2024 Feb 12].

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2):77-101.

https://doi.org/10.1191/1478088706qp063oa

Bronfenbrenner, U. (1979). The Ecology of Human Development: Experiments by Nature and Design. Cambridge: Harvard University Press.

Burgess, R.A., Jeffrey, M., Odero, S.A., Rose-Clarke, K., & Devakumar, D. (2022). Overlooked and unaddressed: A narrative review of mental health consequences of child marriages. *PLOS Global Public Health*, 2(1):e0000131.

https://doi.org/10.1371/journal.pgph.0000131

Chandra-Mouli, V., Camacho, A.V., & Michaud, P.A. (2018). WHO technical consultation on married adolescents. WHO guidelines on preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries. *Journal of Adolescent Health*, 56(5):S3-S22.

https://doi.org/10.1016/j.jadohealth.2018.03.001

Chow, G., Bird, M., Gabana, N., Cooper, B., & Berker, M.S. (2021). A program to reduce stigma toward mental illness and promote mental health literacy and help-seeking in National collegiate athletic association division i student-athletes. *Journal of Clinical Sport Psychology*, 15(3):1-21.

https://doi.org/10.1123/jcsp.2019-0104

Cornwall, A., & Brock, K. (2005). What do buzzwords do for development policy? A critical look at 'participation', 'empowerment' and 'poverty reduction'. *Third World Quarterly*, 26(7):1043-1060.

Cresswell, J.W. (2013). Qualitative Inquiry and Research Design: Choosing among the Five Approaches. United States: SAGE Publication Incorporated.

Ettekal, A., & Mahoney, J.L. (2017). Ecological systems theory. In: *The SAGE Encyclopedia* of Out-of-School Learning. United States: SAGE Publications, p.670-674.

https://doi.org/10.4135/9781483385198.n94

Glicken, M.D. (2011). Social Work in the 21st Century. An Introduction to Social Welfare, Social Issues and the Profession. 2nd ed. United States: SAGE.

Hicks, S.F., & Murray, K. (2009). Structural social work. In: Gray, M., & Webb, S.A., (eds). Structural Social Work. Social Work Theories and Methods. United States: SAGE.

Hotchkiss, D.R., Godha, D., Gage, A.J., & Cappa, C. (2016). Risk factors associated with the practice of child marriage among Roma girls in Serbia. *BMC International Health of Human Rights*, 16(1):6.

https://doi.org/10.1186/s12914-016-0081-3

International Federation of Social Work (IFSW). (2014). Global Definition of Social Work Profession. Available from: https://www.ifsw.org [Last accessed on 2023 Dec 13].

It's an Obnoxious Practice. (2021). The Cable Newspaper. Available from: https://www.thecable.ng/its-an-obnoxious-practice-enugu-traditional-rulers-council-outlaws-girl-child-marriage [Last accessed on 2024 May 14].

Joint United Nations Programme on HIV, AIDS, & World AIDS Campaign. (2004). Women, Girls, HIV and AIDS. Available from https://www.hivinfocus.org/english/docs/global%20%20world%20aids%20campaign%202004%20-%20strategic%20overview%20and%20background%20notes%20.pdf [Last accessed on 2023 Dec 31].

Kamal, S.M., & Ulas, E. (2021). Child marriage and its impact on fertility and fertility-related outcomes in South Asian Countries. *International Sociology*, 36(3):362-377.

https://doi.org/10.1177/0268580920961316

Kidman, R. (2016). Child marriage and intimate partner violence: A comparative study of 34 countries. *International Journal of Epidemiology*, 45(4):1437-1446.

https://doi.org/10.1093/ije/dyv325

Kidman, R., & Palermo, T. (2015). The relationship between parental presence and child sexual violence: Evidence from thirteen countries in Sub-Saharan Africa. *Child Abuse and Neglect*, 51:172-180.

https://doi.org/10.1016/j.chiabu.2015.06.013

Kohno, A., Techasrivichien, T., Pilar, S.S., Dahlui, M., Farid N.D., & Nakayama, T. (2020). Investigation of the key factors that influence the girls to enter into child marriage: A meta-synthesis of qualitative evidence. *PLoS One*, 15(7):e0235959.

https://doi.org/10.1371/journal.pone.0235959

Kottegoda, S., Samuel, K., Emmanuel, S., & Ranjan-Das, M. (2008). Reproductive health concerns in six conflict-affected areas of Sri Lanka. *Reproduction of Health Matters*, 16(31):75-82.

https://doi.org//10.1016/S0968-8080(08)31390-2

Lebni, J. F., Solhi, M., Azar, F. E. F., Farahani, F. K., & Irandoost, S. F. (2023). Exploring the consequences of early marriage: A conventional content analysis, Inquiry, *The Journal of Health Care Organization, Provision, and Financing*, 60: 1-14.

https://doi.org/10.1177/00469580231159963

Madhumita, P. (2022). Child Marriage Twice as Prevalent in Nigeria's Rural Areas than Urban: Report. Down to Earth. Available from: https://www.downtoearth.org.in/news/africa/one-in-every-3-southern-african-children-are-stunted-report-84238 [Last accessed on 2024 Feb 19].

Marshall, M.N. (1996). Sampling for qualitative research. *Family*

Practice, 13(6):522-525.

https://doi.org/10.1093/fampra/13.6.522

Modak, P. (2019). Determinants of girl-child marriage in high prevalence states in India. *Journal of International Women's Studies*, 20(7):374-394.

Nasrullah, M., Muazzam, S., Bhutta, Z.A., & Raj, A. (2014). Girl child marriage and its effect on fertility in Pakistan: Findings from Pakistan demographic and health survey, 2006-2007. *Maternal Child Health Journal*, 18(3):534-543.

https://doi.org/10.1007/s10995-013-1269-z

National Association of Social Work. (2015). Standard and Indicators for Cultural Competence in Social Work Practice. Washington, DC: National Association of Social Work. Available from: https://www.socialworkers.org/linkclick.aspx?fileticket=ponptdebrn4%3d&portalid=0 [Last accessed on 2024 May 15].

Nour, N.M. (2009). Child marriage: A silent health and human rights issue. *Reviews in Obstetrics and Gynecology*, 2(1):51-56.

Osakinle, E.O., & Tayo-Olajubutu, O. (2017). Child marriage and health consequences in Nigeria. *American Scientific Research Journal of Engineering, Technology and Sciences*, 30(1):351-356.

Padgett, D.K. (2009). Qualitative and mixed methods in social work knowledge development. *Social Work*, 54(2):101-105.

https://doi.org/10.1093/sw/54.2.101

Putri, N.D., Achmad, A., & Pulubuhu, D.A.T. (2021). Determinants of child marriage using ecological theory: A literature review. *Budapest International Research and Critics Institute-Journal*, 4(4):8338-8347.

https://doi.org/10.33258/birci.v4i4.2774

Rahman, A., Bunn, J., Lovel, H., & Creed, F. (2013). Association between antenatal depression and low birthweight in a developing country. *Acta Psychiatrica Scandinavica*, 127(2):153-159.

https://doi.org/10.1111/j.1600-0447.2006.00950.x

Raj, A., Saggurti, N., Balaiah, D., & Silverman, J.G. (2014). Prevalence of child marriage and its effect on fertility and fertility-control outcomes of young women in India: A cross-sectional, observational study. *Lancet*, 373(9678):1883-1889.

https://doi.org/10.1016/S0140-6736(09)61574-8

Salim, T.A., & Lombard, A. (2020). The Role of Social Workers in Curbing Girl Marriages: A Famsa Case Study. A Mini Dissertation. South Africa: University of Pretoria.

Santhya K.G., Haberland, N., Ram, F., Sinha, R.K., & Mohanty, S. (2018). Consent and coercion: Examining unwanted sex among married young women in India. *International Perspectives on Sexual and Reproductive Health*, 44(1):1-10.

https://doi.org/10.1363/44e3818

Santhya, K.G., Ram, U., Acharya, R., Jejeebhoy, S.J., Ram, F., & Singh, A. (2019). Associations between early marriage and young women's marital and reproductive health outcomes: Evidence from India. *International Perspectives on Sexual and Reproductive Health*, 35(3):97-110.

https://doi.org/10.1363/ipsrh.35.097.10

Save the Children International. (2021). Results for Children. Annual Report. Available from: https://www.savethechildren.org/content/dam/usa/reports/annual-report/annual-report/2021-annual-report/2021-annual-report-results-for-children.pdf [Last accessed on 2024 May 15].

Uche, O.A., Uzuegbu, C.N., & Uche, I.B. (2023). Strategies that promote sustainability of community development projects in Southeast Nigeria Charity Ngozi UZUEGBU Ijeoma blessing UCHE. *Transylvanian Review of Administrative Sciences*, 68:132-148.

UNICEF. (2014). Child Protection from Violence, Exploitation and Abuse. Available from: https://data.unicef.org/resources/child-protection-violence-exploitation-abuse [Last accessed on 2024 May 15].

UNICEF. (2021). Child marriage: Child Marriage Threatens the Lives, Well-Being, and Futures of Girls around the World. Available from: https://www.unicef.org/protection/child-marriage [Last accessed on 2024 Feb 15].

United Nations. (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. Available from: https://sdgs.un.org/goals [Last accessed on 2024 Feb 10].

Vacca, R., Cañarte, D., & Vitale, T. (2021). Beyond ethnic solidarity: The diversity and specialisation of social ties in a stigmatised migrant minority. *Journal of Ethnic and Migration Studies*, 48:3113-3141.

https://doi.org/10.1080/1369183X.2021.1903305

World Bank. (2017). Educating Girls, Ending Child Marriage. Available from: https://www.worldbank.org/en/news/immersive-story/2017/08/22/educating-girls-ending-child-marriage [Last accessed on 2024 May 15].

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ORIGINAL RESEARCH ARTICLE

The relation between emotional intelligence, resilience, and burnout in Portuguese individuals

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Abstract

According to the literature, the way through which individuals manage their emotions when faced with challenging situations plays a major role in their personal and professional success and can act as a protective factor against burnout. With the aim of understanding the relationship between the perception of emotional intelligence (EI), resilience (Rs), and burnout syndrome (BS), 1363 individuals aged between 16 and 84 were studied. Of this sample, most of the participants are female, living in the center of mainland Portugal, single, with a degree, employed in the social area, with an open-ended contract, and with a salary of between 1001 and 1500 euros per month. The Wong and Law Emotional Intelligence Scale, the Brief Resilience Coping Scale, and the Oldenburg Burnout Inventory were applied in the questionnaire administered to the participants in person and through Google Forms. The results of the bivariate correlation analysis showed positive correlations between EI and Rs, both in the overall values of EI and in their four dimensions; and negative correlations among EI and BS, both in the overall values of EI and BS, in the four dimensions of EI and in the two dimensions of BS, and between Rs and BS, both in the overall values and in the two dimensions of BS. In conclusion, the higher the perception of EI and Rs, the lower the perception of BS, and vice versa. Therefore, the promotion of positive emotional skills is fundamental as a preventive strategy to combat burnout.

Keywords: Emotional intelligence; Resilience; Burnout; Correlation study

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1. Introduction

According to Goleman (2010), emotional intelligence (EI) translates into an individual's ability to recognize their own feelings and those of others, through the acquisition and development of personal and social skills. According to Rodrigues *et al.* (2011), the concept of EI can be represented according to two conceptual models: the aptitude model and the dispositional model. The aptitude model is based on a conceptualization that gives EI a cognitive character, viewing it as a set of specialized skills for processing emotional information. According to this approach, EI consists of a construct reified in four interrelated aptitudes, using perceived emotions to facilitate understanding and management of emotions and thinking. The hierarchical and increasingly complex functioning of these processes plays an important role in facilitating thinking and optimizing the individual's performance, contributing to their emotional and intellectual development. In contrast, the dispositional model views EI as a construct

of a dispositional nature, and therefore more based on personality characteristics than on the sphere of cognitions, that is, EI represents a composite construct that includes individual dispositions (domain of personality and affections), but also cognitive and motivational aspects that are responsible for the perception, assimilation, understanding, and management of emotions, processes that contribute to the subject's adaptive functioning in the face of the demands of their environment (Rodrigues *et al.*, 2011). The relevance of EI is well documented in the literature. It boosts individuals' social effectiveness – individuals with greater levels of EI are more likely to engage in positive social relationships, avoid conflicts, be more satisfied with their networks, and have a higher perception of support (Mayer *et al.*, 2004), is positively related to better work performance and mental health (Bar-On, 2006; Druskat *et al.*, 2005), to better chances of achieving success in personal and professional lives (Barros, 2011; Fortes, 2016; Goleman, 2010; 2021), and to greater job satisfaction and collective well-being (Andrade, 2001).

Luthar *et al.* (2000) define resilience (Rs) as a dynamic process of positive adaptation of the individual to situations considered adverse. This concept encompasses two dimensions: the individual's exposure to significant/severe threats and their ability to adapt. Since Rs is defined as a processual characteristic, resulting from the interaction between the individual and their environment, the levels of perceived Rs are associated with the situations; they face in their process, allowing them to accumulate resources (Artuch-Garde *et al.*, 2022). Hu *et al.* (2015) explain Rs as the ability to recover from negative emotional experiences and the flexibility to adapt to the demands resulting from stressful experiences. The American Psychological Association (APA, 2023) recognizes Rs as a process and result of positive adaptation to challenging and difficult life experiences, which is achieved through emotional, mental, and behavioral flexibility and adjustment to internal and external requirements. In this process, coping represents the way in which individuals deal with stressful experiences (Muller *et al.*, 2021). It can be characterized by action or inaction, namely, by adopting an attitude of confrontation or avoidance, using strategies to reduce the negative effects of stress on personal well-being—for example, by avoiding the situation, creating a new meaning for the problematic experience, devaluing the stressor, focusing solely on solving the problem, denying the existence of the problem, reducing the importance of the stressful situation, recreating oneself with a view to personal change, daydreaming, focusing on emotions, among others. Sinclair & Wallston (2004) state that the concept of coping is fundamental to understanding an individual's capacity for Rs, noting that coping occurs at a given moment, while Rs takes place over time. The main characteristic that distinguishes Rs coping from proper coping is the ability to promote positive adaptation despite a high level of stress.

Armstrong *et al.* (2011) state that EI can be interdependent with Rs, saying that the ability to perceive, access, and regulate emotions can help develop self-regulatory processes (emotion and motivation), enabling individuals to cope adaptively with a more stressful work environment and make adjustments to achieve predefined goals. In 2011, Trindade carried out a study on the relationship between EI and Rs in university students and found that there was a positive and significant relationship between the two constructs. López-Angulo *et al.* (2022) also carried out a study on the relation between teachers' EI and their Rs during the distance learning period and concluded that teachers' EI and Rs are essential for coping with educational adversity and the challenges that arise as a result of an unstable context.

Saveca *et al.* (2020) define stress as a "complex set of dynamic phenomena and not just the consequence of a single external event acting on a person" (p.4). In this sense, stress can be referred to as interactive (*i.e.*, interaction between the subject and their work environment) or transactional (*i.e.*, referring to interactions and emotional reactions between the person and the environment). In the case of occupational stress, this is, according to Rocha (2020), related to instability in the workplace and can be boosted by pressure, economic problems, sudden changes in professional/private life, extreme demands, family, and health problems. Stress affects, in addition to the health of professionals, the quality and productivity of work and can be enhanced when the individual faces a stressful work environment and has limited tools to face these challenges (Sinval *et al.*, 2019). According to some studies, one of the most alarming consequences of occupational stress is burnout and it translates into a mismatch between the worker's motivations and expectations and the resources available to address them. For Maslach *et al.* (1997), burnout syndrome (BS) is characterized by emotional exhaustion (feeling of physical and psychological exhaustion), depersonalization (cold and indifferent attitude towards others), lack of achievement of personal goals, feeling of failure, and reduced self-esteem, causing the affected individuals to feel emotionally detached and to give up on professional performance. This same idea is shared by other authors (Badger *et al.*, 2008; Baum, 2012; Finklestein *et al.*, 2015; Molnar *et al.*, 2020) who consider that the higher the BS levels, the lower the capacity for empathy.

Soares (2014) studied the relationship between EI and burnout among undergraduate and master's students at a Portuguese university and found a strong negative relationship between EI and academic effectiveness. Fiorilli *et al.* (2020) also assessed the role that EI plays in preventing school burnout and concluded that students with a higher level of EI were less likely to experience school anxiety, more resilient, and consequently at a lower risk of school burnout. In 2021, Gaspar carried out a study with 392 student-workers and found that high levels of EI have positive implications in the work context, specifically greater job satisfaction, happiness and occupational well-being, better professional performance, high problem-solving capacity and control in high-stress situations, showing a lower predisposition to BS. Thus, workers with high levels of EI are more able to understand the causes of their stress and mobilize strategies that allow them to cope better with these situations, thus reducing the negative consequences of stress. Villanueva *et al.* (2022), in a study with pre-adolescents, confirmed that when EI and self-esteem traits are high and stress traits are low, there is more satisfaction with life and fewer physical complaints. Geraci *et al.* (2023) investigated EI, burnout, commitment to work and self-efficacy during the remote teaching period caused by the COVID-19 lockdown and concluded that there were negative effects of the pandemic on self-efficacy, commitment to work, and burnout in teachers, with the latter varying according to their levels of EI, showing that EI can characterize the way teachers face the different stressful challenges they confront on a daily basis. As for the relationship between burnout and Rs, Augusto-Landa *et al.* (2022) studied how EI affects levels of stress, anxiety, depression, and coping strategies in university students and found that there is a relationship between EI and levels of anxiety, depression, and stress, as well as an influence of EI on the use of adapted coping strategies. Furthermore, Ogunsanwo & Bukki (2023), in their study among university students, found negative correlations between academic stress and EI, and positive ones between academic stress and Rs. Other studies, on social and health professionals, reached the similar conclusions. Ferreira, in 2022, found high levels of stress and emotional fragilities in these professionals that impacted on their professional practices (Ferreira, 2022). Furthermore, according to a study by Freitas *et al.* (2023) carried out in Portugal with 603 individuals, occupational stress has a significantly positive effect on turnover plans, and burnout mediates this relationship. According to these authors, the most critical dimensions of occupational stress are work overload, stress caused by managers and career and remuneration. In addition, Jesus *et al.* (2023) studied 1172 health professionals working in public and private sector organizations in Portugal with the aim of investigating the effect of burnout on suicidal behavior and the mediating effect of self-esteem on this relationship. They concluded that these professionals show a high level of burnout and that exhaustion and disengagement positively and significantly affect suicidal behavior.

Many studies on these concepts have been carried out, but few have looked at the relationship between them. This study was developed in response to this gap. Given the current context of crises (*i.e.*, pandemic, war, economic crisis, *etc.*) in which we live and whose threats and risks affect our daily lives, we tried to understand how the perception of EI and Rs are correlated to burnout of a sample of Portuguese individuals aged 16 or over and with at least a third-level education. Based on the literature, a hypothesis was formulated: the higher the perception of EI and Rs, the lower the perception of occupational stress. In this way, the study is relevant for understanding how the concepts are related and for being able to provide theoretical and practical guidelines for intervention, to design and implement actions aimed at promoting the perception of well-being and reducing the costs that occupational stress and burnout brings to the individual, the company/institution and to health, both general and economic, reducing the so-called indirect costs. In this context, the results of this study also represent an essential variable for future fields of research, particularly on the role of EI and Rs in preventing burnout in Portuguese individuals.

2. Materials and methods

2.1. Sampling procedure and study participants

This study was carried out on Portuguese individuals aged 16 or over and with at least a third-level education (inclusion criteria). The individuals were selected for convenience. An online questionnaire survey was drawn up using the Google Forms program, which was then shared on social networks, sent through email, and distributed in paper format, to participants for anonymous self-completion, between January and March 2023. Informed consent (drawn up in accordance with the Personal Data Protection Act – Law no. 58/2019 of August 8 – and respecting ethical standards and guidelines) was obtained, and permission was sought from the participants. Regarding the procedure for administering the questionnaire online, all individuals who read the study on social media and contacted the team by email were sent an informed consent form. After the teams received the signed informed consent, the link of Google Forms was sent. Informed consent was reiterated on the Google Forms. Several institutions volunteered to take part in the procedure for administering the questionnaire

in paper format. The emails were sent to these institutions and a day and time were agreed to the investigator go on site to administer the questionnaires. Before the protocol was applied, informed consent was signed.

The sample consisted of 1363 individuals, of whom 25.1% were male (n = 342) and 74.6% female (n = 1017), aged between 16 and 84 (35.69 ± 14.63). The majority of them lived in central Portugal (n = 1032; 75.7%), were single (n = 737; 54.1%), had a university degree (n = 535; 39.3%), were employed in the social sector (n = 494; 36.2%), had an open-ended contract (n = 625; 45.9%), and earned between 1001 and 1500 euros a month (n = 333; 24.4%) (national average salary 1438 euros, NSI, 2023) (Table 1).

2.2. Materials and tools

A protocol consisting of a sociodemographic questionnaire, the Wong and Law Emotional Intelligence Scale, the Brief Resilience Coping Scale, and the Oldenburg Burnout Inventory (OLBI) was used.

The sociodemographic questionnaire consisted of eight general data questions, such as gender, age, area of residence, marital status, educational qualifications, occupation, type of contract, and salary.

The Wong and Law Emotional Intelligence Scale (Wong & Law, 2002) was translated and adapted for the Portuguese context by Rodrigues *et al.* in 2011. The WLEIS (Wong and Law Emotional Intelligence Scale) is a self-report instrument made up of 16 positive items, which assesses four dimensions: (1) Evaluation and expression of one's own emotions (items 1, 2, 3 and 4; e.g., "I understand my emotions well."); (2) evaluation and recognition of emotions in others (items 5, 6, 7, and 8; e.g., "I am a good observer of other people's emotions."); (3) regulating one's own emotions (items 13, 14, 15, and 16; e.g., "I can control my emotions well."); and (4) using emotions to facilitate performance (items 9, 10, 11 and 12; e.g., "I am a self-motivated person.") (Rodrigues *et al.*, 2011). Each of the sub-dimensions is made up of four items, assessed using a five-point Likert scale, from 1 'Strongly Disagree' to 5 'Strongly Agree,' with 3 being the middle point. In the study carried out in the Portuguese population (Rodrigues *et al.*, 2011), the instrument showed good internal consistency, both in terms of the overall scale (α = 0.82) and the four sub-scales 'Evaluation and expression of own emotions' (α = 0.84), 'Evaluation and recognition of emotions in others' (α = 0.80), 'Regulation of own emotions' (α = 0.89) and 'Use of emotions to facilitate performance' (α = 0.73). In the present study, the measure showed adequate validity and reliability, having extracted the four theoretically predicted factors, with Cronbach's alphas ranging from 0.93 ('Regulation of own emotions')

Table 1. Sociodemographic characteristics of the sample (n=1363)

	M	SD
Age (years)	35.69	14.63
	n	**%**
Gender		
Male	342	25.1
Female	1017	74.6
Other	4	0.3
Location of residence		
North	50	3.7
Center	1032	75.7
South	245	18.0
Archipelagos	36	2.6
Marital status		
Single	737	54.1
Married/Living together	510	37.4
Separated/Divorced	104	7.6
Widow	12	0.9
Educational level		
Basic (9th year)	90	6.6
Secondary (12th year)	397	29.1
Professional-Technical Course (12th year)	134	9.8
Degree	535	39.3
Masters	183	13.4
Doctorate	23	1.7
Occupation		
Unemployed	48	3.5
Employed in the social area	494	36.2
Employed in another area	515	37.8
Retired	23	1.7
Student	283	20.8
Contract type		
Without a term	625	45.9
With a term	241	17.7
Service provision	70	5.1
Trainee	59	4.3
Other	71	5.2
No framework	297	21.9
Salary		
From 500 euros	36	2.6
501 – 700 euros	116	8.5
701 – 1000 euros	301	22.1
1001 – 1500 euros	333	24.4
1501+euros	189	13.9
I prefer not to answer	69	5.1
No framework	319	23.4

Note: M: Mean; SD: Standard deviation; n: Number of participants; %: Percentage.

to 0.86 ('Evaluation and recognition of emotions in others' and 'Use of emotions to facilitate performance'). Studies using this scale have shown predictive validity in relation to important organizational variables, such as satisfaction and performance, as well as convergent validity with other EI measures and discriminant validity in relation to personality variables (Law *et al.*, 2004; Wong & Law, 2002).

The Brief Coping Resilience Scale (Sinclair & Wallston, 2004) was translated and adapted for the Portuguese population by Ribeiro & Morais in 2010. The EBCR is a one-dimensional self-report scale made up of four items that seek to understand the individual's ability to cope with stress in an adapted way ($\alpha = 0.53$). The items are answered using a five-point Likert scale (from 1 'Almost Never' to 5 'Almost Always'). All the items are worded positively (e.g., 'I believe I can grow positively by dealing with difficult situations'). In the present study, it had a Cronbach's α of 0.78.

The OLBI (Demerouti & Nachreiner, 1998) was translated and adapted for the Portuguese context by Sinval *et al.* in 2019. The OLBI is a self-report scale made up of 16 items that assess two dimensions: detachment (items 1, 3, 6, 7, 9, 11, 13 and 15; e.g., "I increasingly talk negatively about my work"; $\alpha = 0.91$) and exhaustion (items 2, 4, 5, 8, 10, 12, 14 and 16; e.g., "After work I feel tired and without energy"; $\alpha = 0.87$) (total OLBI, $\alpha = 0.93$). It has inverted items (1; 5; 7; 10; 13; 14; 15; 16). The items are answered using a five-point Likert scale (from 1 'Strongly Disagree' to 5 'Strongly Agree') (Sinval *et al.*, 2019). In this study, the inventory showed adequate reliability, with Cronbach's alphas ranging from 0.85 (Distancing) to 0.91 (Total Burnout).

2.3. Statistical analysis

The data collected were entered into the EXCEL program and the results were statistically processed using the SPSS program (Statistical Package for the Social Sciences version 28.0 of 2021 for Windows).

3. Results

3.1. EI

The 1363 individuals who took part in the study showed that they are above average (3) in terms of overall EI (M = 3.73). In terms of assessing their own emotions, they showed that they can make a good assessment of their emotions daily (M = 3.88). Regarding assessing and perceiving the emotions of others, most participants chose option 4 (agree) (M = 3.95), showing that they can accurately assess the emotions of others. In terms of using own emotions to facilitate performance, the participants showed greater weakness compared to the previous domains (M = 3.33), although the results were not statistically significant. As for the regulation of own emotions, most of the participants responded the questions by choosing 4 (agree) (M = 3.76) and were also above average in this dimension (Table 2).

3.2. Rs

About coping, the majority of the participants answered 3 (Often), revealing a median coping (M = 3.21), *that is*, that they use adapted coping strategies on a daily basis (Table 3).

3.3. Burnout

Participants were above average (2) for total burnout (M = 2.40). The values for detachment (M = 2.32) and exhaustion were also above average (M = 2.48). In this parameter, the higher the value, the greater the individual's perception of BS (Table 4).

3.4. Bivariate correlation

From the bivariate correlation analysis, there were positive correlations between EI and Rs ($p = 0.000$), both in the overall EI values and in the four dimensions that make it up (evaluation and expression of own emotions; evaluation and recognition of emotions in others; regulation of own emotions; and use of emotions to facilitate performance) and negative correlations between EI and BS ($p = 0.000$), both in the overall values of EI and BS, in the four dimensions of EI and in the two dimensions

Table 2. Emotional intelligence of participants

	M	SD
WLEIS-Assessment of your own emotions	3.88	0.66
WLEIS-Assessment of others' emotions	3.95	0.56
WLEIS-Regulation of one's own emotions	3.76	0.71
WLEIS-Use of emotions to facilitate performance	3.33	0.77
WLEIS-Total	3.73	0.48

Notes: M: Mean; SD: Standard deviation.

Table 3. Resilience of participants

	M	SD
EBCR_Total	3.21	0.76

Notes: M: Mean; SD: Standard deviation.

Table 4. Burnout of participants

	M	SD
OLBI_Distancing	2.32	0.51
OLBI_Exhaustion	2.48	0.46
OLBI_Total	2.40	0.43

Notes: M: Mean; SD: Standard deviation.

of BS (detachment, and exhaustion), and between Rs and BS (p = 0.000), both in the overall values and in the two dimensions of BS (Table 5). Only the correlation between total EI and Rs shows a moderate value, while the other correlations are weak.

4. Discussion

The aim of this study was to understand the relationship between the perception of EI, Rs, and BS in a sample of Portuguese individuals aged 16 or over and with at least a third-level education.

According to Bar-On (2006), to be emotionally intelligent, one must have the capacity for self-knowledge and relationships with others, effective management of the demands, challenges, and pressures of everyday life, based on the capacity for self-awareness, to identify strengths and weaknesses and to better express feelings, as well as the ability to identify the emotions, feelings and needs of others, with a view to establishing cooperative relationships, in order to solve problems and make decisions that benefit all parties. In this study, the sample showed a high average perception (M = 3.73) of EI, more specifically, individual ability to understand and express their own emotions, ability to observe and understand the emotions of others, and ability to regulate their own emotions, and average ability to direct emotions to facilitate performance (M = 3.33). The results showed that the Portuguese participants perceive that they can understand, evaluate, and analyze their own

Table 5. Bivariate correlation between emotional intelligence0. resilience and burnout syndrome

	WLEIS1	WLEIS2	WLEIS3	WLEIS4	WLEIS–Total	EBCR–Total	OLBI1	OLBI2	OLBI–Total
WLEIS1									
Correlation	1	0.311**	0.410**	0.394**	0.751**	0.340**	−0.231**	−0.304**	−0.299**
Sig.		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WLEIS2									
Correlation		1	0.238**	0.237**	0.588**	0.277**	−0.194**	−0.096**	−0.167**
Sig.			0.000	0.000	0.000	0.000	0.000	0.000	0.000
WLEIS3									
Correlation			1	0.325**	0.719**	0.450**	−0.308**	−0.324**	−0.355**
Sig.				0.000	0.000	0.000	0.000	0.000	0.000
WLEIS4									
Correlation				1	0.733**	0.415**	−0.209**	−0.309**	−0.289**
Sig.					0.000	0.000	0.000	0.000	0.000
WLEIS–Total									
Correlation					1	0.536**	−0.337**	−0.380**	−0.402**
Sig.						0.000	0.000	0.000	0.000
EBCR–Total									
Correlation						1	−0.307**	−0.324**	−0.271**
Sig.							0.000	0.000	0.000
OLBI1									
Correlation							1	0.579**	0.900**
Sig.								0.000	0.000
OLBI2									
Correlation								1	0.977**
Sig.									0.000
OLBI–Total									
Correlation									1
Sig.									

Note: ** Correlation is significant at the 0.01 level (2–tailed).
Abbreviations: WLEIS1: WLEIS–Assessment of one's own emotions; WLEIS2: WLEIS–Assessment of the emotions of others; WLEIS3: WLEIS–Regulation of one's own emotions; WLEIS4: WLEIS–Use of emotions to facilitate performance; OLBI1: OLBI–Distancing; OLBI2: OLBII–Exhaustion; Correlation: Pearson's correlation; Sig.: significance (2–tailed).

and others' expressions and emotions, and that these skills are essential for professional performance and emotional well-being, enabling them to deal assertively with problem-solving and decision-making.

As for the levels of Rs, the participants perceive that they can maintain reasonable levels of adaptation and coping, adopting adaptive strategies in the course of their work.

As far as BS is concerned, it was found to be medium/high (M = 2.40) in terms of both the ability to emotionally detach and the perception of exhaustion. This means that, similar to the results found in other studies (Augusto-Landa *et al.*, 2022; Ferreira, 2022; Ogunsanwo & Bukki, 2023; Vasconcelos, 2021), the participants showed some weaknesses in detachment and indicators of exhaustion.

When the relationship between the three dimensions (EI, Rs, and BS) was evaluated, there were positive correlations between EI (overall, evaluation and expression of own emotions; evaluation and recognition of emotions in others; regulation of own emotions; and using emotions to facilitate performance) and Rs, and negative correlations between EI (overall value and in the four dimensions) and BS (overall, detachment, and exhaustion), and between Rs and BS (overall values and in the two dimensions), showing that the higher the perception of EI and Rs, the lower the perception of BS, and vice versa. These results are in line with Mayer *et al.* (2004) who mention that EI boosts individuals' social effectiveness; Bar-On (2006) and Druskat *et al.* (2005) who show that EI is positively related to better performance at work and mental health; and Goleman (2010) who reports that people with greater emotional competencies are more likely to achieve success in their personal and professional lives. Andrade (2001) also states that EI can enhance individual and collective well-being, such as the psychological functioning of the individual, the functioning of the organization and productivity, interpersonal relationships, the environment, perspectives, rewards, and work regimes, and reduce BS. Muller *et al.* (2021) report that coping represents the way the individual deals with stressful experiences, so the more Rs the individual has (strategies to reduce the negative effects of stress on personal well-being), the less likely they are to develop occupational stress, which is in line with the present study.

In view of the results obtained, and according to the study by Moon and Hur (2011), dimensions of EI such as the ability to evaluate emotions and optimism work as protection against emotional exhaustion, *that is*, they are particularly associated. Goleman (2010) argues that, along with personal qualities such as initiative, empathy, adaptability, or persuasiveness, the way in which each individual faces and deals with day-to-day stress in the work context, *that is*, the way in which they manage their emotions in challenging situations, is increasingly playing a key role in the success of their jobs and careers, making them capable of responding appropriately to work while aptly managing stressful situations; however, this postulation does not seem to align with the findings of this study. Méndez-Fernández *et al.* (2022) consider that experiences of organizational support protect people from trauma and promote Rs, both directly and indirectly.

Through our analyses, the primary concern stemming from this research is the severity of burnout problems, especially the exhaustion of the participants, which is in line with the results of the studies by Ferreira (2022) and Vasconcelos (2021), in which the professionals had high levels of stress and were emotionally and professionally fragile. In other words, despite the medium-high EI and Rs values, which according to the literature are protective factors in relation to BS, the participants already showed some weaknesses, reflected from their responses to the burnout ratings.

Finally, with the pandemic, war, climate change and other external problems that have ended up impacting and worsening the respondents' problems, the results showed that the impact of these transformations is not demonstrated in the domains addressed in this study. However, the adaptation process remains a concern that should be studied longitudinally.

The main limitations of this study are related to the study design. As this study was designed to survey participants' perception of Rs, EI, and BS, some individual biases were inevitable. The dissemination of the questionnaires through social networks, despite offering some advantages in terms of increasing sample size, allowing for a greater number and diversity of participants, put some limitations on obtaining a controlled sample. In this case, such surveying approach led us to a sample with unbalanced gender distribution, with male participants being significantly underrepresented in the sample. Furthermore, the fact that this is a cross-sectional study does not allow a longitudinal perspective of the evolution of the relations studied or the effect that the pandemic may had on them.

For future studies, we suggest replicating the study according to the participants' areas of activity, in order to better understand BS levels in a more targeted manner and develop prevention strategies tailored to their expertise. Understanding the relationship between these concepts according to age groups could also be significant for adapting and defining more targeted and focused intervention strategies. It is also suggested that

longitudinal studies be carried out on BS to understand, from an ontogenetic perspective, the relationship with EI and Rs and to facilitate the design of the best intervention strategies and measures.

5. Conclusion

The perception of EI and Rs of the participants in the sample is average/high and is weaker in terms of the ability of individuals to use their emotions to facilitate their performance. Regarding BS, it was found that the participants showed some weaknesses in terms of emotional detachment and exhaustion, which should be considered when defining intervention strategies. The positive correlations between EI and Rs, and the negative correlations between EI and BS and between Rs and BS, prove that the higher the perception of EI and Rs, the lower the perception of BS, and *vice versa*.

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Conflict of interest

The authors declare no conflicts of interest.

Author contributions

Conceptualization: Fátima Gameiro
Formal analysis: All authors
Investigation: All authors
Methodology: All authors
Writing – original draft: All authors
Writing – review & editing: Fátima Gameiro

Ethics approval and consent to participate

The study was approved by the ISS Ethics Committee (approval number ISS202319). Informed consent was taken from the participants before their participation.

Consent for publication

Informed consent of study participants has been acquired for publishing their data. The questionnaires were completed anonymously by the participants, and only researchers had access to their data.

Availability of data

Data used in this work are available from the corresponding author on reasonable request.

References

American Psychological Association. (2023). Resilience. Available from: https://www.apa.org/topics/resilience [Last accessed: November 23, 2023].

Andrade, L.M.C. (2001). A Satisfação Profissional nos Enfermeiros de Pediatria [Mestrado em Ciências da Enfermagem-Pediatria, Universidade do Porto]. Repositório Aberto da Universidade do Porto. Available from: https://hdl.handle.net/10216/10058 [Last accessed: December 5, 2023].

Armstrong, A.R., Galligan, R.F., & Critchley, C.R. (2011). Emotional intelligence and psychological resilience to negative life events. *Personality and Individual Differences*, 51(3):331-336.

https://doi.org/10.1016/j.paid.2011.03.025

Artuch-Garde, R., González-Torres, M.C., Martínez-Vicente, J.M., Peralta-Sánchez, F.J., & Fuente-Arias, J. (2022). Validation of the child and youth resilience measure-28 (CYRM-28) among Spanish youth. *Heliyon*, 8(6):e09713.

https://doi.org/10.1016/j.heliyon.2022.e09713

Augusto-Landa, J.M., García-Martínez, I., & León, S.P. (2022). Analysis of the effect of emotional intelligence and coping strategies on the anxiety, stress and depression levels of university students. *Psychological Reports*.

https://doi.org/10.1177/00332941221144603

Badger, K., Royse, D., & Craig, C. (2008). Hospital social workers and indirect trauma exposure: An exploratory study of contributing factors. *Health and Social Work*, 33(1):63-71.

https://doi.org/10.1093/hsw/33.1.63

Bar-On, R. (2006). The bar-on model of emotional-social intelligence (ESI). *Psicothema*, 18:13-25. Available from: https://psycnet.apa.org/record/2006-12699-003 [Last accessed: May 24, 2024]

Barros, M. (2011). Inteligência Emocional, Confiança do Empregado na Organização e Bem Estar no Trabalho: Um estudo com Executivos [Pós-Graduação em Psicologia da Saúde, Universidade Metodista de São Paulo]. Available from: https://tede.metodista.br/jspui/handle/tede/1296 [Last accessed: December 5, 2023].

Baum, N. (2012). Trap of conflicting needs: Helping professionals in the wake of a shared traumatic reality. *Clinical Social Work Journal*, 40(1):37-45.

https://doi.org/10.1007/s10615-011-0347-0

Demerouti, E., & Nachreiner, F. (1998). The specificity of burnout in human services: Fact or artifact. *Zeitschrift für Arbeitswissenschaf*, 52:82-89.

https://doi.org/10.1007/s41449-018-0100-4 Z

Druskat, V.U., Mount, G., & Sala, F. (eds.). (2005). Vinculando Inteligência Emocional e Desempenho no Trabalho: Evidências de Pesquisas Atuais com Indivíduos e Grupos. 1ª

ed. United Kingdom: Imprensa de Psicologia.

https://doi.org/10.4324/9780203763896

Ferreira, D. (2022). Stress e Burnout dos Assistentes Sociais na Área da Saúde em Contexto de Pandemia [Master's thesis, Universidade Lusíada]. Portugal: Repositório da Universidade Lusíada. Available from: https://hdl.handle.net/11067/6653

Finklestein, M., Stein, E., Greene, T., Bronstein, I., & Solomon, Z. (2015). Posttraumatic stress disorder and vicarious trauma in mental health professionals. *Health and Social Work*, 40(2):e25-e31.

https://doi.org/10.1093/hsw/hlv026

Fiorilli, C., Farina, E., Buonomo, I., Costa, S., Romano, L., Larcan, R., *et al.* (2020). Trait emotional intelligence and school burnout: The mediating role of resilience and academic anxiety in high school. *International Journal of Environmental Research and Public Health,* 17(9):3058.

https://doi.org/10.3390/ijerph17093058

Fortes, F. (2016). A Gestão Emocional na Relação com o Outro [Doctoral Dissertation, Universidade Europeia]. Available from: https://hdl.handle.net/10400.26/12388 [Last accessed: November 23, 2023]

Freitas, M., Moreira, A., & Ramos, F. (2023). Occupational stress and turnover intentions in employees of the Portuguese tax and customs authority: Mediating effect of burnout and moderating effect of motivation. *Administrative Sciences*, 13(12):251.

https://doi.org/10.3390/admsci13120251

Gaspar, B. (2021). Inteligência Emocional, Engagement, Burnout e Satisfação No trabalho: Um Estudo de Clusters com Trabalhadores Portugueses [Master's thesis, Universidade Portucalense]. Available from: http://hdl.handle.net/11328/386 [Last accessed: December 4, 2023].

Geraci, A., Domenico, L., Inguglia, C., & D'Amico, A. (2023). Teachers' emotional intelligence, burnout, work engagement, and self-efficacy during covid-19 lockdown. *Behavioral Sciences* (*Basel*), 13(4):296.

https://doi.org/10.3390/bs13040296

Goleman, D. (2010). Inteligência emocional. 14th ed. Lisboa: Temas e Debates.

Goleman, D. (2021). Leadership blindspots. *Leader to Leader*, 2021(100):22-25

https://doi.org/10.1002/ltl.20564

Hu, T., Zhang, D., & Wang, J. (2015). A meta-analysis of the trait resilience and mental health. *Personality and Individual Differences*, 76:18-27.

https://doi.org/10.1016/j.paid.2014.11.039

Jesus, A., Pitacho, L., & Moreira, A. (2023). Burnout and suicidal behaviours in health professionals in Portugal: The moderating effect of self-esteem. *International Journal of Environmental Research and Public Health*, 20:4325.

https://doi.org/10.3390/ijerph20054325

Law, K.S., Wong, C.S., & Song, L.J. (2004). The construct and criterion validity of emotional intelligence and its potential utility for management studies. *Journal of Applied Psychology*, 89(3):483-496.

https://doi.org/10.1037/0021-9010.89.3.483

López-Angulo, Y., Mella-Norambuena, J., Sáez-Delgado, F., Peñuelas, S., & González, O. (2022). Association between teachers' resilience and emotional intelligence during the covid-19 outbreak. *Revista Latinoamericana de Psicologia*, 54:51-59.

https://doi.org/10.14349/rlp.2022.v54.6

Luthar, S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. Child Development, 71(3):543-562.

https://doi.org/10.1111/1467-8624.00164

Maslach, C., Jackson, S.E., & Leiter, M.P. (1997). Maslach burnout inventory manual. In: Zalaquett, C., & Wood, R. (eds.), Evaluating stress: A Book of Resources. 3th ed. The Scarecrow Press, p.191-215.

Mayer, J.D., Salovey, P., & Caruso, D.R. (2004). Target articles: Emotional intelligence: Theory, findings, and implications. *Psychological Inquiry*, 15(3):197-215.

https://doi.org/10.1207/s15327965pli1503_02

Méndez-Fernández, A., Aguiar-Fernández, F., Lombardero-Posada, X., Murcia-Álvarez, E., & González-Fernández, A. (2022). Vicariously resilient or traumatised social workers: Exploring some risk and protective factors. *British Journal of Social Work*, 52:1089-1109.

https://doi.org/10.1093/bjsw/bcab085

Molnar, B., Meeker, S., Manners, K., Tieszen, L., Kalergis, K., Fine, J., *et al.* (2020). Vicarious traumatization among child welfare and child protection professionals: A systematic review. *Child Abuse and Neglect*, 110:104679.

https://doi.org/10.1016/j.chiabu.2020.104679

Moon, T., & Hur, W. (2011). Emotional intelligence, emotional exhaustion and job performance. *Social Behavior and Personality*, 39:1087-1096.

https://doi.org/10.2224/sbp.2011.39.8.1087

Muller, J., Silva, N., & Pesca, A. (2021). Coping strategies in the workplace: An integrative review of Brazilian and international scientific production. *Revista Psicologia, Organizações e Trabalho*, 21(3):1594-1604.

https://doi.org/10.5935/rpot/2021.3.20385

National Statistics Institute. (2023). Statistics Portugal. Available from: https://www.ine.pt/xportal/

xmain?xpid=INE&xpgid=ine_main [Last accessed: November 23, 2023].

Ogunsanwo, M., & Bukki, A. (2023). Undergraduates' academic engagement: The predictive power of academic stress, emotional intelligence and resilience. *NUST Journal of Social Sciences and Humannities*, 9(1):1-17.

https://doi.org/10.51732/njssh.v9i1.161

Ribeiro, J.L.P., & Morais, R. (2010). Adaptação portuguesa da escala breve de *coping resilience*. *Psicologia, Saúde and Doença*s, 11(1):5-13. Available from: https://www.redalyc.org/articulo.oa?id=36219018001 [Last accessed: November 23, 2023].

Rocha, A.E.F. (2020). Stress Ocupacional e Comportamentos de Saúde: Intervenção em Profissionais de um Centro Hospitalar [Mestrado em Enfermagem na Área de Especialização em Enfermagem Comunitária, Escola Superior de Enfermagem de Lisboa]. Available from: https://hdl.handle.net/10400.26/37317 [Last accessed: November 23, 2023].

Rodrigues, N., Rebelo, T., & Coelho, J.V. (2011). Adaptação da Escala de Inteligência Emocional de Wong e Law (WLEIS) e análiseda sua estrutura factorial e fiabilidade numa amostra Portuguesa [Adaptation of the Wong and Law Emotional Intelligence Scale (WLEIS) and analysis of its factorial structure and reliability in a Portuguese sample]. *Psychologia*, 55:189-207.

https://doi.org/10.14195/1647-8606_55_10

Saveca, P.T.A., Montero, F.P., & Tembe, V.A. (2020). O Stress Ocupacional Como Fatcor Principal de Risco Psicossocial no Ambiente de Trabalho. Portal dos Psicólogos. Available from: https://www.psicologia.pt/artigos/textos/A1409.pdf [Last accessed: December 5, 2023].

Sinclair, V.G., & Wallston, K.A. (2004). The development and psychometric evaluation of the brief resilient coping scale. *Assessment*, 11(1):94-101.

https://doi.org/10.1177/1073191103258144

Sinval, J., Queirós, C., Pasian, S., & Marôco, J. (2019). Transcultural adaptation of the Oldenburg burnout inventory (OLBI) for Brazil and Portugal. *Frontiers in Psychology*, 338(10):338.

https://doi.org/10.3389/fpsyg.2019.00338

Soares, N. (2014). Burnout e Inteligência Emocional em Estudantes Universitários: Que Relação? [Master's thesis, Universidade de Coimbra]. Available from: https://estudogeral.uc.pt/handle/10316/28215 [Last accessed: November 24, 2023].

Trindade, M. (2011). Inteligência Emocional e Resiliência: Estudo Exploratório Junto de uma População Universitária [Master's thesis, Universidade Fernando Pessoa]. Repositório Institucional da Universidade Fernando Pessoa. Available from: https://bdigital.ufp.pt/handle/10284/3217 [Last accessed: December 5, 2023].

Vasconcelos, A. (2021). Saúde Mental, Burnout, Coping e Suporte Social em Profissionais de Saúde Durante a Pandemia covid-19 [Master's Thesis, Politécnico Porto]. Repositório Científico do Instituto Politécnico do Porto. Available from: https://hdl.handle.net/10400.22/19078 [Last accessed: November 24, 2023].

Villanueva, L., Prado-Gascó, V., & Montoya-Castilla, I. (2022). Longitudinal analysis of subjective well-being in preadolescents: The role of emotional intelligence, self-esteem and perceived stress. *Journal of Health Psychology*, 27(2):278-291.

https://doi.org/10.1177/13591053209516

Wong, C.S., & Law, K.S. (2002). The effects of leader and follower emotional intelligence on performance and attitude: An exploratory study. *The Leadership Quarterly*, 13(3):243-274.

https://doi.org/10.1016/S1048-9843(02)00099-1

ACCSCIENCE PUBLISHING

Global Health Economics and Sustainability

ORIGINAL RESEARCH ARTICLE

Promoting sustainability through equality, peace, and justice: A luck-dependent decision-making practice in an economically successful intentional community

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Abstract

The sustainable development goals (SDGs) of the United Nations address global challenges such as reducing inequality (Goal 10) and promoting peace and justice (Goal 16). Intentional communities inherently support the SDGs through their focus on equality and their decision-making practices to settle interpersonal conflicts to achieve peace and justice for their members. While intentional communities have garnered recent interest as potential models for meeting these goals, research in this area remains limited. In addition, the economic success of the intentional community is crucial for its sustainability and societal relevance. This study investigates how an economically successful intentional community, the Korean popular music group Stray Kids, contributes to Goals 10 and 16 through its decision-making practices that promote equality, peace, and justice. What is unexpected is that the mutually agreed-upon practice for decision-making involves accepting luck and often settling community disputes through the game of Rock-Paper-Scissors—an unusual, though not unheard-of, practice in various official capacities. This study investigates the significant features of this practice and its relationship to group cohesion and individual mental health using the historical research method, considering both its strengths and weaknesses. Insights are provided regarding the potential application of this decision-making method to mainstream society, aiming to improve the social and economic sustainability of its institutions in achieving Goals 10 and 16.

Keywords: Sustainable development goals; Intentional communities; Economically successful; Stray Kids; Luck; Rock-Paper-Scissors

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1. Introduction

The 2030 Agenda for Sustainable Development (United Nations, 2023) aims to guide societies toward a more sustainable future for all based on 17 sustainable development goals (SDGs) established in 2015. Through the 17 goals, the agenda has become a global framework for ending poverty, protecting the planet, and reducing inequalities. Two of these goals are the focus of this study: Goal 10, which targets decreasing inequality, and Goal 16, which aims for peace and justice (United Nations, 2015). There is a growing interest in how intentional communities can serve as models to achieve these goals

(Esteves *et al.*, 2021; Kaul *et al.*, 2022), despite a paucity of research in this regard. For research to increase in this area, maintaining the intentional community through its economic success is necessary. This study aims to investigate the preferred decision-making practices of one economically successful intentional community in demonstrating equality and achieving peaceful and just solutions to potential group-wide problems. The intentional community is a Korean popular (K-pop) music group named Stray Kids. Surprisingly, their primary method of decision-making involves using luck to settle potential community disputes by playing the Rock-Paper-Scissors game. While unusual, research has identified it as a game played in various official capacities (Brockbank & Vul, 2021).

Luck is different from fortune, which is defined as a relatively stable positive or negative context within which choices are made; in contrast, luck is an unpredictable series of better or worse outcomes (Ranieri *et al.*, 2019). Decisions made by luck are those that are entirely outside the control of the individual. Relying on luck to make decisions allows individuals to blame external factors when they experience a loss, impeding the internalization of negative emotions (Krull *et al.*, 2024). Negative emotions are recognized to hamper peace in settling conflicts (Saliternik, 2016). Therefore, a decision-making method, like luck, which reduces the internalization of negative emotions, is compatible with Goal 16 of the United Nations SDGs. In addition, playing games based on luck has been identified with players being more forgiving of shortcomings regarding service failures associated with reasons for playing the game (Xu & Liu, 2024). Forgiveness is considered a primary ingredient for reconciliation in social justice and maintaining peace (Mullet *et al.*, 2021), both aspects of Goal 16.

Intentional communities are groups that "form for a specific agreed-upon purpose and live in close proximity to achieve their desired end" (Rubin *et al.*, 2019, p. 181). They include those "who have chosen to live (and sometimes work) together for some common purpose beyond that of tradition, personal relationship, or family ties" (Jarvis, 2019, p. 268). Consequently, an intentional community may go beyond people cohabitating and involve a working community—the type of intentional community that is the focus of this study. Both definitions identify the importance of an agreed-upon common purpose, representing what is uniquely valued by the intentional community. Communities are intentional when they choose to live separately from society (Sager, 2018), as they isolate themselves spatially and psychologically from the mainstream (Lopez & Weaver, 2019). A three-way relationship is identifiable among intentional communities, utopianism, and anarchism (Firth, 2019). Shared values, mutual agreements, or agreed-upon purposes define the intentional nature of the community. In their attempt at democratic cooperation in a highly competitive culture, intentional communities rely on members' personally chosen values being accepted and supported (Jarvis, 2019). Although intentional communities based on shared personal values have always existed, they remain rare (Kozakavich, 2023). The defining feature of any intentional community is rejecting the idea that one person can represent others—all members must be directly involved in decision-making (Firth, 2019). In this regard, by their very nature, intentional communities look to support the United Nations SDG of equality, as everyone affected by a decision must participate in deciding the course before taking action. In a review of various forms of decision-making for intentional communities, the conclusion is that after considering the needs of everyone, peace remains and a sense of justice prevails (The Seeds for Change Collective, 2007), in contrast to representational decision-making through voting, where only those identified with the representative winner are satisfied with the result. As over a decade ago, losing such a representational vote was found to be the primary reason for a lack of satisfaction with democracy (Singh *et al.*, 2012), the potential value of the decision-making practices of intentional communities is noteworthy for the larger society for maintaining peace and a sense of justice.

Stray Kids is a self-producing male K-pop music group of eight (there were originally nine, one of the members left the group in 2019 [Delgado, 2019]) members, who live together in dorms in Seoul, South Korea. JYP Entertainment formed the group in 2017 through a reality TV show of the same name (Crystal-Stay, 2022), where the participants were personally selected by their then-20-year-old leader (Wicks, 2023). Since their debut album in 2018, Stray Kids' most recent four albums have all ranked number one on the Billboard 200 album chart (Sisario, 2023), which ranks the most popular albums of the week in the United States of America (US) based on multi-metric consumption in equivalent album units (Caulfield, 2023). In October 2023, Stray Kids was named Next Generation Leaders by Time magazine based on their international success, global fan base, and goal of "continuously pioneering new (musical) subjects to have their music be recognized as a 'Stray Kids' genre" (de Guzman, 2023). Known for their humility, earnestness, and empowerment (Frances, 2018), Stray Kids members depend on their close bond with each other and with their fans to maintain a continuing sense of what they have described as "family" (Bell, 2022). The group represents an intentional community because its formation was contingent on the values of the leader of the

group, who wanted to create a community of artists using the K-pop training system. The leader, Bang Chan, himself trained with JYP Entertainment (JYP Entertainment Corp., 2024) from the time of his successful audition in his home country of Australia at the age of 13 (KapanLagi, 2021) until the age of 20, when he received the assignment to create a group that he would lead (Wicks, 2023) based on the values he considered most important—developing a long-lasting, successful K-pop group that wrote and self-produced its music (Kelley, 2019). Members expressing a vision in common with the group leader were selected (Spotify, 2022).

When making group-wide decisions, Stray Kids prioritize maintaining their close connection to permit the successful continuation of the group with all original members. Despite individual preferences, such as one member known for a principled approach to decision-making (Bell, 2022), Stray Kids have adopted the use of luck, most often by playing the Rock-Paper-Scissors game to decide the winner (or loser), where players simultaneously produce a hand signal indicating their choice of "rock," "paper," or "scissors." The rules are that rock beats scissors, paper beats rock, and scissors beats paper. Since group cohesion is paramount to Stray Kids, once the game is over, the members accept the result, regardless of the outcome. The importance of this game for their decision-making strategy is evident in the first episode of their "2 Kids Show" that began airing on November 22, 2023 (Stray Kids, 2023, 15:33) and at a 2024 conference they held to assess their strengths, weaknesses, opportunities, and threats (Stray Kids, 2024b, 10:34; Stray Kids, 2024d, 26:33, 26:36, 35:27, 40:06 – 50:01, 51:12). As well, noting its importance to the group, two self-composed songs—one penned and recorded by an individual group member (Iwalyzy, 2021) and the other created by the self-producing team of the group—3 Racha (Bell, 2022)—and recorded by the group as a whole (Stray Kids, 2023a)—reference the game. As an intentional community, the primary concern of Stray Kids is making decisions based on each member's interests and abilities in writing, producing, performing, and promoting their music and the group, while ensuring group cohesion remains intact. What this means for Stray Kids is that decisions requiring a quick resolution in daily matters are made using luck, primarily through Rock-Paper-Scissors, where maintaining their close family-like bond takes precedence over winning.

The socioeconomic stability of an organization is affected by several factors, most recently studied regarding three aspects of organizational resilience: Crisis anticipation, organizational robustness, and recoverability (Rai *et al.*, 2021). Socioeconomic stability was particularly problematic during the COVID-19 pandemic, with the negative impact on organizations described as "huge" (Wei *et al.*, 2021). Despite this, Stray Kids demonstrated organizational resilience and were able to grow their international fan base, music units, and merchandise sales (McIntyre, 2023) at a time when panic buying of essentials was prevalent (Lahiri & Sinha, 2021). Stray Kids debuted on March 25, 2018, where the opening price for JYP Entertainment stock was ₩17,350. After rising somewhat in the first few years after Stray Kid's debut, with the announcement of the pandemic on March 11, 2020 (Cucinotta & Vanelli, 2020), the opening price for JYP Entertainment was virtually the same at ₩17,500 (Dow Jones, 2024). However, during a time when businesses were more likely to fail as a result of the pandemic conditions (Amankwah-Amoah *et al.*, 2021), the growth of JYP was robust, in no small measure, as a result of the dominant rise of Stray Kids (Lee, 2023). During the height of the pandemic in South Korea, in March 2022 (Shin & Smith, 2022), JYP Entertainment's opening price was ₩50,100 (Dow Jones, 2024). By the time the pandemic officially ended in South Korea in May 2023 (Kim, 2023), the opening price of JYP Entertainment had risen to ₩90,400, reaching a high of ₩135,500 in August 2023 (Dow Jones, 2024). The JYP Entertainment stock has since declined to ₩55,600 in June 2024 due to a reduction in album sales as no new albums have been released (Jeong & Lee, 2024). A recent substantial acquisition of stock by the founder of JYP Entertainment has demonstrated his confidence in the company (Lee, 2024). A new album by Stray Kids, anticipated to be their most significant, was expected for the end of April (Salomon Quotes, 2024c). The album release date is confirmed as July 19, 2024 (Ha, 2024; JYP Entertainment Co., Ltd., 2024). Regarding the business history of their parent company, Stray Kids not only anticipated how to react to the pandemic crisis, but their group also demonstrated robustness and recoverability. These qualities should again take their parent company out of the recent downturn.

Recognizing the socioeconomic stability of Stray Kids, this study will investigate the features of the group members playing Rock-Paper-Scissors to settle their group-wide disputes using the historical research method. Examined are the strengths and weaknesses of using the historical method for investigating Stray Kids' use of Rock-Paper-Scissors as the decision-making method. For society to improve its institutions in their social and economic sustainability in meeting Goals 10 and 16, offered insights show how this method can apply.

2. Methods

2.1. Data

The data for this study were gathered from primary sources, representing first-hand information, as well as

supplementary information from relevant publications (often popular sources). Specifically, these sources include blogs and audio-visual materials (e.g., videos or media coverage) made by the group available on YouTube (Stray Kids, 2024a) of episodes for different series they have recorded over the years. The data were searched on YouTube using "Stray Kids Rock-Paper-Scissors [year]). These will include particular shows referring to the playing of Rock-Paper-Scissors to make decisions (Stray Kids, 2018; X INKIGAYO, 2019a; X INKIGAYO, 2019b; Stray Kids, 2020; Shopee Indonesia, 2020; Stray Kids, 2021; Stray Kids, 2022; Stray Kids, 2023a; Stray Kids, 2023b; Stray Kids, 2024b; Stray Kids, 2024d; Stray Kids, 2024e) among the list of Stray Kids YouTube videos available to the public. The author selected episodes for inclusion by reviewing each one and determining if it featured the group playing Rock-Paper-Scissors and whether the outcome was consequential in advancing either Goal 10 or Goal 16 of the United Nations SDGs. Videos were excluded if they did not depict the group playing Rock-Paper-Scissors or if the result appeared inconsequential to Goals 10 or 16 of the United Nations SDGs.

2.2. Historical method

The historical method is a system by which present-day events are studied regarding past events, seeking to explain current questions with an intensive study of the past (Pandey & Pandey, 2015). This research method applies the scientific method to historical problems based on historical records. It involves evaluating materials—recognizing that historical facts are unlike laboratory observations in being unreproducible (Pandey & Pandey, 2015). The historical method is an umbrella term for a grouping of qualitative methods that explore the what, when, why, and how of a past event. It depends as much as possible on primary (original) sources, as primary sources serve as evidence for the occurrence of the event or phenomenon under investigation (Langtree *et al.*, 2019). In conducting historical research, various sources are used (Mages & Fairman, 2008). Additional information about the videos created by Stray Kids comes from newspaper articles about the group and video-recorded news items selected after a Google search for a particular topic. For most items related to Stray Kids, it was one source that produced an article repeated by other news agencies. From the information available about each article, the one selected is the original where the story appeared.

Selection bias can be a problem in a method that investigates the ability of a game of luck, like Rock-Paper-Scissors, to meet Goals 10 and 16 of the United Nations SDGs. Collider stratification bias, resulting from conditioning on a common effect of two causes (Lu *et al.*, 2024), is a type of selection bias such that Stray Kids may find Rock-Paper-Scissor useful merely because they trust in their leader and the urge of the group members to be successful. It is possible that whatever decision-making practice Bang Chan would have decided on would have been accepted by the group based on their trust in him and their interest in keeping Stray Kids intact. However, decisions based on luck provide the least negative results regarding long-term effects on mental health (Krull *et al.*, 2024). For this reason, group approval of luck using Rock-Paper-Scissors may have been this type of understanding.

There is no recorded information on how Stray Kids decided on Rock-Paper-Scissors as their primary method of group-wide decision-making. However, they are not the first K-pop group to employ Rock-Paper-Scissors. BTS, the most popular male K-pop group based on their YouTube subscribers (Count, 2024)—now on hiatus as the members are on mandatory military service (Young, 2023)—used the same method. A video with the introductory image entitled, "How to solve world problems (sic)? Use Rock-Paper-Scissors" (Pinkkoyaa Films, 2023), has been created of the times BTS used Rock-Paper-Scissors to settle disputes. Therefore, Rock-Paper-Scissors may have been adopted and used by Stray Kids as the natural solution to solving problems in a male K-pop group.

2.3. Analysis

Regarding whether they affect equality, peace, and justice—the variables relevant to Goal 10 and Goal 16 of the United Nations SDGs focused on achieving a better, more inclusive, and more sustainable future—an analysis of the variables related to the decision-making process used by Stray Kids in playing the game Rock-Paper-Scissor is provided. The order of the variables will be their encounter when playing the game, involving initial considerations of whether it is relevant to play the game, aspects of playing the game, and then matters regarding the game results.

The analysis will be qualitative. From economic considerations, the description of qualitative analysis is an "integral type of business information that can be curated and collected from a variety of sources. Unlike quantitative data, which are numerical measurements or values, qualitative data are subjective as they represent categorical, characteristic, or estimated information" (Zentner, 2021). Such analysis depends on documents, defined as "literary, textual, or visual devices that enable information to be shared and 'stories' to be presented" (Coffey, 2014). The type of qualitative analysis used for this historical research is a narrative analysis using the constructionist approach, meaning it "will generally concentrate on the story as the analytical unit and explore how different levels of context—

processes of research and broader socio-cultural and historical contexts—generate stories" (Esin *et al.*, 2014). The last decade has seen an increase in the historical research method for strategy research (Argyres *et al.*, 2020).

3. Results

Table 1 provides the results of this historical method concerning the data gathered. Six categories following the order of considered matters in the process of playing the game identify the decision-making practice of Stray Kids playing Rock-Paper-Scissors game: Group stability as the main concern; supporting personal values; issues prioritized; time to decision; decision satisfaction; and reconsideration as an option. SDGs of equality, peace, or justice are relevant to each category. Comparison is made of decision-making practices because the decision-making practices of this intentional community for how they respond to these three goals are the aim.

3.1. Group stability as the main concern

"Group stability as the main concern" refers to whether maintaining group cohesiveness is the primary concern in decision-making. Research indicates that peaceful social systems require a common identity, positive social interconnectedness, and group interdependence (Fry *et al.*, 2021), demonstrating the connection between group stability and peace. Promoting peace is part of Goal 16 of the United Nations SDGs.

The priority for Stray Kids as an intentional community is group cohesiveness. As a result, all group decisions are accepted in playing Rock-Paper-Scissors because doing so keeps the group intact, even though group members may not prefer the result regarding their self-interest (Stray Kids, 2021; Stray Kids, 2022; Stray Kids, 2023b). This aim to keep the group intact while accepting a loss is evident in an Indonesian variety show video recording of the group playing successive rounds of Rock-Paper-Scissors where a toy hammer hits the head of the loser (Shopee Indonesia, 2020). Although using luck to make decisions has been studied very little in any discipline (Sauder, 2020), this K-pop group, in continuing their use of Rock-Paper-Scissors to make group-wide decisions, considered its use necessary to keep the original membership intact. Beyond luck, one of the relevant features of group stability is the constant improvement of the group beyond its expectations—recognized most recently in Forbes Korea's naming Stray Kids to its 2024 "30 Under 30" List (Salomon Quotes, 2024a). Research has indicated that group stability is aided by similar constant meteoric improvement (Martin *et al.*, 2023).

Table 1. Decision factors of Stray Kids as an intentional community in playing Rock-Paper-Scissors game, the results, and the relevant United Nations Sustainable Development Goals

Decision factor for Rock-Paper-Scissors	Result	UN goal
Group stability as the main concern	Yes	Peace
Supporting personal values	Random	Justice
Issues prioritized	Yes	Equality
Time to decision	Very short	Peace
Decision satisfaction	Acceptable	Justice
Reconsideration as an option	No	Equality

3.2. Supporting personal values

Whether or not the outcome of the decision-making supports the personal values of the intentional community members is relevant to consider. An aspect of human rights concerning social justice is having a supportive process of personally held values (Kymlicka, 2008). Justice is part of Goal 16 of the United Nations SDGs.

The group members of Stray Kids have joined this intentional community because they believe they want to be K-pop idols in the manner envisioned by the group leader. They know this takes talent, work, dedication, time, honesty, humility, and the desire to work as a group member (Zhu, 2023). As such, when group decisions potentially harm any of these relevant aspects for group cohesiveness, the group members agree to use luck to determine the outcome, most often using Rock-Paper-Scissors (Table 2). In this way, they are willing to accept group-cohesive decisions that they may not value considering their self-interest, as group cohesion is a personal value superior for each rather than self-interest. Stray Kids members have intentionally decided to value maintaining the group ahead of their self-interest (Stray Kids, 2021); therefore, using luck is a method of resolving conflict that is appropriately just, promoting ethical behavior in such work-related situations (Al Halbusi *et al.*, 2020).

3.3. Issues prioritized

The importance of a particular decision is established concerning the goals of the intentional community before the decision-making begins, when a priority arrangement represents the issues in the decision-making process. With many forms of egalitarianism, the importance of prioritizing decisions to considerations of equality is on a spectrum (Otsuka & Voorhoeve, 2018), depending on other features of the decision-making process to determine if an intentional community is more or less equal as a result of prioritizing issues. Equality is related to Goal 10 of the United Nations SDGs.

Table 2. Data of stray kids playing Rock-Paper-Scissors video recorded by them from 2018 to 2024 as part of one of their regular series posted on YouTube

Video name	Date	Time of game
Stray Kids Funny Moment	April 28, 2018	0:05, 0:42, and 0:43
Stray Kids Inkigayo Check-in LIVE (episode 1)	June 4, 2019	7:45
Stray Kids Inkigayo Check-in LIVE (episode 2)	June 4, 2019	4:11
Stray Kids Playing Rock-Paper-Scissors	March 16, 2020	0:03 – 1:59
Hebohnya Stray Kids Main Hammer Game!	December 12, 2020	2:57, 3:18, 3:27, 3:31, 3:37, 3:46, 4:40, 4:51, 5:03, 6:13, 6:22, 6:33, 7:30, 7:45, and 7:58
가위바위보 게임과 스트레이 키즈 | Rock-Paper-Scissors Game and Stray Kids	October 27, 2021	00:07
2 Kids Room (Episode 14) Bang Chan X Changbin	April 25, 2022	2:15 – 2:41
SKZ code (episode 35)	May 4, 2023	27:47
2 Kids Show	November 22, 2023	15:33
2024 SKZ (conference) #1	February 8, 2024	10:34
2024 SKZ (conference) #2	February 15, 2024	26:33, 26:36, 35:27, 40:06 – 50:01, and 51:12
SKZ Code (episode 49)	April 25, 2024	17:30

Whether they are intrinsic to the group members personally (and thus a personal choice where self-interest is paramount) or if the matter pertains to the group is what prioritizes the issues. If it is related to the group, the members use luck to determine the result. Playing the necessary rounds of Rock-Paper-Scissors accomplishes this most often (Table 2). Establishing an order of priority in international decision-making has been found relevant by, for example, Switzerland as a country in its decisions regarding the United Nations SDGs concerning equality; however, this need to prioritize has not been considered necessary by other countries (Sousa *et al.*, 2021). In decision-making, the high expectations of both Stray Kids and Switzerland for their members may direct each to focus on prioritizing issues (De Santis & Emery, 2017).

3.4. Time to decision

"Time to decision" is recognized as an essential ingredient of peace and conflict resolution in the decision-making process (Reychler, 2015)—part of Goal 16 of the United Nations SDGs.

All that is necessary to make a quick group decision for Stray Kids as an intentional community is for one group member to indicate the need to play Rock-Paper-Scissors. Once making this call, there is no disagreement regarding the need for Rock-Paper-Scissors—all accept this as the decision-making method. As an eight-member group, when all are in attendance to make a particular decision, it may require a few rounds of the game to produce the final winner (Stray Kids, 2020). Stray Kids has continued to make use of this method, and how they do so is evident from their recent video for their weekly show, SKZ Code (Stray Kids, 2024e, 17:30). Once the winner is determined, this result is accepted by all group members, unless there was some misreading of the particular throw by someone, as has been recorded (X INKIGAYO, 2019b). In this case, another round of play determines the final result. In using this form of decision-making, keeping the peace among the members is maintained by quick decision-making and all deciding to abide by the results. Although the ability to make decisions quickly can sometimes hamper outcomes, it is identified as a significant variable for business success (Alzghoul *et al.*, 2022) and seen as a feature in improving the peace of this work-related, success-oriented, intentional community.

3.5. Decision satisfaction

"Decision satisfaction" refers to the level of satisfaction members of each intentional community have regarding the decision-making results. Regarding justice, decision satisfaction concerning having a voice in the decision-making process is considered paramount (Lister, 2008)—one aspect of Goal 16 of the United Nations SDGs.

Individual satisfaction is irrelevant for group decisions that result from playing Rock-Paper-Scissors. As such, it is regularly the case that the only group member who is satisfied with the result regarding self-interest is the winner—that is, unless the "winner" has to do an activity that no one wants to do, such as carrying groceries for all from the convenience store (X INKIGAYO, 2019b), then the winner is the least satisfied personally. Since luck decides the results, all members accept that there will be times when they win and other instances when they lose in making these group decisions. As only those with the

preferred outcome are content regarding their self-interest, yet they are willing to disregard it for the sake of the group, this decision-making method provides a level of justice acceptable to everyone involved, although not ideal. It is relevant that the group members understand the role of luck and do not underestimate it, a factor regarding justice in work-related decision-making (Dorin *et al.*, 2021).

3.6. Reconsideration as an option

Whether or not an intentional community can reconsider its decision-making results is an important consideration, as the ability to deliberate the result of a decision is highly valued in considerations of equality (Bell & Reed, 2021). Equality is regarding Goal 10 of the United Nations SDGs.

A reconsideration of the results of Rock-Paper-Scissors in making a group decision with Stray Kids is infrequent—only happening if the members misread a hand sign (X INKIGAYO, 2019b). Even if the results have randomly meant that a particular group member too frequently has had to do something that no one prefers to do (such as carry the coats of other members (Stray Kids, 2018), they accept that this is what happens in using luck to make these group-wide decisions, although an individual negatively affected may not prefer the result in its being contrary to their self-interest (Stray Kids, 2021; Stray Kids, 2022; Stray Kids, 2023b). It would seem on the surface that this poses a problem of inequality in the decision-making of Stray Kids. However, a prior group-wide decision made to base the result on luck before the result is known is likely to be accepted for the equality of the outcome regardless of the individual preferences of group members or their belief that they may lose too often by resorting to luck (Micheli & Gagnon, 2020).

3.7. Priority of variables

Although each of the six factors identified in decision-making is relevant to satisfaction with the result, for Stray Kids, these variables are arranged from most to least important: (i) Group stability as the main concern; (ii) issues prioritized; (iii) time to decision; (iv) reconsideration as an option; (v) supporting personal values; and (vi) decision satisfaction. Whatever Stray Kids accomplish, their most important value is keeping the group together with all the original members. As such, they recognize that some matters pertain to their own interests and others concern the group. Luck determines only those matters that relate to the group as a whole (or, if a decision concerns a subset of the group, that subset)—the preference of a group member is what decides other personal matters. Whether the decision is an individual or a group matter is of next importance, requiring the prioritization of issues. The third priority is that when making decisions that could result in a dispute among the members, the matter must be solved quickly so that the group can retain its cooperation. Consequently, if there is a misreading of the throw in Rock-Paper-Scissors, this must be recognized and solved with another round immediately. As self-interest is considered by the members to lack relevance to group-wide decisions, losing the game matters minimally.

4. Discussion

Three elements are the focus of this discussion in considering the United Nations SDGs concerning Goal 10—supporting equality, and Goal 16—maintaining peace and promoting justice. The first relates to supporting group continuation in using Rock-Paper-Scissors for decision-making—relevant to Goals 10 and 16 because the type of group continuity available to intentional communities defines how they support equality while maintaining peace and justice for all members. The second concerns the individual mental health of the participants in adhering to the particular decision-making for the intentional community—a substantial ingredient in the SDGs. The final aspect of the discussion is the specific strengths and limitations of the historical research method used for this investigation.

4.1. Group cohesion

On October 22, 2023, during their "5 Dome" concert in Seoul, Stray Kids had the most recent opportunity for their leader to express his dream that the members of Stray Kids "stay together for a long, long time" (Celeb Confirmed, 2023), a sentiment to which other group members nodded in agreement on stage. This enduring desire for the members to remain together relates to their enacting Rock-Paper-Scissors most often as the method of decision-making to solve daily living matters quickly—ones that otherwise might produce possible conflict—in a manner that not only retains but reinforces group cohesion. For example, the first time the group conducted a live broadcast to interact with their fans during the summer of 2019, produced two episodes, each approximately 18 min. During the first episode, after introducing their new album (X INKIGAYO, 2019a, 7:45), the initial game they play is Rock-Paper-Scissors, demonstrating the importance of this game to the group. In the second video (X INKIGAYO, 2019b, 4:11), the MC tells the members they are playing a game to test their strength—only half the members will be permitted to eat the food prepared for them. The test requires playing Rock-Paper-Scissors. Even though all the members wanted to eat, those who lost appeared happily willing to endure watching the others eat. From the video, the most important outcome is that the group remains cohesive

and supportive of one another—the members refer to each other as "brothers" in more than one instance during the live broadcast. In a recent live broadcast of the group from March 10, 2024 (Stray Kids, 2024c), there are numerous times when first the three members present of the eight—then the two remaining ones once one member leaves the broadcast—resort to using Rock-Paper-Scissors almost instinctively (timestamps: 26:33, 26:36, 35:27, 40:06—50:01, 51:12). Immediately, when any one of them gauges that there could be a dispute, they play the game and abide by the results. Throughout the broadcast, rather than showing animosity concerning the number of times they play the game, members appear happy, playful, and even childish. This type of foolishness is unexpected, as one of these group members in the live broadcast (as well as two other members not present in that broadcast) recently were named among the five most talked-about celebrities during 2024 fashion week in both Milan and Paris (Stay Inn, 2024, 00:13) "despite having no prior experience in the field" (Salomon Quotes, 2024b, 00:55). That they feel relaxed enough together while being filmed for their fans to behave in this carefree way appears in no small measure due to their method of solving possible disputes quickly using luck from the results of automatically playing Rock-Paper-Scissors. Particularly relevant is that it is the same three members who played the game in 2018 (Stray Kids, 2018) when the one "man of principles" expressed his dislike for playing the Rock-Paper-Scissor—now, 6 years later, he is the one to initiate its use in solving disputes.

4.2. Individual mental health

How the decision-making of this intentional community affects the mental health of the community's participants regarding enhancing positive mental health or negatively influencing mental health is relevant to consider. In working toward the United Nations SDGs of equality, peace, and promoting justice, the assessment of the decision-making process must be transparent in this regard so that what is effective and what is potentially detrimental regarding individual mental health is evident.

Although all members of Stray Kids are willing to accept the outcome of Rock-Paper-Scissors when it is played, personally deciding that they support the group over their own self-interest, this does not mean that each member individually feels content with the outcome regarding self-interest. One member in particular, known as the "man of principles" (Cheesesong, 2021), voiced in the past that he does not like to play Rock-Paper-Scissors (Lee Doesn't Know, 2022), stating that he always loses. His propensity for losing the game, including his dislike when he lost twice and had to carry his and other members' winter coats up a long flight of stairs (Stray Kids, 2018), was recorded in 2018. Another member recorded in 2023 for not liking to lose in Rock-Paper-Scissors reacted to a loss by finding various negative ways to be humorous regarding his plight of having to carry a heavy bag of ice cream for all the group members from the convenience store to their vacation home (Stray Kids, 2023a, 27:47). He first pretended to run away. After accepting the result, he acted as if the bag was far heavier than it was. When the others started leaving without him, he mock-cried. Finally, he slowed down. The others left him behind. He sped up, playfully claiming, "No loyalty, just leaving me like that." Once he caught up, he softly hit the arm of one of the members while saying, "This is the punch of loyalty." The reactions of both of these two Stray Kids members to losing in Rock-Paper-Scissors demonstrate that, when they have lost, they have been frustrated by the game and endured its results for the greater good—not because they endorsed the outcome at the level of self-interest. As such, when putting their self-interest first, at least these two members have had temporary mental health that is negative from a loss in Rock-Paper-Scissors. However, this transient feeling has not appeared to influence their subsequent behavior. As an example, recently, the "man of principles" was part of a live broadcast with two of the other members, where he was the one who called for the use of Rock-Paper-Scissors more than once during the broadcast and appeared to willingly and happily accept the result even in instances when he lost (Stray Kids, 2024c), although on an earlier episode of another show he had said he wouldn't be playing the game again because he always lost (Stray Kids, 2022, 2:15 – 2:41).

Believing oneself to be a member of a team has been identified previously as a reason for those whose mental health is generally dependent on self-interest in decision-making to be willingly considerate of group members, with such consideration improving their mental health (Nash, 2023a; Nash, 2023b).

4.3. Strengths and limitations

The strength of employing the historical research method lies in its independence from secondary sources for assessment. As such, the ability to recognize what has been identified by this research is open to all other researchers who may want to investigate the referenced sources. With the historical research method, data are available for consideration that would not be recognized by alternative forms of research assessment.

A significant limitation is the dearth of academic assessment on intentional communities to date. As a result, there are few peer-reviewed references on these

communities for this work—often the case with original historical research (Kipping *et al.*, 2014)—representing a general limitation to the historical method (Pandey & Pandey, 2015).

Another limitation is that, despite this intentional community relying on the participation of all members rather than representation in decision-making, the author was unable to assess the views of all historically associated members of Stray Kids. Thus, individual viewpoints could potentially have led to results different from those recorded. For example, although the eight members of Stray Kids in 2024 are noticeably bound to each other and their group goals, one member left early in the group's history for undisclosed personal reasons (Delgado, 2019). However, there was likely significant interpersonal conflict that led to the breakup of this member with the group, as that past group member recently created an apology video to Stray Kids for his behavior (Chon, 2024). Understanding how Stray Kids navigated such challenges could be valuable in understanding their group cohesion regarding their decision-making; nevertheless, only a week after this ninth group member left, the remaining others acted on camera as if the group had always consisted of only eight members (Bang, 2019).

From these limitations, the consideration given to the ability of this assessment of the use of Rock-Paper-Scissors by Stray Kids in group-wide decision-making to apply to general society in meeting Goals 10 and 16 of the United Nations SDGs should be cautious. There are many necessary and interdependent variables for Stray Kids to make decisions able to meet Goals 10 and 16, the most important being trust in the ability of Bang Chan as a leader to keep the group intact and continue its success. These considerations can produce and maintain team mindfulness—mindfulness that has been found relevant to promoting positive mental health resulting from group decision-making (Nash, 2023a; Nash, 2023b).

5. Conclusion

This study aimed to contribute to the literature on intentional communities by exploring their ability to meet Goals 10 and 16 of the SDGs—specifically, promoting equality, peace, and justice through their decision-making processes. Recent interest in intentional communities as models for achieving these goals has prompted this research (Esteves *et al.*, 2021; Kaul *et al.*, 2022).

Examining the economically successful intentional community of Stray Kids, this study concludes that their use of luck-based decision-making, specifically the Rock-Paper-Scissors game, requires an understanding of the community's values and the participants' self-interest for sustainability. For this practice to be sustainable, it must enable the intentional community to persist while ensuring that each member finds the results acceptable.

Key factors influencing Stray Kids' decision-making process include: Prioritizing group stability, supporting individual values, addressing relevant issues, ensuring relevant decision time; making decision satisfaction a priority; and reconsideration of the outcome of a decision is an option—factors related to the SDGs of equality, peace, and justice—the most important to Stray Kids being group stability and making decisions quickly so the group can return to their work as a successful, self-producing K-pop group. Continued creativity and group cohesiveness gain support through any individual negative feelings representing reduced mental health being resolved quickly in this intentional community.

This result holds significant value for intentional communities considering changes in their decision-making practices in settling potential interpersonal conflicts to ensure their continued satisfaction with their decision-making process. Rock-Paper-Scissors, a game primarily played by two players, can also serve as a group activity, as demonstrated by Stray Kids in one of their earlier videos (Stray Kids, 2020). This demonstration might be helpful to those interested in using this game as a decision-making method. Placing the value of the group ahead of self-interest in group-wide decisions, the value of the group is paramount in resolving interpersonal conflicts and defines the positive mental health of group members. Societies accustomed to the supremacy of self-interest in decision-making might accomplish this by considering team mindfulness, the value of which this author examined elsewhere (Nash, 2023a; Nash, 2023b). If these practices extend beyond intentional communities to general society, they could contribute positively to achieving Goals 10 and 16 of the SDGs.

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Availability of data

Readers wanting access to the data may refer to Table 2, "Data of stray kids playing Rock-Paper-Scissors video recorded by them from 2018 to 2024 as part of one of their regular series posted on YouTube". The video locations are in the reference list.

Further disclosure

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References

Al Halbusi, H., Williams, K.A., Mansoor, H.O., Hassan, M.S., & Hamid, F.A.H. (2020). Examining the impact of ethical leadership and organizational justice on employees' ethical behavior: Does person-organization fit play a role? *Ethics and Behavior*, 30(7):514-532.

https://doi.org/10.1080/10508422.2019.1694024

Alzghoul, A., Khaddam, A.A., Abousweilem, F., Irtaimeh, H.J., & Alshaar, Q. (2022). How business intelligence capability impacts decision-making speed, comprehensiveness, and firm performance. *Information Development*, 40(5):026666692211084.

https://doi.org/10.1177/02666669221108438

Amankwah-Amoah, J., Khan, Z., & Wood, G. (2021). COVID-19 and business failures: The paradoxes of experience, scale, and scope for theory and practice. *European Management Journal*, 39(2):179-184.

https://doi.org/10.1016/j.emj.2020.09.002

Argyres, N.S., De Massis, A., Foss, N.J., Frattini, F., Jones, G., & Silverman, B.S. (2020). History-informed strategy research: The promise of history and historical research methods in advancing strategy scholarship. *Strategic Management Journal*, 41(3):343-368.

https://doi.org/10.1002/smj.3118

Bang, C. (Director). (2019). Chan's Room Ep. 43. Vol. 43. [Video]. YouTube. Available from: https://www.youtube.com/watch?v=JuESJvD3Zio [Last accessed on 2023 Dec 05].

Bell, C. (2022). Stray Kids Profile: SKZ on Touring, Connection, and Bringing "Genuine" Energy to the Stage. Teen Vogue. Available from: https://www.teenvogue.com/story/stray-kids-touring-connection-bringing-genuine-energy-to-the-stage-maniac-interview [Last accessed on 2023 Dec 05].

Bell, K., & Reed, M. (2021). The tree of participation: A new model for inclusive decision-making. *Community Development Journal*, 57(4):bsab018.

https://doi.org/10.1093/cdj/bsab018

Brockbank, E., & Vul, E. (2021). Formalizing opponent modeling with the rock, paper, scissors game. *Games*, 12(3):70.

https://doi.org/10.3390/g12030070

Caulfield, K. (2023). Stray Kids' '5-STAR' Debuts at No. 1 on Billboard 200 Albums Chart. Billboard. Available from: https://www.billboard.com/music/chart-beat/stray-kids-5-star-number-one-debut-billboard-200-albums-chart-1235351204 [Last accessed on 2023 Dec 05].

Celeb Confirmed (Director). (2023). Stray Kids-Bangchan Cries During Ending Ment: 5 Star Dome Tour Unveil 13 in Seoul [Video]. YouTube. Available from: https://www.youtube.com/shorts/qHxSd3O9RtQ [Last accessed on 2023 Oct 23].

Cheesesong (Director). (2021). Stray Kids Seo Changbin A Man with Principles (Seo Funny) [Video]. YouTube. Available from: https://www.youtube.com/watch?v=p5gP803H2aY [Last accessed on 2023 Dec 05].

Chon, S. (Director). (2024). Reverse : Breaking the Silence. D.I 228 Seoul [Video]. YouTube. Available from: https://www.youtube.com/watch?v=ecvJ0HE2NXA [Last accessed on 2024 Apr 01].

Coffey, A. (2014). Analysing documents. In: Flick, U. (ed.). The SAGE Handbook of Qualitative Data Analysis. United States: SAGE Publications, Inc., p.367-379.

https://doi.org/10.4135/9781446282243

Count B. (Director). (2024). KPOP YouTube Subscribers Today (1st-20th) [Video]. Available from: https://www.youtube.com/watch?v=33JgRSH-wbw [Last accessed on 2024 Apr 29].

Crystal-Stay (Director). (2022). Stray Kids Survival Show (Eng Sub) [Video]. YouTube. Available from: https://www.youtube.com/playlist?list=plhfxjztdj_6yvfr_guoocdyntuo_alby [Last accessed on 2023 Dec 05].

Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta BioMedica*, 91(1):157-160.

https://doi.org/10.23750/abm.v91i1.9397

De Guzman, C. (2023). Stray Kids Found Global Success by Embracing A New Sound. TIME. Available from: https://time.com/collection/next-generation-leaders/6317288/stray-kids [Last accessed on 2023 Dec 05].

De Santis, L.G., & Emery, Y. (2017). Comparing stakeholders' expectations of "good justice" in Switzerland: Toward a "Hybrid" judicial culture. *Justice System Journal*, 38(1):78-111.

https://doi.org/10.1080/0098261X.2016.1169960

Delgado, S. (2019). Stray Kids Member Woojin is Leaving the K-Pop Group. Teen Vogue. Available from: https://www.teenvogue.com/story/stray-kids-woojin-leaving-k-pop-group-personal-reasons [Last accessed on 2023 Oct 25].

Dorin, C., Hainguerlot, M., Huber-Yahi, H., Vergnaud, J.C., & De Gardelle, V. (2021). How economic success shapes redistribution: The role of self-serving beliefs, in-group bias and justice principles. *Judgment and Decision Making*, 16(4):932-949.

https://doi.org/10.1017/S1930297500008032

Dow Jones. (2024). JYP Entertainment Corp. Market Watch. Available from: https://www.marketwatch.com/investing/stock/035900/download-data?startdate=2/13/2018&enddate=03/14/2024&countrycode=kr [Last accessed on 2024 Mar 15].

Esin, C., Fathi, M., & Squire, C. (2014). Narrative analysis: The constructionist approach. In: Flick, U. (ed.). The SAGE Handbook of Qualitative Data Analysis. United States: SAGE Publications, Inc., p.203-216.

https://doi.org/10.4135/9781446282243

Esteves, A.M., Genus, A., Henfrey, T., Penha-Lopes, G., & East, M. (2021). Sustainable entrepreneurship and the Sustainable Development Goals: Community-led initiatives, the social solidarity economy and commons ecologies. *Business Strategy and the Environment*, 30(3):1423-1435.

https://doi.org/10.1002/bse.2706

Firth, R. (2019). Utopianism and intentional communities. In: Levy, C., & Adams, M.S., (eds.). The Palgrave Handbook of Anarchism. Cham: Springer International Publishing, p.491-510.

https://doi.org/10.1007/978-3-319-75620-2_28

Frances, L. (2018). Stray Kids Are Empowering A New Generation of K-POP. TMRW. Available from: https://www.tmrwmagazine.com/features/music/stray-kids-k-pop#:~:text=their%20music%20speaks%20for%20the,struggles%20of%20many%20young%20adults [Last accessed on 2023 Oct 25].

Fry, D.P., Souillac, G., Liebovitch, L., Coleman, P.T., Agan, K., Nicholson-Cox, E., Mason, D., Gomez, F.P., & Strauss, S. (2021). Societies within peace systems avoid war and build positive intergroup relationships. *Humanities and Social Sciences Communications*, 8(1):17.

https://doi.org/10.1057/s41599-020-00692-8

Ha, Y. (2024). Stray Kids to Release New Mini Album "ATE". K-Entertainment News. Available from: https://www.k-ennews.com/news/articleView.html?idxno=2121 [Last accessed on 2024 Jun 19].

Iwalyzy. (2021). Lyrics Han-Scissor. JSPinyin World Lyrics and Songs. Available from: https://lyrics-jspinyin-net.translate.goog/lyrics-han-scissor/?_x_tr_sl=ko&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=sc [Last accessed on 2023 Dec 05].

Jarvis, H. (2019). Sharing, togetherness and intentional degrowth. *Progress in Human Geography*, 43(2):256-275.

https://doi.org/10.1177/0309132517746519

Jeong, M., & Lee, J. (2024). Shares of K-pop Giants Hit by Falling Album Sales, Not Love Affairs. The Chosun Daily. Available from: https://www.chosun.com/english/industry-en/2024/03/12/er5r5usxebdp5agvncubycwbfe [Last accessed on 2024 Jun 26].

JYP Entertainment Co., Ltd. (2024). Schedule. Stray Kids. Available from: https://straykids.jype.com/default/schedule [Last accessed on 2024 Jul 02].

JYP Entertainment Corp. (2024). About JYP. JYP Leader in Entertainment. Available from: https://www.jype.com/en/JYP [Last accessed on 2024 Mar 09].

KapanLagi. (2021). Bang Chan STRAY KIDS' Story, Best Multitalented Leader-Controversy Arises from Old Viral Video. KapanLagi English. Available from: https://en.kapanlagi.com/korea/bang-chan-stray-kids-story-best-multitalented-leader-controversy-arises-from-old-viral-video.html [Last accessed on 2024 Oct 04].

Kaul, S., Akbulut, B., Demaria, F., & Gerber, J.F. (2022). Alternatives to sustainable development: What can we learn from the pluriverse in practice? *Sustainability Science*, 17(4):1149-1158.

https://doi.org/10.1007/s11625-022-01210-2

Kelley, C. (2019). Stray Kids Talk Songwriting, Career Goals and their First U.S. Tour. Forbes. Available from: https://www.forbes.com/sites/caitlinkelley/2019/06/06/stray-kids-talk-songwriting-career-goals-and-their-first-us-tour/?sh=2224c89b1c49 [Last accessed on 2024 Mar 09].

Kim, A. (2023). At Last, an End to COVID-19 Emergency in South Korea. The Korea Herald. Available from: https://www.koreaherald.com/view.php?ud=20230511000640 [Last accessed on 2024 Jun 26].

Kipping, M.R., Wadhwani, D., & Bucheli, M. (2014). Analyzing and interpreting historical sources: A basic methodology. In: Bucheli, M., & Wadhwani, R.D. (eds.). Organizations in Time: History, Theory, Methods. 1st ed. Oxford: Oxford University Press, p.305-330.

Kozakavich, S.C. (2023). Archeology of Utopian and Intentional Communities. United States: University of Florida Press.

https://doi.org/10.1007/s41636-018-0096-9

Krull, S., Pelster, M., & Steinorth, P. (2024). Skill, effort, luck: Determinants of rank-based endowments and risk-taking in a social setting. *Journal of Behavioral and Experimental Finance*, 42:100924.

https://doi.org/10.1016/j.jbef.2024.100924

Kymlicka, W. (2008). Multiculturalism, social justice and the

welfare state. In: Craig G., Burchardt, T., & Gordon, D. (eds.). Social Justice and Public Policy: Seeking Fairness in Diverse Societies. England: Policy Press, p.53-76.

Lahiri, S., & Sinha, M. (2021). A study of the socio-economic implications of the COVID-19 pandemic. *Australasian Accounting Business and Finance Journal*, 15(1):51-69.

https://doi.org/10.14453/aabfj.v15i1.5

Langtree, T., Birks, M., & Biedermann, N. (2019). Separating "Fact" from fiction: Strategies to improve rigour in historical research. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, 20(2):1-17.

https://doi.org/10.17169/FQS-20.2.3196

Lee Doesn't Know (Director). (2022). Changbin and his HATE for Rock-paper-scissors. 2 Kids Room [Video]. YouTube. Available from: https://www.youtube.com/shorts/llvd1Ife4kY [Last accessed on 2023 Dec 05].

Lee, J.L. (2023). JYP Entertainment Shares Soar Due to Success of its Artists. Korea JoongAng Daily. Available from: https://koreajoongangdaily.joins.com/2023/06/14/business/industry/JYP/20230614113619104.html [Last accessed on 2024 Jun 26].

Lee, Y. (2024). Heads of JYP, YG Bolster Confidence with Major Stock Purchases. The Korea Times. Available from: https://www.koreatimes.co.kr/www/biz/2024/03/602_367535.html [Last accessed on 2024 Jun 26].

Lister, R. (2008). Recognition and voice: The challenge for social justice. In: Craig G., Burchardt, T., & Gordon, D. (eds.). Social Justice and Public Policy: Seeking Fairness in Diverse Societies. Bristol: Policy Press, p.105-122.

Lopez, C., & Weaver, R. (2019). Placing intentional communities in geography. *Journal of Geography*, 118(5):197-209.

https://doi.org/10.1080/00221341.2019.1616803

Lu, H., Gonsalves, G.S., & Westreich, D. (2024). Selection bias requires selection: The case of collider stratification bias. *American Journal of Epidemiology*, 193(3):407-409.

https://doi.org/10.1093/aje/kwad213

Mages, K., & Fairman, J. (2008). Working with primary sources: An overview. In: Lewenson, S. (ed.). Capturing Nursing History: A Guide to Historical Methods in Research. Cham: Springer, p.129-148.

Martin, V., Flanagan, T.D., Vogus, T.J., & Chênevert, D. (2023). Sustainable employment depends on quality relationships between supervisors and their employees on the autism spectrum. *Disability and Rehabilitation*, 45(11):1784-1795.

https://doi.org/10.1080/09638288.2022.2074550

McIntyre, H. (2023). Stray Kids Are Responsible for 2% of All CD Sales in the U.S. In 2023. Forbes. Available from: https://www.forbes.com/sites/hughmcintyre/2023/07/18/stray-kids-are-responsible-for-2-of-all-cd-sales-in-the-us-in-2023/?sh=77ad92945f9c [Last accessed on 2024 Feb 09].

Micheli, L., & Gagnon, N. (2020). Unequal chances: Ex ante fairness and individual control. *Scientific Reports*, 10(1):21862.

https://doi.org/10.1038/s41598-020-78335-w

Mullet, E., López López, W., & Pineda Marín, C. (2021). Forgiveness and reconciliation in post-conflict settings. In: López López, W., & Taylor, L.K. (eds.). Transitioning to Peace. Cham: Springer International Publishing, p.67-90.

https://doi.org/10.1007/978-3-030-77688-6_5

Nash, C. (2023a). Team mindfulness for healthcare burnout reduction. *Journal of Mental Health Disorders*, 3(1):16-17.

https://doi.org/10.33696/mentalhealth.3.017

Nash, C. (2023b). Team mindfulness in online academic meetings to reduce burnout. *Challenges*, 14(1):15.

https://doi.org/10.3390/challe14010015

Otsuka, M., & Voorhoeve, A. (2018). Equality versus priority. In: Olsaretti, S. (ed.). The Oxford Handbook of Distributive Justice. 1st ed. Oxford: Oxford University Press, p.65-85.

Pandey, P., & Pandey, M.M. (2015). Research methods. In: Research Methodology Tools and Techniques. United States: Bridge Center, p.78-83. Available from: https://dspace.vnbrims.org:13000/jspui/bitstream/123456789/4666/1/research%20methodology%20tools%20and%20techniques.pdf [Last accessed on 2023 Dec 05].

Pinkkoyaa Films (Director). (2023). BTS Playing Rock Paper Scissors [Video]. Available from: https://www.youtube.com/watch?v=-leEVFfVu90 [Last accessed on 2024 Apr 29].

Rai, S.S., Rai, S., & Singh, N.K. (2021). Organizational resilience and social-economic sustainability: COVID-19 perspective. *Environment, Development and Sustainability*, 23(8):12006-12023.

https://doi.org/10.1007/s10668-020-01154-6

Ranieri, A.Y., Kauffman, S.S., & Schneider, S.L. (2019). Good fortune but bad luck? Predictable versus unpredictable gains and losses in risky choice. *Journal of Behavioral Decision Making*, 32(3):359-372.

https://doi.org/10.1002/bdm.2117

Reychler, L. (2015). Time, "Temporament," and sustainable peace: The essential role of time in conflict and peace. *Asian Journal of Peacebuilding*, 3(1):19-41.

https://doi.org/10.18588/201505.000034

Rubin, Z., Willis, D., & Ludwig, M. (2019). Measuring success in intentional communities: A critical evaluation of commitment and longevity theories. *Sociological Spectrum*, 39(3):181-193.

https://doi.org/10.1080/02732173.2019.1645063

Sager, T. (2018). Planning by intentional communities: An understudied form of activist planning. *Planning Theory*,

17(4):449-471.

https://doi.org/10.1177/1473095217723381

Saliternik, M. (2016). Perpetuating democratic peace: Procedural justice in peace negotiations. *European Journal of International Law*, 27(3):617-642.

https://doi.org/10.1093/ejil/chw032

Salomon Quotes (Director). (2024a). Amazing! STRAY KIDS becomes the Only Kpop Idol Group to Enter Forbes Korea's 2024 "30 Under 30" List [Video]. YouTube. Available from: https://www.youtube.com/watch?v=aFfg7PNB9Xk [Last accessed on 2024 Mar 10].

Salomon Quotes (Director). (2024b). STRAY KIDS' Felix, I.N, and Hyunjin Are on the List of the 10 Most Talked about Fashion Celebrities [Video]. YouTube. Available from: https://www.youtube.com/watch?app=desktop&v=kjk4JgCBLGU [Last accessed on 2024 Mar 11].

Salomon Quotes. (2024c). STAY Prepared! STRAY KIDS Will Reportedly Make their Biggest Comeback At the End of April 2024 [Video]. YouTube. Available from: https://www.youtube.com/watch?v=nk3VhENGneA [Last accessed on 2024 Mar 15].

Sauder, M. (2020). A sociology of luck. *Sociological Theory*, 38(3):193-216.

https://doi.org/10.1177/0735275120941178

Shin, H., & Smith, J. (2022). South Korea Looks to End COVID Restrictions Despite Record Surge in Cases, Deaths. Reuters. Available from: https://www.reuters.com/world/asia-pacific/skorea-reports-record-new-daily-covid-cases-deaths-kdca-2022-03-17 [Last accessed on 2024 Jun 26].

Shopee Indonesia (Director). (2020). Hebohnya Stray Kids Main Hammer Game! (ENG Sub). Shopee Online Fanmeet. Shopee [Video]. YouTube. Available from: https://www.youtube.com/watch?v=MMOrAoYLAgI [Last accessed on 2024 Apr 29].

Singh, S., Karakoç, E., & Blais, A. (2012). Differentiating winners: How elections affect satisfaction with democracy. *Electoral Studies*, 31(1):201-211.

https://doi.org/10.1016/j.electstud.2011.11.001

Sisario, B. (2023). Stray Kids Score Another No. 1 With "Rock-Star." The New York Times. Available from: https://www.nytimes.com/2023/11/20/arts/music/stray-kids-rock-star-billboard-chart.html [Last accessed on 2023 Dec 08].

Sousa, M., Almeida, M.F., & Calili, R. (2021). Multiple criteria decision making for the achievement of the UN Sustainable Development Goals: A systematic literature review and a research Agenda. *Sustainability*, 13(8):4129.

https://doi.org/10.3390/su13084129

Spotify. (2022). From Unconventional Debut To Self-Producing Idols, This Is Why We Stan Stray Kids [K-Pop ON! Track]. Spotlight ON! Available from: https://kpopontrack.byspotify.com/spotlight/from-unconventional-debut-to-self-producing-idols-this-is-why-we-stan-stray-kids [Last accessed on 2024 Mar 09].

Stay Inn (Director). (2024). March 7 News in STAY World [Video]. YouTube. Available from: https://www.youtube.com/watch?app=desktop&v=3WtK4UrjljA [Last accessed on 2024 March 11].

Stray Kids (Director). (2018). Stray Kids Funny Moment-Changbin Hyunjin Seungmin Rock Paper Scissor [Video]. YouTube. Available from: https://www.youtube.com/watch?v=xgmNUGMVnEM [Last accessed on 2023 Dec 05].

Stray Kids (Director). (2020). [Eng Sub] (Spot Kids : Black) Stray Kids Playing Rock-Paper-Scissors [Video]. YouTube. Available from: https://www.youtube.com/watch?v=FCoq4zmFw-I [Last accessed on 2024 Apr 29].

Stray Kids (Director). (2021). 가위바위보 게임과 스트레이 키즈. Rock Paper Scissors Game and Stray Kids [Video]. YouTube. Available from: https://www.youtube.com/shorts/wwQ-LfdswFc [Last accessed on 2024 Apr 29].

Stray Kids (Director). (2022). [2 Kids Room] Ep.14 Bang Chan X Changbin. Vol. 14. [Video]. YouTube. Available from: https://www.youtube.com/watch?v=g2nzG4CFDLs&t=141s [Last accessed on 2024 Apr 29].

Stray Kids (Director). (2023a). Time Out #1 MT Part 3. [SKZ Code] Ep.35. Vol. 35. [Video]. YouTube. Available from: https://www.youtube.com/watch?v=kuwmx5hty6g&list=plvn_yqlzvwglgjtdtboaclw8yu77ewnjd&index=35 [Last accessed on 2023 Dec 05].

Stray Kids (Director). (2023b). [2 Kids Show] Ep.01 HAN X Seungmin. VOLCANO, Hold On. With MC Changbin. Vol. 1. [Video]. YouTube. Available from: https://www.youtube.com/watch?v=M2gEBq955jU [Last accessed on 2024 Apr 29].

Stray Kids (Director). (2024a). Stray Kids [Video]. YouTube. Available from: https://www.youtube.com/@straykids/videos [Last accessed on 2024 Mar 15].

Stray Kids (Director). (2024b). 2024 스키즈 대담 (2024 SKZ Conference) #1 [Variety Show]. JYP Entertainment, YouTube. Available from: https://www.youtube.com/watch?v=dQvh06oEwcc [Last accessed on 2024 Mar 14].

Stray Kids (Director). (2024c). 미니허니비니 [Video]. Available from: https://www.youtube.com/watch?v=vXbx3Ppm5zc [Last accessed on 2024 Apr 29].

Stray Kids (Director). (2024d). 토끼와 거북이 (The Tortoise and the Hare) #1 | [SKZ Code] Ep.49. Vol. 49. [Video]. YouTube. Available from: https://www.youtube.com/watch?v=L5pYlIc_Fp8 [Last accessed on 2024 Apr 25].

The Seeds for Change Collective. (2007). How to make decisions by consensus. In: The Trapese Collective, (ed.). Do It Yourself: A Handbook for Changing our World. London: Pluto Press, p.63-77.

United Nations. (2015). Take Action for the Sustainable Development Goals. Sustainable Development Goals. Available from: https://www.un.org/sustainabledevelopment/sustainable-development-goals [Last accessed on 2024 Jun 25].

United Nations. (2023). The Sustainable Development Agenda. Sustainable Development Goals. Available from: https://www.un.org/sustainabledevelopment/development-agenda [Last accessed on 2024 Mar 14].

Wei, X., Li, L., & Zhang, F. (2021). The impact of the COVID-19 pandemic on socio-economic and sustainability. *Environmental Science and Pollution Research*, 28(48):68251-68260.

https://doi.org/10.1007/s11356-021-14986-0

Wicks, H. (2023). Meet the K-Pop Idol: Who Is Bang Chan? Meet the Leader, Producer of Stray Kids That Pretty Much Created the Group. J-14. Available from: https://www.j-14.com/posts/bang-chan-is-the-leader-producer-of-stray-kids-meet-k-pop-idol/#:~:text=bang%20chan%20can%20do%20it,star%20and%20his%20life%20story [Last accessed on 2023 Dec 25].

X INKIGAYO (Director). (2019a). [EP01] (KOR/ENG SUB) 스트레이키즈 인기가요 출첵라이브 1부 (Stray Kids Inkigayo Check-in LIVE Ep.01) [Video]. YouTube. Available from: https://www.youtube.com/watch?v=11eDNf3IV2U [Last accessed on 2023 Dec 05].

X INKIGAYO (Director). (2019b). [EP02] (KOR/ENG SUB) 스트레이키즈 인기가요 출첵라이브 2부 (Stray Kids Inkigayo Check-in LIVE Ep.02) [Video]. YouTube. Available from: https://www.youtube.com/watch?v=-XKrGIpv9BE [Last accessed on 2023 Dec 05].

Xu, X., & Liu, J. (2024). Promotional games in service recovery: Luck works. *Annals of Tourism Research*, 105:103691.

https://doi.org/10.1016/j.annals.2023.103691

Young, J.Y. (2023). K-Pop in Uniform: All 7 BTS Members Are Doing Military Service. The New York Times. Available from: https://www.nytimes.com/2023/12/12/world/asia/bts-military-service-south-korea.html [Last accessed on 2024 Mar 10].

Zentner, A. (2021). Qualitative Data Analysis. United States: SAGE Publications, Inc.

https://doi.org/10.4135/9781071865859

Zhu, J. (2023). The Road to Success: What Qualities Can We Learn from Kpop Idols? SONICAL.LY. Available from: https://www.sonical.ly/blog-post/the-road-to-success-what-qualities-can-we-learn-from-kpop-idols [Last accessed on 2023 Dec 09].

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ORIGINAL RESEARCH ARTICLE

Disposition of health-care workers toward hospital patients during the COVID-19 pandemic in Nigeria

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Abstract

During the second wave of the COVID-19 pandemic, the World Health Organization declared health-care workers "the last line of defense against the COVID-19 pandemic." Against this backdrop, this study investigated the state, responses, and attitudes of health-care workers toward hospital patients during the pandemic in Nigeria, alongside the attitudes of patients and the responsibilities of Nigerian social workers in ensuring adequate patient care. Employing a descriptive research design, the study sampled 17 respondents from Enugu State and utilized a qualitative research approach with an in-depth interview guide for data collection. The findings revealed that Nigerian healthcare workers exhibited a negative attitude toward hospital patients during the pandemic. Factors contributing to this negative attitude include fear of contracting the virus due to inadequate personal protective equipment, lack of incentives, insufficient hazard allowances, and inadequate hospital facilities. The death rate of patients with complications unrelated to COVID-19 was high because patients avoided hospital care even when critically ill due to fear of contracting the virus. Consequently, there was an increase in self-medication and reliance on alternative medicine among patients. Social workers played a significant role by advocating for improved hospital care and welfare for patients. They engaged in dialogue with hospital management to secure better attention and treatment for patients and advocated for adequate welfare provision for health-care workers. Social workers undertook educational initiatives to raise awareness among patients about the dangers of alternative medicine, self-medication, and the imperativeness of complying with the stipulated COVID-19 preventive protocol. In conclusion, this study recommends policy reforms aimed at enhancing budgetary allocations to the health-care sector and institutionalizing the social work profession in Nigeria through constitutional provisions.

Keywords: Healthcare workers; Hospital patients; COVID-19 pandemic; Social work

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1. Introduction

SARS-CoV-2 (coronavirus), a novel virus suspected to have originated from a wildlife market in Wuhan City, China, in December 2019 (Johns Hopkins Medicine, 2020), primarily causes mild-to-moderate respiratory illnesses in the majority of infected individuals, who typically recover without requiring special treatment. However, older

adults and those with underlying medical conditions such as cancer, diabetes, cardiovascular disease, and chronic respiratory diseases are more likely to develop serious illnesses (the World Health Organization [WHO], 2020). In 2020, globally, more than 100,000,700,000 individuals had been infected by COVID-19; the virus had claimed the lives of over 516,000 individuals, and an end to the pandemic was not yet in perspective. However, over 548,000,000 individuals have recovered from the virus (Worldometer, 2020).

Health-care workers have played a prominent role in the global battle against the COVID-19 pandemic, serving on the frontlines against the virus. The director-general of the WHO described them as the last line of defense in this war. Despite their pivotal role, healthcare workers have also been identified as a vulnerable group in the fight against the virus. The impact of COVID-19 on health-care workers has been severe. Globally, over 230,000 health-care workers have been infected by the virus (Kenny, 2020), with at least 62,690 cases reported among healthcare workers in the United States (US) (Sternlicht, 2020). Tragically, 600 out of the infected healthcare workers have lost their lives to COVID-19 (Jewett *et al*., 2020). In Nigeria, at least 812 healthcare workers have tested positive for COVID-19, including 29 cases among the staff of the Nigerian Center for Disease Control (NCDC) (Adejoro, 2020). The spike in the number of infections and deaths among healthcare workers was attributed to the shortage of PPE.

In Nigeria, various studies conducted under different circumstances have explored the attitudes of healthcare workers toward patients. One prominent example is the aftermath of the Ebola outbreak, where a significant number of healthcare workers responded to patients with intense fear and suspicion, leading to suboptimal care and attention (Oluyemi *et al.,* 2018). Another study examined the attitudinal disposition of Nigerian health-care workers toward human immunodeficiency virus (HIV)-positive patients, revealing widespread discrimination and poor treatment (Daniel, 2014). Similarly, a study in Ogun State investigated the attitude of healthcare workers toward patients and colleagues infected with HIV, revealing discriminatory behavior driven by fear of contracting the virus (Sadoh *et al*., 2020). This issue extends beyond Nigeria; a study in Iran examined the knowledge levels and attitudes of health professionals toward patients with hepatitis C infection, revealing discriminatory attitudes toward these patients (Joukar *et al*., 2012).

An array of studies in Nigeria has portrayed the difficulties and challenges encountered by healthcare workers during the COVID-19 pandemic in Nigeria. For example, Okediran *et al*. (2020), using a qualitative method, investigated the experience of health-care workers during the COVID-19 crisis in Lagos, Nigeria. Their study revealed that limited resources were the major challenges faced by healthcare workers during the COVID-19 pandemic in Lagos, Nigeria. Similarly, Ilesanmi & Fagbule (2020), in a review study, opined that limited knowledge about the novel coronavirus and an inadequate supply of personal protective equipment (PPE) were the major challenges faced by healthcare workers during the COVID-19 pandemic in Nigeria. Furthermore, PPE such as masks, gloves, hand sanitizers, and other protective equipment is not readily available in health-care facilities. Health-care workers' lack of adequate welfare was an enormous source of discouragement in an effort to combat the COVID-19 pandemic in Nigeria. Healthcare workers' hazard allowances were not paid when they were due, and there were a lot of unfulfilled government promises. Healthcare workers in Nigeria went on strike more than two times in 2020 in protest of the poor remuneration of doctors and other health-care practitioners (Akindare, 2020).

Before the COVID-19 pandemic, scholars explored the attitudes of health-care workers toward hospital patients in Nigeria. However, with the emergence of COVID-19, the horizon has shifted drastically. Despite these changes, there have been no empirical studies investigating health-care workers' attitudes toward hospital patients during the COVID-19 pandemic in Nigeria. Hence, this study aims to fill this gap by exploring the factors influencing healthcare workers' attitudes toward hospital patients in Nigeria during the COVID-19 pandemic. The following research questions guided the study: (i) What are the perceptions of health-care workers' attitudes toward hospital patients during the COVID-19 pandemic? (ii) what are the attitudes of community members/patients toward hospital care during the COVID-19 pandemic? (iii) what are the measures to manage and improve the attitude of health-care workers toward hospital patients? (iv) what are the roles of social workers in addressing attitude-related problems among healthcare workers and community members/patients toward hospital care during the COVID-19 pandemic?

2. Methods

2.1. Research design

The study was designed to examine, describe, and analyze the attitude of health-care workers toward hospital patients during the COVID-19 pandemic in Nigeria while also examining the role of social workers in ensuring adequate care for patients and the well-being of health-care workers. The study adopted a descriptive research design, which is a scientific method used to learn more about a specific

population or phenomenon. This type of research provides an in-depth and accurate image of the characteristics and actions of a certain group or topic (Sirisilla, 2023). Descriptive research enables researchers to gather data in a methodical way to characterize a population, circumstance, or phenomenon. Researchers can gain a deeper understanding of a certain issue through observations and data collection, which can serve as a foundation for further investigation (VOXCO, 2021; Sirisilla, 2023). This research design facilitated a real-time exploration of healthcare workers' attitudes toward hospital patients amid the 2020 COVID-19 pandemic in Nigeria, as well as an examination of the pivotal role of social workers in ensuring patients' access to effective health-care. Furthermore, it enabled the researchers to incorporate and describe a strong theme that emerged in the field: the attitude of community members/patients toward hospital care during the COVID-19 pandemic in Nigeria.

2.2. Area of the study

Participants for this study were drawn from Enugu State, one of Nigeria's 36 states, and were among those significantly impacted by the COVID-19 pandemic. By mid-August 2020, Enugu State had reported a total of 976 COVID-19 cases, with 19 fatalities, 650 patients discharged, and 307 cases actively receiving treatment. The crude case fatality rate at the time stood at 1.95%. The moderately deficient health systems of Enugu State, caused by inadequate funding from the public sector and a high burden of infectious diseases such as tuberculosis, HIV, and malaria, may have contributed to the rise in the COVID-19-linked fatality rate between February and August 2020 (Strategic Purchasing Africa Resource Centre [SPARC], 2021). Further insight was gained from two doctors in Lagos who were among those protesting due to issues such as unpaid allowances, hazard allowances, and poor working conditions. These concerns were highlighted during a live broadcast on Arise News Television.

Nigeria's population was projected to reach 226.2 million by December 2023, with an average annual growth rate exceeding 2% from 1965 to 2023. In 2023, the population increased by 2.44% compared to the previous year. The most populous nation in Africa is Nigeria (Statista, 2023). Similarly, the current population estimate for Enugu in 2024 is 875,552. There were 59,663 residents in Enugu in 1950. Enugu's annual growth rate over the past year has been 3.42% (28,992 residents) (World Population Review, 2024). Furthermore, Enugu State has a total of 868 health-care facilities, comprising 524 primary health-care facilities, 342 secondary health-care facilities, and two tertiary health-care facilities (Procurement Monitor, 2024). The University of Nigeria Teaching Hospital (UNTH) in Enugu and the Enugu State University of Science and Technology (ESUT) Teaching Hospital, Parklane Enugu, are the two tertiary health-care facilities in Enugu State. The UNTH accommodates up to 500 active beds (UNTH, 2024), while ESUT Teaching Hospital's intensive care unit (ICU) is equipped with four beds and various medical equipment such as ventilators, suction machines, defibrillators, i-stat machines, multiparameter monitors, and syringes and infusion pumps (Eya *et al.,* 2022). The ESUT Teaching Hospital has a total of 350 healthcare workers (Onoh, 2021). In Nigeria, medical doctors earn an average monthly salary of 217,000 Naira (Glassdoor, 2024).

2.3. Sample size

In the study, the sample size consisted of 17 respondents, comprising three medical social workers, four healthcare workers (including a public health-care worker, a doctor, and two nurses), and 10 community members. Two of the medical social workers were selected from the University of Nigeria, Nsukka Medical Centre, and one from the UNTH, Ituku Ozalla. The medical social workers were selected to provide their perspective on the role of social workers in ensuring adequate healthcare for patients during the COVID-19 pandemic. Among the healthcare workers, a doctor was selected from the University of Nigeria, Nsukka Medical Centre, while the first nurse was selected from Bishop Shanahan Hospital, Nsukka, and the second nurse was from the UNTH, Ituku Ozalla, Enugu. In addition, a public healthcare worker was selected from the Faith Foundation Hospital Nsukka, Enugu State. The remaining 10 respondents were community members and non-healthcare workers from different walks of life, such as farmers, traders, and civil servants. These individuals were selected based on their recent hospital visits within 6 months from the onset of the COVID-19 pandemic in Nigeria (February 27, 2020). Their participation was crucial in providing perspectives on health-care workers' attitudes toward hospital patients during the COVID-19 pandemic and the attitudes of community members and patients toward hospital care.

2.4. Sampling technique

The study adopted a non-probability sampling technique. This method is usually adopted when random probability sampling is not practicable due to time or money constraints (Fleetwood, 2023). Non-probability sampling is equally adopted when peculiar characteristics are sorted out among the population, such as in this study, where key informants such as healthcare workers and social workers are needed. Purposive and availability sampling were employed to select the respondents for this study. Medical social workers and healthcare workers were purposefully selected for this study.

Among those selected, only those available were eventually interviewed, according to availability sampling principles. The additional 10 community members who participated in the study were chosen using availability sampling. Criteria for their selection included recent hospital visits for treatment within 6 months from the date of the first reported COVID-19 case in Nigeria on February 27, 2020.

2.5. Instrument for data collection

The instrument for data collection was an unstructured, in-depth interview (IDI) guide. This made it possible for the inclusion of strong themes identified in the field. The data for the study were collected between October 5, 2020, and November 30, 2020. One-third of the interviews were done over the telephone because of the prevalence of the COVID-19 pandemic at the time and compliance with strict preventive measures. The researchers were assisted by research assistance from the Department of Social Work, University of Nigeria, Nsukka. A qualitative approach was employed for the study using thematic analysis. The audio records were transcribed and categorized into themes.

2.6. COVID-19 protocol

Special precautions were adhered to in line with the guidelines from the NCDC for COVID-19 infection prevention. These guidelines included wearing face masks throughout interviews, maintaining a two-meter distance between the interviewer and interviewee, and using hand sanitizer before and after the interview. In addition, one-third of the interviews were conducted through phone to further observe a stringent social distancing protocol. The cost of the PPE, such as nose masks, hand gloves, and hand sanitizers, was funded entirely through the researchers' personal expenses, without any external funding or aid.

2.7. Ethical approval

Ethical approval to conduct the study was obtained from the Ethical Review Board of the UNTH, Ituku Ozalla. The approval number is NHREC/05/01/2008B-FWA00002458-1RB00002323. This approval was crucial to ensuring the safety of human subjects involved in the data collection process. Verbal informed consent was obtained from all the respondents before the interviews were conducted. The respondents were informed that participation in the study was voluntary and that they had the right to withdraw from the study at any point during the interview. The anonymity of the respondents was strictly observed throughout the study to ensure confidentiality.

2.8. Limitations of the study

The study encountered several limitations. Many healthcare workers declined to participate, citing discomfort in discussing healthcare workers' attitudes toward hospital patients during the COVID-19 pandemic. One nurse, in particular, declined to participate in the study and expressed concerns about potential repercussions despite assurances from researchers that participation was strictly for academic purposes and guaranteed the anonymity of the respondents. There were also financial constraints; the researcher received no funding for the study. This limitation restricted the sample size due to the researchers' limited out-of-pocket expenses. Despite these limitations, the study remains valuable and contributes significantly to both theoretical understanding and practical implications.

3. Results

3.1. Demographic characteristics of the respondents

This section presents the demographic characteristics of the study respondents. The presented variables include gender, age, occupation, religion, educational qualification, and marital status.

Table 1 summarizes the demographic characteristics of the 17 study participants, whereby six respondents were male and 11 were female. The mean age of the respondents was 41 years. In addition, the occupational distribution of the respondent comprises four healthcare workers (including a doctor, a public healthcare worker, and two nurses), three medical social workers, three farmers, two traders, a salesgirl, a civil servant, a provision store seller, and a nursing mother. Religious affiliations were predominantly Christians (13), with two respondents belonging to African traditional religion (ATR) and one respondent identifying as an atheist. The distribution of the respondents by educational qualification included four with a Master of Science (M.Sc.) degree, four with a Bachelor of Science (BSc) degree, one with a Higher National Diploma (HND), one with an Ordinary National Diploma (OND), four with West African Examination Council (WAEC) certification, and three with a First School Leaving Certificate (FSLC). Marital status among respondents was as follows: 14 were married, two were single, and one was widowed.

3.2. Public perception of the attitude of healthcare workers toward hospital patients during COVID-19 pandemic

The study revealed that hospital staff members' attitudes toward patients during the COVID-19 epidemic were extremely unfavorable and subpar. Healthcare workers could not effectively attend to patients because of their fear of contracting COVID-19. Patients were avoided by medical practitioners during this period. This sentiment was captured in the following illustrative quotes:

Table 1. Sociodemographic characteristics of the study respondents

S/N	Gender	Age	Occupation	Religion	Education	Marital status
IDI 1	Male	52	Doctor	Christian	M.Sc	Married
IDI 2	Female	40	Public health-care worker	Christian	M.Sc	Married
IDI 3	Female	35	Nurse	Christian	BSc	Married
IDI 4	Male	38	Nurse	Christian	BSc	Married
IDI 5	Female	39	Medical social worker	Christian	M.Sc	Married
IDI 6	Female	29	Medical social worker	Christian	M.Sc	Married
IDI 7	Male	34	Medical social worker	Atheist	BSc	Single
IDI 8	Female	40	Grass-cutting worker	Christian	WAEC	Married
IDI 9	Male	36	Nursing mother	Christian	HND	Married
IDI 10	Female	55	Civil servant	Christian	BSc	Married
IDI 11	Female	59	Farmer	ATR	OND	Widow
IDI 12	Female	50	Trader	Christian	FSLC	Married
IDI 13	Female	43	Farmer	Christian	WAEC	Married
IDI 14	Female	50	Trader	Christian	WAEC	Married
IDI 15	Female	19	Sales girl	Muslim	FSLC	Single
IDI 16	Male	47	Farmer	ATR	FSLC	Married
IDI 17	Male	37	Provision store seller	Christian	WAEC	Married

Abbreviations: ATR: African Traditional Religion; BSc: Bachelor of Science; FSLC: First School Leaving Certificate; M.Sc.: Master of Science; OND: Ordinary National Diploma; S/N: Serial Number; WAEC: West African Examination Council.

> "Most of the healthcare workers in Nigeria abandoned their patients. Patients were abandoned because healthcare workers were scared of COVID-19. At the peak of the coronavirus in Nigeria, a patient was carried to the hospital in a vehicle, and when the patient was brought out of the vehicle, he was vomiting and very sick. The nurses saw the condition of the patient, and they all ran away. One went to the toilet and never came out until the patient was carried out of the hospital. Health-care workers took social distancing to the extreme and abandoned their patients. Most of the patients that went to the hospital received poor treatment" (IDI 17: provision store seller).
>
> "My mom was hospitalized at the University of Nigeria Nsukka Medical Centre when COVID-19 started. This period was a very bad one. The nurses deserted the hospital; my mother was not being taken care of by the nurses. A lot of the nurses stopped coming to work when the lockdown began. My mom's condition became worse because of the lack of care from the healthcare workers. I had to take her home and continue with herbal treatment" (IDI 12: trader).

At the peak of the COVID-19 pandemic in Nigeria, health-care workers were afraid to come close to patients out of fear of contracting the virus. This led to a record high of non-COVID-19-related deaths. Healthcare workers avoided patients on discovery of any of the symptoms of COVID-19. Extracts from IDI respondents are as follows:

> "Patients were abandoned by health-care workers, especially when they saw symptoms of coronavirus in the patients; the patients passed away due to lack of care. Most of the people who went to the hospital during this period died. A patient's informal caregiver was denied access to the hospital to meet and take care of his sick relative, and later on, the patient passed away due to lack of care. Hospital patients were not taken care of. A lot of them passed away" (IDI 9: nursing mother).
>
> "Many people who had other illnesses before COVID-19 passed away during COVID-19. Hospitals were short-staffed partially because the healthcare workers were not attending to the patients, and some stopped going to work. Patients were literally abandoned by the healthcare worker. Hence, many rich men also passed away. Those rich men who go abroad for medical checkups could not go because of the lockdown and travel bans, and as a result, many of them passed away" (IDI 13: farmer).

Some factors that influenced the negative attitude of health-care workers toward hospital patients during the COVID-19 pandemic were identified through IDIs. Some of the factors include lack of PPE and hospital equipment in general; lack of incentive and hazard allowances; and

unpaid salaries. According to IDI respondents, doctors and nurses, especially in public hospitals, avoided their responsibilities due to a lack of necessary equipment to work with. Items such as hand sanitizers, gloves, face masks, temperature checkers, and test kits were not available. An illustrative quote from an IDI respondent underscores this perspective:

> "Healthcare workers were afraid to engage because they were not well equipped. There is nothing like a hand glove or a common face mask. Assuming you are a healthcare worker, there is no face mask; there is no glove, and no overall vest that 10 naira can buy; the government cannot provide it. How do you expect health-care workers to approach patients whose COVID-19 status is unknown? Just put yourself in their shoes. My mother, who was a health-care worker, passed away on December 22, 2010; to date, they have not paid her entitlement. Would you want to risk your life and leave your family in hardship?" (IDI 2: public health worker).

Medical doctors in Nigeria have gone on strike twice since the first COVID-19 case was reported in February 2020. Some of the striking doctors on demonstration in Lagos State were captured in a live broadcast on Arise News Television. They voiced concerns about the lack of incentives, hazard allowances, unpaid salaries, and inadequate equipment, which they identified as major factors contributing to the negative attitude of health-care workers toward combating COVID-19 in Nigeria. The following quotes were captured from these striking doctors:

> "What we are asking is that we get paid for the work we are doing. We were promised a COVID-19 hazard allowance, but up until now, none of our members have been paid. The Lagos State government instituted an insurance scheme for medical workers who died from COVID-19, and as we speak, we have lost a lot of medical workers to COVID-19, and members of their families do not even have hope of receiving anything from the government. A promise has been made, and this promise has to be fulfilled. We are losing health-care workers, so we are already an endangered species in this COVID-19 pandemic. If we lose our lives, who is going to fight the pandemic in the hospitals? Just because we do not have the necessary equipment to work with. More importantly, we do not think that we are doing any disservice to the populace by engaging in strike action. We are trying to let the government do the right thing. Looking at the health system in Nigeria, it is obvious that it is weakened and threatened. Can you look at the budget of this present government? The health budget and that of education were slashed. The health budget was slashed by 43%; this is not what we need now. This means that we are not giving things actual priority. Every aspect of the Nigerian economy is affected; why should the health budget be cut down at this point? (Live Arise News Television Broadcast: doctor "A").
>
> "If we don't cry out now and make our voices heard, when will we do so? We do not have a listening government. Health should not be relegated to the background. The health system in Nigeria is dying, if it is not already dead. Hence, many of us have left the country because of the insincerity of the government. Protective equipment to work with is not available in our hospitals. Over 800 health workers have been infected by a coronavirus in Nigeria. Our demand at state tertiary institutions is COVID-19 inducement allowance and insurance. For example, in Lagos, we have been shortchanged for years. We are not paid well. Our residential quarters are in bad condition. For example, at Lagos State University (LASU), we have had to endure. We are resident doctors, and as resident doctors, we have to be accommodated within the hospital or, at most, around the hospital. We need good accommodations. In this COVID-19 pandemic, our doctors were stranded; they could not come to work at the early period of the lockdown because there was no transportation" (Live Arise News Television Broadcast: doctor "B").

3.3. The attitude of community members/patients toward hospital care during the COVID-19 pandemic

The attitude of community members/patients toward hospital care during the COVID-19 pandemic in Nigeria was very poor. The attitude was one of fear and fright. Many people who were sick during this COVID-19 pandemic in Nigeria were afraid to approach the hospital so that they would not get infected. Some community members who are sick prefer to die at home rather than go to the hospital. A lot resorted to self-medication and herbal treatment; consequently, a lot of deaths and worsened health situations were reported in Nigeria outside of COVID-19 infections. The following is a quote from an IDI respondent:

> "Many community members don't want to go to the hospital because they don't know who has the coronavirus there. From the examples in Italy, the USA, and Europe, it was the health-care workers who contracted the virus the most. So, regular hospital patients in Nigeria don't want to go to a hospital out of fear of contracting the virus. What patients say is, "Instead of going to the hospital to contract coronavirus, let me manage this sickness that I have."

> Many stayed at home to manage their sickness. Some don't even have money for drugs because of the lockdown without palliative care. Most people patronized chemist shops. The only people who come to the hospital are people who are almost dead or who can't manage themselves again. People died a lot during this period, but not from coronaviruses; there was a lot of self-medication" (IDI 4: nurse).

Some IDI respondents expressed a negative and poor disposition toward hospital care because they did not trust the healthcare workers, especially the nurses and doctors, whom they viewed as potential carriers of the coronavirus because they were not well covered and equipped against the virus. The following are the illustrative quotes from these respondents:

> "Somebody like me is not going to the hospital; the reason is that the nurses there are coronavirus suspects because they are not well covered with PPE. I have fear in me; I can't go to the hospital, and instead, we go to herbal treatment (unorthodox medication). Many people have turned to herbal treatments. Before, many people went to the hospital when they had malaria or typhoid, but now we don't go to the hospital because the doctors are not covered. We now turn to herbal treatment, using roots and leaves to cure our sickness" (IDI 8: grass-cutting industry worker).
>
> "I was in the hospital 3 months ago because I have high blood sugar. I could not get the proper attention I needed. It made me resort to herbal medication. It was even very risky that I went to the hospital because I could have gotten infected. The nurses do not have protective equipment such as hand sanitizers and face masks" (IDI 10: civil servant).

3.4. Management of health-care workers' attitudes toward hospital patients during COVID-19 pandemic

The study respondents indicated several ways the negative attitudes of health-care workers can be adjusted and changed to be positive and meet the needs of hospital patients during the COVID-19 pandemic in Nigeria. Some recommendations include special education for health-care workers, government recognition of health-care workers' efforts, payment of salaries, and hazard allowances. The following are the exact reflections of some IDI respondents:

> "Creating awareness: the government should sensitize the health-care workers. Health-care workers should be paid a risk-hazard fee. This is because they are risking their lives." (IDI 3: A nurse).
>
> "Health-care workers should be paid well; you know that Nigerian health-care workers are underpaid. They should be provided with protective gear that they will use to protect themselves and treat patients. For example, a thermometer that is used for checking the temperature is lacking in all the health centers." (IDI 2: public healthcare workers).
>
> "Adequate incentives will help health-care workers be committed to their work and responsibilities. It is very discouraging that, over the past 10 years, our salary as doctors has not increased. The revision made by the past government to increase our salary has not been implemented. The government promised to pay the doctors allowances and hazards allowances, but none of us have received them. Provision of PPE such as gloves, face masks, sanitizer, ventilators, more bed spaces, and other necessary equipment." (IDI 1: doctor).

3.5. Management of the attitude of community members/patients toward hospital care during COVID-19 pandemic in Nigeria

The IDI respondents suggested that implementing certain measures would enable community members/patients to have a positive disposition toward hospital care during the COVID-19 pandemic. This measure could get community members to repose their confidence in hospital care rather than self-help and self-medication, which were dangerously prevalent during the COVID-19 pandemic period. Some of the recommendations include: hospital management should build confidence among patients and community members by providing adequate hospital equipment; conducting mass community education and sensitization through traditional media and social media; and educating the populace about their right to receive adequate care in the hospital space. An illustrative quote is the following:

> "Community members and patients have to be convinced about the quality of hospital care. Equipping the hospital is number one. Some chemist shops are better equipped than the health-care centers. Number two is massive sensitization. Social media spreads a lot of fake news that affects patients' and community members' willingness to utilize hospital services during this time of coronavirus. The government should set up machinery that will counter this fake news. Health-care workers have to be educated on the best ways to handle patients in a friendly and respectful way. Some patients, because of the kind of treatment they receive in the hospital, hate going there. Some nurses and health-care providers are abusive; I work with them. I know how many times I had to quarrel with them. You can't treat somebody like trash because the person came to receive treatment" (IDI 2: public healthcare worker).

3.6. The role of social workers in addressing both attitude problems of healthcare workers and community members/patients toward hospital care during the COVID-19 pandemic

In an IDI session with medical social workers, it became evident that medical social workers and other social workers in the public health domain played a major role in addressing the negative attitude of healthcare workers toward patients during the COVID-19 pandemic and lockdown. They also made efforts to address the apathy toward hospital treatment displayed by community members during the COVID-19 pandemic outbreak in Nigeria, which resulted in self-medication, unorthodox treatments, and a lot of unrelated COVID-19 deaths. Social workers during this period educated patient on their rights to adequate medical treatment as enshrined in the Nigerian constitution and the medical code of ethics that binds healthcare workers. The following are the quotes captured from the medical social workers:

> "I had to encourage pregnant women to come for their antenatal care because it will be to their own detriment if they avoid the hospital because of fear of COVID-19. We also facilitated the provision of PPE in the hospital" (IDI 5: medical social workers).
>
> "Social workers have to let patients and community members know that they have certain rights. They do not know their rights. Instead of taking up the matter in the hospital when despised by health-care workers, they give up on hospital treatment and resort to self-medication. They should be made to understand, first, their rights and, second, the dangers of self-medication and quack treatment. All this treatment they receive, you know, has an effect. You will discover that organ failure has reached a very alarming state. All these people who said 'they poisoned me,' have been taking self-medication for a long time. What do these drugs do? They go to your vital organs and damage them. Social workers also have responsibilities for engaging stakeholders. Stakeholders like community leaders, local government authorities, and the health communities will now come together to rectify those problems that are limiting people's access to adequate hospital care. Social workers also make sure that all the health benefits that are supposed to go to the people get to the people." (IDI 7: medical social worker).

4. Discussion

This study investigated the attitude of health-care workers toward hospital patients during the COVID-19 pandemic in Nigeria, the attitude of community members/patients toward hospital care during the COVID-19 pandemic, and the role of social workers in ensuring adequate care for patients. A series of issues were uncovered by this study. First, the study revealed that the attitude of healthcare workers toward hospital patients during the COVID-19 pandemic in Nigeria was negative and suboptimal. Healthcare workers abandoned their patients due to fear of contracting COVID-19. Due to the poor and negative attitude of healthcare workers toward hospital patients, a lot of patients passed away, and for some, their health conditions worsened. Studies and reviews have underscored the devastating impact of healthcare workers' negative attitudes toward work and patients. According to Obinna (2011), it is especially concerning when healthcare professionals in Nigeria's public and private hospitals have a negative attitude toward their jobs and their patients. The lives of patients, many of whom are already in critical condition, have been put at further risk by years of bad attitudes, especially in the public sector. Again, over 90% of deaths recounted in Nigerian hospitals were a result of the poor attitude of health-care workers toward work and the very patients they were assigned to take care of (Agan, 2020). A study by Inyang & Doubrapade (2016) also warned of the dangers of the unfounded, poor, and negative attitudes of health-care workers toward patients.

Some factors informed the suboptimal and negative attitude of health-care workers toward patients during the COVID-19 pandemic outbreak and lockdown in Nigeria. Those factors incapacitated and limited healthcare workers' ability to help patients adequately during the pandemic outbreaks. These factors include a lack of hospital equipment such as PPE, a lack of incentives, hazard allowances, minimum wage allowances, and unpaid salaries. Medical doctors went on strike twice in 2020 during the COVID-19 pandemic in Nigeria. These strike actions were to notify the government and other relevant stakeholders of how disgruntled and unhappy healthcare workers are with the lack of incentives, hazard allowances, and salaries that are unpaid in many state hospitals. Studies have proven that challenges such as those mentioned above have, in the past, been a cog in the wheel and a discouraging factor for health-care workers in discharging their duties of saving lives. For example, Osain (2011) came to the conclusion that the Nigerian health care system is underdeveloped, citing a lack of modern technology and surveillance systems after looking at the country's medical care system and the necessity of integrating effective medical surveillance and intelligence systems. More recent studies proved that not much has changed with time. For example, a study by Uchendu *et al.* (2020) interrogated barriers and facilitators of Nigerian nurses' engagement in health-promoting behavior. The study revealed that Nigerian health workers, such as

nurses, were largely limited and hindered from discharging their duties of saving lives by a lack of infrastructural facilities, equipment, incentives, allowances, unpaid salaries, etc. In addition, Abene *et al.* (2021) opined that a lack of knowledge of the dynamics and nature of the novel coronavirus contributed largely to the negative attitude of health-care workers toward patients during the COVID-19 pandemic in Nigeria. Furthermore, Olateju *et al.* (2022) identified some challenges that undermined the positive disposition of health-care workers toward hospital patients during the COVID-19 pandemic in Nigeria. The challenges include: delayed access to care and lack of transportation; public misconceptions about COVID-19; exhaustion due to an increased workload; and stigmatization of COVID-19 patients.

Furthermore, the attitude of community members/patients toward hospital treatment during the COVID-19 pandemic in Nigeria was very poor. Some sick community members would rather remain at home, risking their lives, than go to the hospital. Fright and fear of contracting coronavirus from hospitals informed the negative attitude of community members/patients toward hospital treatment. During the period of the COVID-19 pandemic, many community members and patients resorted to self-medication, self-help, and unorthodox or herbal treatment instead of visiting hospitals for proper diagnosis and treatment. Nigerian hospital patients or community members did not trust the doctors and nurses to treat them for any kind of illness during the pandemic because of their lack of adequate PPE, fearing that nurses and doctors could potentially infect them. Even pregnant women who have regular antenatal checkups avoid the hospitals like one avoids the plague.

Studies in the past have investigated patients' attitudes and levels of satisfaction toward medical care in Nigeria and healthcare workers. A significant number of these studies have uncovered low levels of satisfaction and mistrust among patients toward the Nigerian health-care system and health workers in particular. For example, a study by Obi *et al.* (2018) investigated patients' satisfaction with services at a tertiary hospital in southeast Nigeria. The study revealed that less than half (47.3%) of the patients were satisfied with the care received at the hospital and the behavior of the healthcare workers. On the other hand, 52.7% of the patients were not satisfied with the attitude of the healthcare worker or the hospital environment.

Having ascertained that the attitude of healthcare workers toward hospital patients at the peak of the COVID-19 pandemic in Nigeria was negative and suboptimal, the study further uncovered that special education for health-care workers (retraining), provision of equipment, payment of salaries, hazard allowance, and government recognition of the effort of the health-care workers would to a great extent foster a positive attitude among health-care workers toward hospital patients during pandemics. In agreement with the above findings, previous studies have reported that sensitization of healthcare workers, incentives, payment of salaries as and when due, and hazard allowances will motivate and foster a positive attitude among healthcare workers toward their patients. For example, Eme *et al.* (2014) emphasized in their study that the provision of adequate hospital equipment will, in no small measure, put Nigerian healthcare workers in the right position to meet patients' needs effectively.

The following solutions were proposed to address the negative attitude of community members/patients toward hospital care during the COVID-19 pandemic: the government should rebuild trust by providing adequate hospital equipment, conduct mass education and public awareness campaigns through traditional media and social media about the dangers of self-medication and unorthodox medicine lacking proper dosages, and retrain health-care workers on essential relationship strategies with patients. Implementing these measures is expected to restore the confidence of community members/patients in hospital care in Nigeria. A significant issue highlighted is the mistrust of hospital care during the first and second waves of the COVID-19 pandemic in Nigeria, leading many to turn to unorthodox medication (alternative medicine); some studies in the past have investigated the dangers of alternative medicine to patients' wellbeing. For example, Okoronkwo *et al.* (2014) investigated the adverse effects of alternative medicine use, and they discovered that alternative medicine has the following adverse effects: general body discomfort, upset stomach, diarrhea, increase in body weight, dizziness, and weakness.

Social workers, while sensitizing health-care workers on the pertinence of having a positive disposition toward the patient during the COVID-19 pandemic in Nigeria, went further to advocate for their general well-being, such as payment of salary as and when due, hazard allowances, and incentives. On the other hand, social workers ensured that patients received adequate medical care amidst the COVID-19 pandemic by educating them on their rights to adequate care and also taking their displeasure and concerns to the appropriate medical authorities. Medical social workers dissuaded patients from self-medication and alternative medicine, which have adverse effects on healthcare. The Nigerian medical social worker's intervention during the COVID-19 pandemic collaborated with the major functions of social workers during the COVID-19 pandemic as inscribed by the International

Federation of Social Workers (IFSW) COVID-19 white paper. In addition to the advancement and strengthening of healthcare and social services as a vital defense against the virus, inequality, and economic and social challenges, the organization states that social workers should be championing social services and policy reforms that are transparent and proactive in supporting communities and vulnerable populations (IFSW, 2020).

For decades, social workers in Philadelphia's West Philly have been delivering care and services to vulnerable populations with limited resources and equipment (Shemelia, 2020). The same is said of social workers in Nigeria, or even worse. The social work profession in Nigeria, to say the least, is not recognized officially by the Nigerian constitution; put another way, the bill to recognize social work as a profession has not been passed or enacted into law by the Nigerian government. Hence, social workers in Nigeria are operating in the shadows. The social work profession in Nigeria lacks funds, resources, and recognition. This also limits how far Nigerian social workers may go in the fight against the COVID-19 outbreak.

5. Conclusion

The study revealed evidence of neglect, suboptimal care, and negative attitudes among health-care workers toward hospital patients during the COVID-19 pandemic in Nigeria. These negative attitudes stemmed from issues such as inadequate PPE, hospital equipment shortages, lack of incentives, unpaid salaries and hazard allowances, and insufficient training. Nigerian social workers functioned as mediators between health-care workers and hospital patients during the pandemic. Despite facing challenges in resources, funds, and recognition, medical social workers successfully advocated for the timely payment of health-care workers' salaries, the provision of incentives and hazard allowances during the pandemic, and the availability of PPE. Their efforts aimed to enable healthcare workers to provide care safely and effectively, driven by a strong sense of patriotism to save lives. In addition, Nigerian social workers educated community members/patients on their rights to adequate healthcare and discouraged harmful practices such as self-medication and reliance on alternative medicine. They also advocated for patients' right to receive adequate care. The study recommends that the government prioritize budgetary allocations to the health-care sector for funding and equipping hospitals. There should be more attention paid to training and retraining health-care workers in virology management. Policy reforms and enforcement are needed to uphold the professional oath taken by healthcare workers, prioritizing saving lives over personal interests. Social workers need to embark on a serious enlightenment campaign to address COVID-19 pandemic misconceptions, fears, and negative attitudes among both community members/patients and healthcare workers. Collaborating with media houses and COVID-19 survivors can facilitate this effort. Further studies are essential to assess the long-term impact of the COVID-19 pandemic on health-care attitudes and behaviors in Nigeria. Furthermore, this advocates for effective public health education implementation among healthcare workers, patients, and the broader community. The government's national orientation agencies, social workers, and civil society should utilize diverse platforms, such as schools, religious bodies, and both new and traditional media, to educate the public on the dynamics of pandemics or epidemics. This will enable community members to be proactive rather than reactive in responding to pandemic situations. The paper also emphasizes the importance of training Nigeran healthcare workers in epidemiology and pandemic response strategies, alongside providing sophisticated, modern health facilities. These measures are crucial for boosting health worker confidence and fostering positive attitudes toward patient care during pandemics.

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Conflict of interest

The authors declare no conflicts of interest.

Author contributions

Conceptualization: Christian C. Iyiani, Henry T. Ajibo
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Ethics approval and consent to participate

Ethical approval to conduct this study was obtained from the Ethical Review Board of the UNTH, Ituku Ozalla. Ethical Clearance Certificate No: NHREC/05/01/2008B-FWA00002458-1RB00002323. Furthermore, verbal informed consent was obtained from all the participants before the interviews.

Consent for publication

The study respondents verbally approved of or consented to their ideas and comments on the subject matter published. To maintain anonymity, the researchers ensured that respondent names were not linked to the data during publication.

Availability of data

Data are available upon request.

References

Abene, E.E., Ocheke, A.N., Ozoilo, K.N., Gimba, Z.M., Okeke, E.N., Agbaji, O.O., *et al.* (2021). Knowledge, attitudes and practices towards Covid-19 among Nigerian healthcare workers during the Covid-19 pandemic: A single centre survey. *Nigerian Journal of Clinical Practice*, 24(12):846-1851.

https://doi.org/10.4103/njcp.njcp_365_20.

Adejoro, L. (2020). 812 Healthcare Workers Infected with COVID-199-NCDC. Punch. Available from: https://healthwise.punchng.com/812-healthcare-workers-infected-with-covid-19-ncdc [Last accessed on 2020 Jun 10].

Agan, T. (2020). 90% Deaths in Nigerian Hospitals Caused by Health workers' Attitude-Teaching Hospital Chief, Premium Time. Available from: https://www.premiumtimesng.com/news/top-news/243653-90-deaths-nigerian-hospitals-caused-health-workers-attitude-teaching-hospital-chief.html

Akindare, L. (2020). Five Challenges Facing Health Care Workers in Nigeria as they Tackle COVID-19. Global Citizen. Available from: https://www.globalcitizen.org/en/content/challenges-for-health-care-workers-nigeria-covid [Last accessed on 2023 Dec 15].

Daniel, E.O. (2014). Attitudes and practices of health care workers towards HIV positive patients at the federal medical. *South American Journal of Public Health*, 2(4):561-604.

Eme, O.I., Uche, O.A., & Uche, I.B. (2014). Building a solid health care system in Nigeria: Challenges and prospects. *Academic Journal of Interdisciplinary Studies*, 3(6):501-510.

https://doi.org/10.5901/ajis.2014.v3n6p501

Eya, J., Ejikem, M., & Ogamba, C. (2022). Admission and mortality patterns in intensive care delivery at Enugu State University of science and technology teaching hospital: A three-year retrospective study. *Cureus*, 14(7):e27195.

https://doi.org/10.7759/cureus.27195

Fleetwood, D. (2023). Non-Probability Sampling: Types, Examples, and Advantages. Available from: https://www.questionpro.com/blog/non-probability-sampling [Last accessed on 2024 Jan 20].

Glassdoor. (2024). How much does a Medical Doctor make in Nigeria? Available from: https://www.glassdoor.com/salaries/nigeria-medical-doctor-salary-srch_il.0,7_in177_KO8,22.htm [Last accessed on 2024 Feb 02].

IFSW. (2020). Updated Information on IFSW and Covid-19. Available from: https://www.ifsw.org/updated-information-on-ifsw-and-the-covid-19-virus

Ilesanmi, O.S., & Fagbule, O.F. (2020). Realities of COVID-19 pandemic in Nigeria: Coping with the challenges and charting a way forward. *Annals of Ibadan Postgraduate Medicine*, 18(1):78-84.

Inyang, M.P., & Doubrapade, W. (2016), The inextricable effect of health worker's attitude on primary health care implementation in South-South Nigeria. *Public Health Research*, 6(2):38-44.

https://doi.org/10.5923/j.phr.20160602.02

Jewett, C., Bailey, M., & Renwick, D. (2020). Exclusive: Nearly 600 US Health Workers Died of Covid-19 and the Toll is Rising. The Guardian. Available from: https://www.theguardian.com/us-news/2020/jun/06/us-health-workers-dying-coronavirus-stats-data [Last accessed on 2020 Jun 10].

Johns Hopkins Medicine. (2020). What is Coronavirus? Available from: https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus [Last accessed on 2021 Nov 12].

Joukar, F., Mansour-Ghanaei, F., Soati, F., & Meskinkhoda, P. (2012), Knowledge levels and attitudes of health care professionals toward patients with hepatitis C infection. *World Journal of Gastroenterology*, 18(18):2238-2244.

https://doi.org/10.3748/wjg.v18.i18.2238

Kenny, P. (2020), Over 230,000 Health Workers Infected with Virus: Study. Anadolu Agency. Available from: https://www.aa.com.tr/en/europe/over-230-000-health-workers-infected-with-virus-study/1863982 [Last accessed on 2020 Jun 10].

Obi, I.E., Ndu, A.C., Agu, K.A., Omotowo, B.I., Agunwa, C.C., & Idoko, A.O. (2018). Patient satisfaction with services at a tertiary hospital in south-east Nigeria. *Malawi Medical Journal*, 32(2):270-275.

https://doi.org/10.4314/mmj.v30i4.10

Obinna, C. (2011). How Poor Attitude of Health Workers is Killing Healthcare Delivery in Nigeria. Vanguard. Available from: https://www.vanguardngr.com/2011/09/how-poor-attitude-of-health-workers-is-killing-healthcare-delivery-in-nigeria [Last accessed on 2020 Jun 10].

Okoronkwo, I., Onyia-pat, J., Okpala, P., Agbo, M., & Ndu, A. (2014). Patterns of complementary and alternative medicine use, perceived benefits, and adverse effects among adult users in Enugu urban, Southeast Nigeria. *Evidence-Based Complementary and Alternative Medicine*, 1(1):239372.

https://doi.org/10.1155/2014/239372

Olateju, Z., Olufunlayo, T., MacArthur, C., Leung, C., & Taylor, B (2022). Community health workers experiences and perceptions of working during the COVID-19 pandemic in

Lagos, Nigeria-a qualitative study. *PLoS One,* 17(3):1-18.

https://doi.org/10.1371/journal.pone.0265092

Oluyemi, J., Yinusa, M., Abdulateef, R., Atolagbe, E., Adejoke, J., Kehinde, K., *et al*. (2018). Attitude of health workers towards patients: An aftermath of Ebola outbreak in Nigeria. *Sierra Leone Journal of Biomedical Research*, 9(2):47-53.

https://doi.org/10.4314/sljbr.v9i2.8

Onoh, L.U.M. (2021). Health care workers' perception on the current and additional safety measures to be provided in Enugu State University Teaching Hospital, G.R.A. Enugu, Nigeria. *International Journal of Innovative Healthcare Research*, 9(2):15-20.

Osain, M. (2011). The Nigerian health care system: Need for integrating adequate medical intelligence and surveillance systems. *Journal of Pharmacy and Bio allied Sciences*, 3(4):470-478.

https://doi.org/10.4103/0975-7406.90100

Procurement Monitor. (2024). Enugu State Health Facility Listing. Available from: https://library/procurementmonitor.org/backend/files/list%20of%20coded%20health%20facilities%20in%20enugu%20state.pdf [Last accessed on 2024 Feb 02].

Sadoh, A.E., Sadoh, W.E., Fawole, A.O., Oladimeji, A., & Sotiloye, O. (2020). Attitude of health care workers to patients and colleagues infected with human immunodeficiency virus. *SAHARA-J: Journal of Social Aspects of HIV/AIDS*, 6(1):17-23.

https://doi.org/10.1080/17290376.2009.9724925

Shemelia, C. (2020). A Front-Line Social Worker's Perspective on COVID-19. The New Social Workers. Available from: https://www.socialworker.com/feature-articles/practice/front-line-social-worker-perspective-covid-19 [Last accessed on 2020 Jun 10].

Sirisilla, S. (2023). Bridging the Gap: Overcome these 7 Flaws in Descriptive Research Design. Enago. Available from: https://www.enago.com/academy/descriptive-research-design [Last accessed on 2024 Jan 20].

SPARC. (2021). Incidence and Case Fatality Rate for COVID-19 in Enugu State, Southeast Nigeria: An Opportunity to Make the Right Investment and Improve Strategic Health Purchasing in the Health Sector. Available from: https://sparc.africa/2021/06/incidence-and-case-fatality-rate-for-covid-19-in-enugu-state-southeast-nigeria-an-opportunity-to-make-the-right-investment-and-improve-strategic-health-purchasing-in-the-health-sector [Last accessed on 2021 Jun 25].

Statista. (2023). Population of Nigeria in Selected Years between 1950 and 2023. Available from: https://www.statista.com/statistics/1122838/population-of-nigeria [Last accessed on 2024 Jan 20].

Sternlicht, A. (2020). Nearly 300 Healthcare Workers have Died from Coronavirus. Forbes. Available from: https://www.forbes.com/sites/alexandrasternlicht/2020/05/28/nearly-300-healthcare-workers-have-died-from-coronavirus/#60284ac749ec [Last accessed on 2020 Jun 10].

Uchendu, C., Windle, R., & Blake, H. (2020). Perceived facilitators and barriers to Nigerian nurses' engagement in health promoting behaviors: A socio-ecological model approach. *International Journal of Environmental Research and Public Health*, 17(13):1-20.

https://doi.org/10.3390/ijerph17041314

VOXCO. (2021). Descriptive Research Design. Available from: https://www.voxco.comblog/descriptive-research-design [Last accessed on 2021 Jun 25].

WHO. (2020). Corona Virus. Available from: https://www.who.int/health-topics/coronavirus#tab=tab_11 [Last accessed on 2020 Jun 10].

World Population Review. (2024). Enugu Population 2024. Available from: https://worldpopulation review.com/world-cities/enugu-population [Last accessed on 2024 Feb 02].

Worldometer. (2020). COVID-19 Coronavirus Pandemic. Available from: https://www.worldometers.info/coronavirus/?utm_campaign=homeAdvegas1?%22%20%5Cl%20% 22countries

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ORIGINAL RESEARCH ARTICLE

Multidimensional perceived social support: A predictor of fatigue and quality of life in Greek social workers

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Abstract

The present study focuses on the investigation of fatigue, social support, and quality of life that characterizes social workers. A total of 400 social workers with an average age of 39.05 years took part in the research. Most of the recruited subjects were women, single, residents of cities with a population of more than 100,000, and health-care workers. The participants were asked to answer online questionnaires (Fatigue Assessment Scale for fatigue, Multidimensional Scale of Perceived Social Support for Social Support, and General Health Questionnaire 28 for quality of life). From the analysis of the data, it was found that the social workers suffered from low levels of fatigue. Meanwhile, the occurrence of negative symptoms among the subjects was not frequent, with physical symptoms appearing more often than the rest. The study also found that the participants received a high level of support from their environment and more so from their significant others. In conclusion, there is a strong relationship between perceived social support with fatigue level and the quality of life of social workers.

Keywords: Social workers; Social support; Fatigue; Quality of life

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1. Introduction

Social work is regarded as one of the highly stressful occupations, characterized by frequent yet painful dealings and communications with other people in multiple situations (Stanley & Bhuvaneswari, 2016). It has been reported that significant sources of job-related stress experienced by social workers include extreme workload, role conflict, overtime, work dilemmas, the need to address unmet personal expectations, and the public's negative perception of this profession (Storey & Billingham, 2010). However, in addition to the above stressors, insufficient support and lack of understanding from the supervisor and colleagues can also give rise to occupational stress and burnout symptoms (Solomonidou & Katsounari, 2022).

According to the relevant literature, high levels of stress in social workers working in Western countries are responsible for the high levels of illness, depression, and burnout (Stanley & Sebastine, 2023). Ravalier (2019) found that the interaction between high demands, low levels of control, and absence of administrative support are related to the stress of social workers and its effects. Other factors related to the occurrence of

stress are poor wages and working conditions (Stanley, 2006).

Fatigue is the outcome of prolonged mental or physical energy. It can affect workers' job performance and harm their mental awareness, subsequently causing them to commit dangerous mistakes. Phillips (2015) argues that fatigue is beyond feeling sleepy and has more dire effects than falling asleep.

In fact, fatigue is synonymous with stress caused by the excessive workload of social workers' work duties (Hoffarth, 2017). Workload, low wages, limited resources, time constraints, conflicts in the work context, ethical dilemmas, and the structural organization within which social workers work are some factors related to the manifestation of their burnout (Ben-Porat & Itzhaky, 2015; Iacono, 2017; McFadden *et al*., 2015; Willis & Molina, 2019).

Burnout is characterized by emotional exhaustion, detachment, and a low sense of accomplishment (Maslach *et al*., 2001). It is also related to personal factors such as family income and workplace factors such as insufficient supervision, lack of support, low job autonomy, and stress (Kim & Stoner, 2008; Lloyd *et al*., 2002; Soderfeldt *et al*., 1995). Burnout negatively affects the health and well-being of social workers and it is related to a number of uncontrolled costs, such as sleep disorders, memory impairment, depression, anxiety, neck and back pain (Peterson *et al*., 2008) as well as a growth in gastrointestinal problems, headaches, and respiratory infections (Kim *et al*., 2011).

Social support is an important factor that affects the emotional state of social workers and mitigates the negative consequences of social worker burnout. It is an important resource that helps people cope with work stress through supportive relationships with others (Thompson *et al*., 1994). Social support helps individuals reduce stress levels and find effective coping strategies for the difficulties they face (Yasin & Dzulkifli, 2011). Social support can be sought for important reasons, including getting practical advice, help, or information as part of coping with a problem, *etc*. (Carver *et al*., 1989).

McDonnell (2014) argues that social support can improve the mental and physical health of social workers as well as their emotional health and is associated with better commitment to work (Christian *et al*., 2011; Hakanen *et al*., 2006). Employees who have low social support may experience high levels of fatigue and lower levels of job satisfaction (Abualrub *et al*., 2009). Theofilou (2015) has noted that there are four dimensions of social support, that is social support provided by family, friends, environment (significant others), and a total score of social support.

The social support mentioned above has a significant impact on the quality of life of social workers, which is a concept that refers to the degree to which a person is in a state of well-being, as well as the meaning that the person attributes to the important aspects of his life (Moons *et al*., 2006). Misajon *et al.* (2008) argue that quality of life is divided into several categories, including psychological well-being, physical health, the interactions of individuals, and their relationship with the characteristics of the social environment.

In the present study, we examined the physical and mental fatigue, multidimensional social support, and quality of life in Greek social workers as well as the association among these three variables.

2. Methods

2.1. Research design

The current investigation is a quantitative cross-sectional study. The dependent variables were fatigue and quality of life, whereas the independent variable was social support.

2.2. Sample

This research employed a convenience sample consisting of a total of 400 social workers. The study participants were recruited from public and private agencies. A Google Form containing both the research instrument and the consent form was distributed electronically by the association of social workers to all registered social workers. The inclusion criteria for the selection of participants in this study are as follows: (i) social workers over the age of 18; (ii) social workers with more than 1 year of experience; (iii) social workers who speak the Greek language; and (iv) social workers working in public or private institutions.

The subjects in this sample had an age range of 23 – 60 years, with an average age of 39.05 years. In terms of gender, 89.4% of the participants are women, while men make up the remaining 10.6% of the sample. Married individuals accounted for 50.4% of the sample, whereas 43.9% were single, 5.3% were divorced, and 0.5% were widowed. Our demographic analysis also extended to the residence of the respondents: 50.9% stated that they reside in a city with a population of more than 100,000 inhabitants; 33.3% live in a city of <100,000 inhabitants; 10.3% live in a town; and 5.5% reside in a village.

Next, the job category to which the respondents belong was investigated: 22.8% working in the health sector, 20.1% in the local government, 16.8% in the education sector, 14% in the community centers, 9.3% in other sectors, 8.8% in the non-governmental governments, 7% in the child

protection category, and 1.3% in the justice sector. The above are tabulated in Table 1.

The serving duration during which the respondents work in their specialty was investigated. In general, the subjects had been working in their respective specialty categories for 0.5 – 38 years, with an average of 11.78 years. The weekly working hours of the respondents were also analyzed: (i) the lowest value was 0 h/week; (ii) the longest certain subjects might work per week was 75 h; and (iii) the average length of working hours per week was 35.25 h. Whether the participants hold a position of responsibility in their work was also investigated. Slightly more than half (51.5%) reported that they did not hold such a position, while the rest (48.5%) held a position of responsibility.

2.3. Research instruments

To achieve the purpose of the research and answer the research questions, a questionnaire of four sections was created. The first section aims to analyze the demographic and work characteristics of the respondents, using two open-ended questions and eight closed-ended questions.

The Fatigue Assessment Scale (FAS) questionnaire — a scale that assesses the fatigue of respondents, whether healthy or with chronic diseases — was included in the second part of the questionnaire. The tool was originally developed by Michielsen *et al.* (2003) and has been used in various population groups. It has also been used in the Greek population in various research studies and clinical practices. This tool is characterized by high internal reliability, with a Cronbach's Alpha Index exceeding 0.8. The tool includes a total of 10 statements rated on a five-point Likert scale from 1 (never) to 5 (always) (Zyga *et al.*, 2015).

The third section of the research tool is the General Health Questionnaire 28 (GHQ-28). This tool is a version of the original GHQ, which was developed in 1978 by Golderg (1978). Both tools focus on the detection of psychiatric disorders in the general population and the assessment of mental health. The tool used was adapted and analyzed in the Greek population by Garyfallos *et al.* (1991). Through 28 Likert-type questions given on a four-point scale from 1 to 5, four basic categories of feelings and psychological states of the respondents, namely the physical symptoms, restlessness and insomnia, social dysfunction, and depression, were examined.

The fourth section of the research tool is the "Multidimensional Scale of Perceived Social Support (MSPSS)," which was used to evaluate and study the perceived social support received by the respondents. The original scale was developed by Zimet *et al.* (1988), including a total of 12 Likert-type questions rated on a seven-point scale of agreement from 1 (strongly disagree) to 7 (strongly agree). This questionnaire covers four dimensions, *that is*, social support provided by family, friends, environment (significant others), and a total score of social support. The questionnaire adopted in this study was based on a version translated and adapted by Theofilou (2015). Finally, the tool presented a particularly high internal consistency, with a Cronbach's alpha index value constantly exceeding 0.8.

2.4. Procedure

A Google Form containing both the research instrument and the consent form was distributed electronically by the association of social workers. It was made clear that the research aims to investigate the opinions of active social

Table 1. Job categories of the respondents

Job categories	Frequency	Percent	Valid percent	Cumulative percent
Valid				
Local government (municipalities-regions-structures to combat poverty)	80	20.0	20.1	20.1
Community centers (Home Help-Roma)	56	14.0	14.0	34.1
Health (First–Second–Third–Mental Health–Addictions)	91	22.8	22.8	56.9
Education	67	16.8	16.8	73.7
Child protection	28	7.0	7.0	80.7
Justice	5	1.3	1.3	82.0
Non-governmental organizations	35	8.8	8.8	90.7
Other	37	9.3	9.3	100.0
Total	399	99.8	100.0	
Missing				
System	1	0.3		
Total	400	100.0		

workers only, while the participants were informed of the purpose of the research as well as the voluntary and anonymous nature of their responses. Ethical approval for this study was obtained from the Committee of the Association of Social Workers of Greece (protocol number 1332/22-12-2023).

The data collected on the Google Form were converted into Microsoft Excel format, where they were appropriately coded. Then, they were transferred to the statistical program Statistical Package for the Social Sciences version 25, where percentages, frequencies, means, and standard deviations were calculated to study all the variables covered in the research tool. In addition, Spearman and regression analyses were performed to investigate the influence of social support on fatigue and the quality of life of the respondents.

3. Results

The FAS component in the questionnaire has a total of 10 statements related to the respondents' fatigue, with each being rated from 1 to 5. A higher average score can be interpreted as an increase in the level of fatigue of the respondents. It was observed that the minimum value of the variable was equal to 1 and the maximum to 4.44, whereas the average value measured 2.30, reflecting the low level of fatigue among the respondents.

The GHQ-28 component utilized in this survey has a total of 28 statements, each of which was rated from 1 to 4, with a higher score indicating a higher level of symptom occurrence. Our results showed that the level of physical symptoms (2.18) was below average, although it scored the highest across the tested categories. This is followed by the level of anxiety and insomnia (2.06), the level of social dysfunction (1.92), and the level of depressive symptoms is particularly low (1.26). Finally, the overall level of symptoms (1.86) was determined to be lower than the average score.

The MSPSS used in the current study encompassed 12 statements, each of which was rated from 1 to 7, with an increase in the average value indicating an increase in the support received by the respondents. Based on the results, support from significant others (5.79) was a highly cited source of support, followed by support from friends (5.57) and support from family (5.44). The overall level of support stands at a high level of 5.60.

Table 2 presents the results of the Spearman's correlation coefficient, highlighting nine statistically significant correlations. More specifically, as the level of overall, physical and mental fatigue increases, so does the level at which respondents experience physical symptoms,

Table 2. Spearman's correlations of total, mental, and physical fatigue with social support and quality of life

Dimensions	FAS-total fatigue	FAS-physical fatigue	FAS-mental fatigue
GHQ-physical symptoms			
Spearman's correlation	0.648**	0.615**	0.600**
Sig. (two-tailed)	0.000	0.000	0.000
n	383	388	395
GHQ-anxiety and insomnia			
Spearman's correlation	0.601**	0.542**	0.597**
Sig. (two-tailed)	0.000	0.000	0.000
n	383	388	395
GHQ-social dysfunction			
Spearman's correlation	0.496**	0.470**	0.470**
Sig. (two-tailed)	0.000	0.000	0.000
n	383	388	395
GHQ-depressive symptoms			
Spearman's correlation	0.458**	0.368**	0.474**
Sig. (two-tailed)	0.000	0.000	0.000
n	383	388	395
GHQ-overall level of symptom occurrence			
Spearman's correlation	0.707**	0.641**	0.690**
Sig. (two-tailed)	0.000	0.000	0.000
n	383	388	395
MSPSS-support from significant others			
Spearman's correlation	−0.297**	−0.249**	−0.299**
Sig. (two-tailed)	0.000	0.000	0.000
n	383	388	395
MSPSS-support from family			
Spearman's correlation	−0.297**	−0.240**	−0.308**
Sig. (two-tailed)	0.000	0.000	0.000
n	383	388	395
MSPSS-support from friends			
Spearman's correlation	−0.304**	−0.240**	−0.310**
Sig. (two-tailed)	0.000	0.000	0.000
n	383	388	395
MSPSS-overall level of support from the environment			
Spearman's correlation	−0.326**	−0.266**	−0.333**
Sig. (two-tailed)	0.000	0.000	0.000
n	383	388	395

**Correlation is significant at $P<0.01$ level (two-tailed).
Abbreviations: FAS: Fatigue Assessment Scale; GHQ: General health questionnaire; MSPSS: Multidimensional Scale of Perceived Social Support.

restlessness and insomnia, social dysfunction, and depressive symptoms, as well as the overall level of symptom occurrence. Furthermore, the higher the respondents' level of overall physical and mental fatigue, the lower the level of support they receive from their significant others, family and friends, and the lower the overall level of support they receive. The correlation range of 0.240 – 0.707 is of small-to-high intensity, with a statistically significant 99% confidence level.

Then, Spearman's correlation analysis was again used to investigate the correlation between the support scores and the scores regarding the respondents' quality of life. Table 3 showcases 19 statistically significant correlations. Based on the results, higher support scores, as marked by increased scores in all the MSPSS scales including the overall level of support from the environment, reflect lower levels of physical symptoms, anxiety and insomnia, social dysfunction, depressive symptoms, and overall level of symptoms. The only exception is the level of social dysfunction, which appears to have no statistically significant relationship with the level of support from friends. The remaining correlations range from 0.107 to 0.376, which are of low intensity, with statistically significant 95% and 99% confidence levels.

Two simple linear regression models were applied to study whether the level of social support is a predictor of fatigue and overall health. The first model (Table 4) has a small predictive ability ($R^2 = 0.098$) but fits the data significantly ($p < 0.001$). From the table of coefficients, it can be seen that the overall level of social support from the environment significantly predicts fatigue ($p < 0.001$), with a negative coefficient (−0.186), indicating that the higher the level of support, the lower the level of fatigue.

The model analyzing general health as a dependent variable (overall level of symptoms) also appears to have low predictive power ($R^2 = 0.105$) but still fits the data significantly. From the table of coefficients, it can be seen that the overall level of support from the environment is again a significant predictive factor ($p < 0.001$), whereas the negative coefficient (−0.129) indicates that as the level of support increases, the level of symptoms decreases, that is, the level of general health increases (Table 5).

Table 3. Spearman correlations of social support with quality of life

Dimensions	MSPSS-Support from significant others	MSPSS-Support from family	MSPSS-Support from friends	MSPSS-Overall level of support from the environment
GHQ-physical symptoms				
Correlation coefficient	−0.162**	−0.199**	−0.186**	−0.207**
Sig. (two-tailed)	0.001	0.000	0.000	0.000
n	400	400	400	400
GHQ-anxiety and insomnia				
Correlation coefficient	−0.182**	−0.203**	−0.175**	−0.211**
Sig. (2-tailed)	0.000	0.000	0.000	0.000
n	400	400	400	400
GHQ-social dysfunction				
Correlation coefficient	−0.107*	−0.193**	−0.092	−0.147**
Sig. (2-tailed)	0.032	0.000	0.065	0.003
n	400	400	400	400
GHQ-depressive symptoms				
Correlation coefficient	−0.266**	−0.376**	−0.278**	−0.352**
Sig. (two-tailed)	0.000	0.000	0.000	0.000
n	400	400	400	400
GHQ-overall level of symptom occurrence				
Correlation coefficient	−0.214**	−0.275**	−0.225**	−0.272**
Sig. (two-tailed)	0.000	0.000	0.000	0.000
n	400	400	400	400

*Correlation is significant at $P<0.05$ level (two-tailed).
**Correlation is significant at $P<0.01$ level (two-tailed).
Abbreviations: FAS: Fatigue Assessment Scale; GHQ: General health questionnaire; MSPSS: Multidimensional Scale of Perceived Social Support.

Table 4. Linear regression results of social support for predicting total fatigue[a]

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	Beta	Std. error	Beta		
1					
(Constant)	3.347	0.161		20.736	0.000
MSPSS-overall level of support from the environment	−0.186	0.028	−0.313	−6.566	0.000

[a]Dependent variable: Total fatigue.
Abbreviation: MSPSS: Multidimensional Scale of Perceived Social Support.

Table 5. Linear regression results of social support for predicting general health – somatic symptoms[a]

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	Beta	Std. error	Beta		
1					
(Constant)	2.582	0.108		23.951	0.000
MSPSS-overall level of support from the environment	−0.129	0.019	−0.324	−6.838	0.000

[a]Dependent variable: Overall level of symptom occurrence.
Abbreviation: MSPSS: Multidimensional Scale of Perceived Social Support.

4. Discussion

Social work is a profession that promotes social change and development, social cohesion, empowerment, and emancipation of individuals, addressing the unmet needs of individuals, families, and communities in a multitude of different personal and social circumstances. The responsibilities of social workers include information provision, assessment, counseling support, psychosocial support, early intervention, support with inclusion in preschool and school education programs, family mediation, social guidance, supervision, psychosocial and psychotherapeutic counseling, crisis intervention, assessment, specialization, facilitation of individuals in bureaucratic issues, social planning, social action, empowerment, professional and functional support, social management, cooperation with interested parties, human resource management and development, public relations development, research activity, community development, and organization. The ultimate goal of their interventions is to improve the quality of life of those served, to empower them, and to ensure their social inclusion (Hall, 2012).

Reviewing the social welfare system, Družić Ljubotina & Friščić (2014) concluded that social workers perform more than 140 different activities in the scope of their work. Robbins & Judge (2013) argue that the basic conditions for employees to be able to perform at their work, including social workers, are the following three: high job quality, high level of work motivation, and job satisfaction. The latter presupposes that employees consider their work important, have a sense of responsibility for the work process, and believe that job satisfaction dictates their work outcomes.

In the present study, we examined social support, fatigue, and quality of life in social workers as well as the association among these three variables. It is more than evident that there is a strong association of perceived social support with fatigue and quality of life among Greek social workers. According to a descriptive cross-sectional study on nursing professionals working at hospital emergency departments in Andalusia, Spain, perceived social support was found to be significantly related to all three dimensions of professional quality of life (Ruiz-Fernández *et al.*, 2021).

In a quantitative cross-sectional study by Theofilou & Varemenos (2024), the questionnaire survey targeted at 506 health-care workers coming from 14 general hospitals located in the 6th Health-Care Region of Greece revealed a low level of social support, a fairly high level of fatigue as well as a moderate to high level of general health. Physical, mental, and overall fatigue were found to be significantly and negatively associated with all the dimensions of social support, that is, social support from significant others, friends, and family, as well as overall social support.

Qiao (2019) who performed a questionnaire survey and interviews with social workers in China revealed that the weaker the feelings of burnout, the higher the level of social support. Furthermore, Zhang (2016) found that social support potentially alleviated burnout in a group of psychological counselors. In a study by Chastali-Sitara *et al.* (2020), it was found that the level of social support may be related to high levels of occupational burnout in

nurses. Furthermore, emotional exhaustion was found to be negatively correlated to perceived social support.

The current study presents some limitations, with one of them being the small sample size of professionals included. In future studies, other variables, such as occupational and demographic features, should be analyzed to see if they have an impact on fatigue and quality of life.

5. Conclusion

Fatigue can be combated by enhancing endurance. Resilience, which is a central skill in work and social practice, enables people to recover from stress despite the difficulties they face, allowing them to maintain their physical, mental, and emotional well-being in stressful situations. Gaining resilience helps social workers demonstrate more self-compassion. To be resilient, social workers should practice self-care, a concept that social workers are familiar with as they encourage their patients to set boundaries; adopt regular routines in healthy eating, sleep, and physical activity; and maintain work-life balance (NASW, 2022).

In 2021, the National Association of Social Workers (NASW) updated its Code of Ethics for social workers, including self-care in an effort to highlight its importance for the competent and ethical practice of social work. It also points out that social workers should make efforts for personal and professional self-care, and social work organizations, agencies, and educational institutions should be encouraged to promote organizational policies, practices, and practical support of self-care for social workers (NASW, 2021).

Despite the challenges in implementing self-care practices, some supportive strategies are recommended as follows:

- Recognizing signs of fatigue to build self-awareness,
- Ensuring work-life balance by engaging in enjoyable activities and allocating free time as much as possible,
- Adopting healthy eating habits and regular exercise,
- Reducing stress through the use of relaxation skills, such as meditation,
- Maintaining communication with people who provide social support, such as loved ones and colleagues, and setting positive, healthy boundaries,
- Utilizing employee support programs.

However, the best approach to self-care is to switch to a different position, when the existing environment in the workplace is becoming less practical for adaptation (NASW, 2022).

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Conflict of interest

The authors declare no conflict of interest.

Author contributions

Conceptualization: All authors
Investigation: All authors
Writing – original draft: All authors
Writing – review & editing: All authors

Ethics approval and consent to participate

Ethical approval for this study was obtained from the committee of the Association of Social Workers of Greece (protocol number 1332/22-12-2023). Informed consent was obtained by electronic means through the distribution of Google forms.

Consent for publication

Not applicable.

Availability of data

Data supporting these findings are available within the article or on request.

Further disclosure

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References

AbuAlRub, R.F., Omari, F.H., & Al-Zaru, I.M. (2009). Support, satisfaction and retention among Jordanian nurses in private and public hospitals. *International Nursing Review*, 56(3):326-32.

https://doi.org/10.1111/j.1466-7657.2009.00718.x

Ben-Porat, A., & Itzhaky, H. (2015). Burnout among trauma social workers: The contribution of personal and environmental resources. *Journal of Social Work*, 15(6):606-620.

https://doi.org/10.1177/1468017314552158

Carver, C.S., Scheier, M.F., & Weintraub, J.K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 56(2):267-283.

https://doi.org/10.1037//0022-3514.56.2.267

Chastali-Sitara, M., Alikari, V., Platis, CH., Tsironi, M., Zyga, S., Alefragkis, D., *et al.* (2020). Association between perceived social support and occupational burnout in Greek nurses: A preliminary study. *Progress in Health Sciences*, 10(2):22-28.

https://doi.org/10.5604/01.3001.0014.6583

Christian, M.S., Garza, A.S., & Slaughter, J.E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel Psychology*, 64(1):89-136.

https://doi.org/10.1111/j.1744-6570.2010.01203.x

Družić Ljubotina, O., & Friščić, L. (2014). Professional stress code social workers: Sources of stress and burnout at work. Annals of Social Work, 21(1):5-32.

https://doi.org/10.3935/ljsr.v21i1.10

Garyfallos, G., Karastergiou, A., Adamopoulou, A., Moutzoukis, C., Alagiozidoy, E., Mala, D., *et al.* (1991). Greek version of the General Health Questionnaire: Accuracy of translation and validity. *Acta Psychiatrica Scandinavica*, 84(4):371-378.

https://doi.org/10.1111/j.1600-0447.1991.tb03162.x

Golderg, D.P. (1978). Manual of the General Health Questionnare. Windsor: NFER-Nelson.

Hakanen, J.J., Bakker, A.B., & Schaufeli, W.B. (2006). Burnout and work engagement among teachers. *Journal of School Psychology*, 43(6):495-513.

https://doi.org/10.1016/j.jsp.2005.11.001

Hall, N. (2012). International Federation of Social Workers (IFSW). In: Healy, L.M., & Link, R.J. (eds.). Handbook of International Social Work: Human Rights, Development, and the Global Profession. United Kingdom: Oxford Academic.

https://doi.org/10.1093/acprof:oso/9780195333619.003.0042

Hoffarth, M.J. (2017). The making of burnout: From social change to self-awareness in the postwar United States, 1970-82. *History of the Human Sciences*, 30(5):30-45.

https://doi.org/10.1177/0952695117724929

Iacono G. (2017). A call for self-compassion in social work education. *Journal of Teaching in Social Work*, 37(5):454-476.

https://doi.org/10.1080/08841233.2017.1377145

Kim, H., & Stoner, M. (2008). Burnout and turnover intention among social workers: Effects of role stress, job autonomy and social support. *Administration in Social Work*, 32(3):5-25.

https://doi.org/10.1080/03643100801922357

Kim, H., Ji, J., & Kao, D. (2011). Burnout and physical health among social workers: A three-year longitudinal study. *Social Work*, 56(3):258-268.

https://doi.org/10.1093/sw/56.3.258

Lloyd, C., King, R., & Chenoweth, L. (2002). Social work, stress and burnout: A review. *Journal of Mental Health*, 11(3):255-265.

https://doi.org/10.1080/09638230020023642

Maslach, C., Schaufeli, W.B., & Leiter, M.P. (2001). Job burnout. *Annual Review of Psychology*, 52:397-422.

https://doi.org/10.1146/annurev.psych.52.1.397

McDonnell, R. (2014). Creativity and Social Support in Mental Health: Service Users' Perspectives. Berlin: Springer.

McFadden, P., Campbell, A., & Taylor, B. (2015). Resilience and burnout in child protection social work: Individual and organizational themes from a systematic literature review. *The British Journal of Social Work*, 45(1):1546-1563.

https://doi.org/10.1093/bjsw/bct210

Michielsen, H.J., De Vries, J., & Van Heck, G.L. (2003). Psychometric qualities of a brief self-rated fatigue measure: The fatigue assessment scale. *Journal of Psychosomatic Research*, 54(4):345-352.

https://doi.org/10.1016/s0022-3999(02)00392-6

Misajon, R., Pallant, J.F., Manderson, L., & Chirawatkul, S. (2008). Measuring the impact of health problems among adults with limited mobility in Thailand: Further validation of the perceived impact of problem profile. *Health Qual Life Outcomes*, 6:6.

https://doi.org/10.1186/1477-7525-6-6

Moons, P., Budts, W., & De Geest, S. (2006). Critique on the conceptualisation of quality of life: A review and evaluation of different conceptual approaches. *The International Journal of Nursing Studies*, 43(7):891-901.

https://doi.org/10.1016/j.ijnurstu.2006.03.015

NASW. (2021). Code of Ethics. Available from: https://www.socialworkers.org [Last accessed on 2024 Jan 08].

NASW. (2022). Self-Care for Social Workers: Tips and Strategies. Available from: https://www.vcu.edu [Last accessed on 2024 Jan 08].

Peterson, U., Demerouti, E., Bergström, G., Samuelsson, M., Asberg, M., & Nygren, A. (2008). Burnout and physical and mental health among Swedish healthcare workers. *Journal of Advanced Nursing*, 62(1):84-95.

https://doi.org/10.1111/j.1365-2648.2007.04580.x

Phillips, R.O. (2015). A review of definitions of fatigue-and a step towards a whole definition. *Transportation Research Part F: Traffic Psychology and Behaviour*, 29:48-56.

https://doi.org/10.1016/j.trf.2015.01.003

Qiao, Y. (2019). The study on the job burnout of social worker from the perspective of social support-based on the survey of Chengdu City. *Southwestern University of Finance and Economics*, 7:1-62.

https://doi.org/10.27412/d.cnki.gxncu.2019.002045

Ravalier, J.M. (2019). Psycho-social working conditions and stress in UK social workers. *British Journal of Social Work*, 49(2):371-390.

https://doi.org/10.1093/bjsw/bcy023

Robbins, S.P., & Judge, T.A. (2013). Organisational Behavior. 15th ed. Boston: Pearson.

Ruiz-Fernández, M.D., Ramos-Pichardo, J.D., Ibáñez-Masero, O., Carmona-Rega, M.I., Sánchez-Ruiz, M.J., & Ortega-Galán, Á.M. (2021). Professional quality of life, self-compassion, resilience, and empathy in healthcare professionals during COVID-19 crisis in Spain. *Research in Nursing and Health*, 44(4):620-632.

https://doi.org/10.1002/nur.22158

Soderfeldt, M., Soderfeldt, B., & Warg, L. (1995). Burnout in social work. *Social Work*, 40(5):638-646.

Solomonidou, A., & Katsounari, I. (2022). Experiences of social workers in nongovernmental services in Cyprus leading to occupational stress and burnout. *International Social Work*, 65(1):83-97.

https://doi.org/10.1177/0020872819889386

Stanley, S. (2006). Social work education in Tamil Nadu: Issues of concern. In: Thavamani, M. (ed.). Issues in Higher Education. India: Bharathidasan University Publications, p.16-25.

Stanley, S., & Bhuvaneswari, G.M. (2016). Reflective ability, empathy, and emotional intelligence in undergraduate social work students: A cross-sectional study from India. *Social Work Education*, 35(5):560-575.

https://doi.org/10.1080/02615479.2016.1172563

Stanley, S., & Sebastine, A.J. (2023). Work-life balance, social support, and burnout: A quantitative study of social workers. *Journal of Social Work*, 23(6):1135-1155.

https://doi.org/10.1177/14680173231197930

Storey, J., & Billingham, J. (2010). Occupational stress and social work. *Social Work Education*, 20(6):659-670.

https://doi.org/10.1080/02615470120089843a

Theofilou, P. (2015). Translation and cultural adaptation of the multidimensional scale of perceived social support for Greece. *Health Psychology Research*, 3(1):1061.

https://doi.org/10.4081/hpr.2015.1061

Theofilou, P., & Varemenos, I. (2024). Perceived Social support as a predictive factor of fatigue and quality of life among healthcare professionals in Greece. *Qeios*.

https://doi.org/10.32388/N3U7W8.3

Thompson, N., Murphy, M., & Stradling, S. (1994). Dealing with Stress. United States: Macmillan.

Willis, N.G., & Molina, V. (2019). Self-Care and the social worker: Taking our place in the code. *Social Work*, 64(1):83-86.

https://doi.org/10.1093/sw/swy049

Yasin, M.A.S.M., & Dzulkifli, M.A. (2011). Differences in depression, anxiety and stress between low-and high-achieving students. *Journal of Sustainability Science and Management*, 6(1):169-178.

Zhang, M. (2016). Research on correlation of psychological counselor's job burnout with self-efficacy and social support and professional identity. *Journal of Hunan Agricultural University*, 8:1-55.

Zimet, G.D., Dahlem, N.W., Zimet, S.G., & Farley, G.K. (1988). The multidimensional scale of perceived social support. Journal of Personality Assessment, *52*(1):30-41.

https://doi.org/10.1207/s15327752jpa5201_2

Zyga, S., Alikari, V., Sachlas, A., Fradelos, E.C., Stathoulis, J., Panoutsopoulos, G., *et al.* (2015). Assessment of fatigue in end stage renal disease patients undergoing hemodialysis: Prevalence and associated factors. *Medical Archives*, 69(6):376-380.

https://doi.org/10.5455/medarh.2015.69.376-380

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ORIGINAL RESEARCH ARTICLE

Exploring the relationship between perceived social support and quality of life among Indian elderly population: A cross-sectional study

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Abstract

The function of society is vital in influencing the quality of life (QOL) for the elderly population. With this context, the influence of perceived social support on enhancing the QOL among the geriatric population is substantial. This study sought to explore the relationship between perceived social support and QOL, employing a descriptive correlational study method. A multi-stage random sampling method was employed, involving 476 elderly persons. Data collection was conducted utilizing three organized interview schedules: The World Health Organization Quality of Life Scale (BREF version), the Multidimensional Scale of Perceived Social Support, and a sociodemographic questionnaire. Data were tabulated and subsequently analyzed using STATA version 16.0, with categorical data presented as percentages (%) and quantitative data as mean ± standard deviation. The ages of the respondents ranged from 60 to 96 years. Pearson correlation analysis assessed the associations among numerical variables, with statistical significance set at a $p \leq 0.05$. The findings revealed that physical health-related QOL was lower among the elderly participants, while social relationship QOL was the highest. More importantly, the family emerged as the primary source of social support. Significant positive correlations were identified between total QOL and total social support, emphasizing the pivotal role of social support in enhancing the well-being of the elderly. The study highlighted that active social engagement is instrumental in mitigating age-related health issues. Through the sharing of experiences, elderly individuals can support each other, derive meaning in life, and collectively improve their QOL. By fostering social connections and encouraging open communication, these strategies can contribute to a more fulfilling and healthier life for the elderly population.

Keywords: Perceived social support; Quality of life; Elderly population; Siwan; India

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1. Introduction

The elderly population has been rising for decades across the globe (United Nations, 2020). Advances in medical science and technology, as well as early detection, treatment, and prevention of diseases, have contributed to a decrease in mortality and an increase in average lifespan. These advancements in preventative healthcare have led to an extended

lifespan and a corresponding increase in the overall elderly population. The combination of falling fertility and rising life expectancy has highlighted the growing percentage of elderly individuals in the world's population. In 2001, the elderly population, aged 60 years or above, comprised 7.4% of the total population. This percentage was slightly lower for males at 7.1%, while for females, it was 7.8%. In 2007, India, the world's second most populous country at the time, had 92 million people aged 60 years and beyond. By 2050, these numbers are predicted to rise to 330 million in India (United Nations, 2007). As per the 2011 census, India's elderly population (≥60 years) has reached 104 million, making up 8.6% of the total population. Among the elderly, females outnumber males. Across states, the proportion ranges from approximately 4% in smaller states such as Nagaland and Arunachal Pradesh to over 7.6% in Bihar.

The term "aging" describes the inevitable, natural, and gradual biological changes that take place throughout an individual's lifespan. Aging can also be defined as a mental condition that does not necessarily correspond with our actual age (Thadathil *et al*., 2015). As people age, they lose certain roles and responsibilities and become more dependent on others. A significant social risk factor in old age is the reduction of social connections due to a decline in social life engagement (Şahin *et al*., 2019). This study was motivated by the gap in existing literature, which lacks comprehensive research exploring the correlation between social support and the quality of life (QOL) in the elderly.

The concept of QOL is closely associated with health and its related aspects. For an elderly individual, QOL refers to the extent of well-being experienced by that person. Lawton (1991) suggests that QOL entails a thorough assessment considering both individualized and socially accepted standards. It involves evaluating a person's interaction with their environment over past, present, and anticipated future periods. According to the World Health Organization (WHO), health is described as a condition marked by full physical, mental, and social well-being, not simply the lack of disease or illness (WHO, 2005). The definition of well-being varies across cultures and individuals. Consequently, individuals often equate their health with their QOL. There are two approaches to assessing life quality: Subjective and objective. Subjective QOL pertains to an individual's satisfaction and enjoyment of their living circumstances, while objective QOL involves meeting established standards for a decent existence. In essence, subjective QOL involves personal assessments of living conditions, whereas objective QOL entails unbiased assessments of life conditions. In our study, QOL pertains to an individual's comprehensive sense of well-being, including the satisfaction of goals, expectations, and standards based on cultural and value systems. QOL is a comprehensive term that includes happiness and fulfillment as well as physical and social activity, mental health, and overall well-being (Coswosck *et al*., 2022). The significance of QOL among elderly individuals is gaining prominence, particularly in light of the ongoing demographic transition toward an aging society. There are signs that concerns related to the QOL in the elderly diverge from those observed in the broader population (Gupta *et al*., 2014). Well-being encompasses both subjective and objective components, with the subjective dimension embodied in the concept of QOL. According to the WHO, QOL is defined as the condition of life influenced by a broad spectrum of factors, including those associated with health, happiness, education, social and intellectual accomplishments, freedom of action, justice, and freedom of expression (WHOQOL Group, 1993). Urbanization, modernity, globalization, individualism, and other social changes have caused significant disruption in family structures and societal norms and values, which negatively impacts the elderly in modern cultures (Varma *et al*., 2010). In addition, aging causes a variety of physiological and psychological issues that negatively impact a person's QOL (Donmez *et al*., 2005). The QOL tends to diminish in older age, a phase where the prevalence of chronic diseases becomes more pronounced with increasing lifespans. Chronic diseases significantly impact the physical, social, and emotional dimensions of elderly individuals' lives, necessitating prolonged periods of care and rehabilitation. Many of these conditions lack complete cures, imposing substantial burdens on the health and economic well-being of patients, their families, and society at large. Consistent research findings indicate that elderly individuals with chronic diseases typically experience a reduced QOL compared to their counterparts without such health conditions (Ponirou *et al*., 2014; Deshmukh *et al*., 2015).

Social support refers to the various forms of assistance that a person receives from others, falling under the broad categories of instrumental and emotional assistance. "Emotional support" encompasses caring; love, affection, and other factors that help someone feel good about themselves. "Instrumental assistance" includes concrete assistance, such as child care, cleaning, or transportation. Having enough social support is essential for a long and healthy life (Charles & Kulandai, 2020). As social beings, people rely on actual or perceived resources from others that make them feel cared for and connected to a communication network. The concept of social support emerged from medicinal settings within the realm of social psychology. This field explores how individuals navigate stress and crises, the significance of social connections,

and the dynamics of societal change (Kasprzak, 2010). According to Sarason *et al.* (1983), social support entails the presence or accessibility of individuals we can depend on, trust, and who sincerely demonstrate concern for us. Zimet *et al.* (1988) define perceived social support as a multidimensional construct, encompassing "family," "friends," and "significant others." In the study, social support was conceptualized as both perceived and multidimensional, impacting variables such as QOL, happiness with life, and wellness. Ozbay *et al.* (2007) contended that social support is a significant factor influencing the preservation of both physical and mental health. Terzi (2008) uncovered a distinct correlation between perceived social support and psychological resilience. In-depth research has explored and substantiated the relationship between social relationships and health, with multiple studies revealing connections between social support and various indicators of well-being in the elderly (Kahn *et al.*, 2003; Shin & Sok, 2012). Studies have indicated a correlation between heightened levels of social support and improved well-being and QOL among older adults (Holmén & Furukawa, 2002; Golden *et al.*, 2009; Shin & Sok, 2012). Social support plays a crucial role in fostering health by providing individuals with positive experiences, socially engaged roles, and improved coping mechanisms to manage stressful events. For older individuals grappling with disabilities linked to chronic diseases or facing social isolation following the loss of a partner, social support becomes particularly crucial. The absence of family or significant others, coupled with diminished social support networks, may lead to feelings of loneliness and contribute to both physical and emotional health issues among the elderly (Golden *et al.*, 2009; Shin & Sok, 2012). Behavior, attitude, psychology, and physical health are greatly influenced by society. The society to which an individual belongs significantly shapes their goals, attitudes, and views. Social support is particularly necessary for those who are unwell, in pain, experiencing anxiety or have lost their employment. Ultimately, it affects the different domains of the life quality of a person. An improved standard of living has been linked with positive social assistance in all four domains (Yanos *et al.*, 2001). Collectively, previous studies have repeatedly demonstrated that anxiety, insomnia, stress, social dysfunction, and deep depression can all result from a lack of social support. These conditions can ultimately lower one's QOL and affect both physical and psychological well-being. Social participation is positively correlated with the QOL (Ono *et al.*, 2011). The family plays a crucial role within this framework of social support. Strong social networks and supportive family members contribute to improving a person's QOL, even in the presence of physical and mental sickness. The finding is further supported by other studies (Umberson & Montez, 2010; Sapp *et al.*, 2003).

Old age is not solely a biological stage; it also represents a social and emotional phase experienced by individuals who have lived through an extensive life journey. Within this context, a social dimension exists wherein certain older individuals, grappling with complex health issues, find themselves reliant on others for support. This dependence, compounded by factors such as social isolation, anxiety, depression, loneliness, and a pervasive sense of hopelessness arising from health challenges or the loss of a spouse and loved ones, collectively contributes to a decline in the QOL for the elderly. The cumulative effect of these challenges manifests in an overall poorer QOL for individuals in their later years.

The role of social support emerges as a pivotal factor that could significantly influence the overall QOL experienced by the elderly. Intriguingly, despite the relevance of this connection, there exists a dearth of prior studies elucidating the specific impact of social support on the QOL of the elderly in the Siwan district of Bihar, India. Against this backdrop, the current study was undertaken to explore and evaluate the influence of social interaction on various domains of QOL among the elderly population.

This study aims to assess the relationship between QOL and multidimensional perceived social support (MSPSS) among the elderly aged 60 years and older. In line with the objective, the following hypothesis was developed: Perceived social support among the elderly aged 60 years and older has a significant and positive effect on their QOL.

2. Methods

2.1. Study setting

The study included individuals aged 60 years and older who lived in the Siwan district of Bihar, India. According to the 2011 census data from the Registrar General of India, 298,247 individuals aged 60 years and older lived in the Siwan district (RGI, 2011). The sample size was determined by a multi-stage random sampling method using Equation I:

$$n = \frac{z^2_{\alpha/2} \times p \times (1-p)}{e^2} \quad \text{(I)}$$

As a result, the sample size was calculated to be 476 individuals, with a 95% confidence interval, a prevalence of aging at 8.96%, a margin of error of 3%, a non-response rate of 10%, and a design effect of 1.25. A survey was conducted in a total of 17 villages within the district, with 28 respondents sampled from each village. Data collection took place during 2021– 2022.

2.1.1. Inclusion criteria

Participants aged 60 years and older who were permanent residents of the district and present during data collection periods were eligible for inclusion. Before participation, all individuals provided informed consent.

2.1.2. Exclusion criteria

Participants were excluded if they were critically ill, unable to communicate verbally, or had hearing impairments. In addition, refusal to provide consent resulted in exclusion from the study.

2.2. Data collection

Sociodemographic data encompassing variables such as gender, age, marital status, caste, religion, educational status, wealth category, and employment status were gathered through the administration of a structured questionnaire. In addition, the data collection process involved the utilization of a 26-item the World Health Organization Quality of Life Scale-BREF version (WHOQOL-BREF) scale and a 12-item Multidimensional Scale of Perceived Social Support (MSPSS) scale.

QOL was evaluated using the WHOQOL_BREF scale developed in 1996 (WHO, 1996). This scale comprises a total of 26 items, categorized into four subdomains: physical QOL, psychological QOL, social QOL, and environmental QOL. Respondents rated the items using a five-point Likert scale (1 = Never to 5 = Extremely), with higher scores indicating a higher QOL. Following WHO guidelines, raw scores for each domain were calculated by summing individual item values and subsequently transforming them to a scale ranging from 0 to 100, where 100 represents the highest value, and 0 denotes the lowest. Mean scores for each domain and the total score were subsequently calculated. Higher scores on the WHOQOL-BREF indicate better QOL.

The MSPSS, introduced by Zimet *et al.* (1988), comprises 12 items distributed across three subdomains: Family, friends, and significant others. Participants rated the items using a seven-point Likert scale, ranging from very strongly disagree (1) to very strongly agree (7). Total scores, reflecting perceived support from family, friends, and significant others in life, ranged from 12 to 84, with higher scores indicating greater levels of support. Mean scores for each subdomain and the overall total score were computed.

2.3. Reliability analyses

In the present study, the reliability of the WHOQOL-BREF and MSPSS scales was assessed using Cronbach's alpha coefficients. The WHOQOL-BREF scale demonstrated a high level of reliability with a Cronbach's alpha coefficient of 0.92. This finding contrasts with a study by Mondal *et al.* (2020), which reported a lower Cronbach's alpha coefficient of 0.76 for the same scale. For the MSPSS, our study yielded a Cronbach's alpha coefficient of 0.75, while Zimet *et al.* (1988) reported a higher value (0.88) in their research. Despite these variations, the Cronbach's alpha coefficients in the present study indicate good internal consistency for the different facets, with values ranging from 0.65 to 0.93, as suggested by the WHO (The WHOQOL Group, 1998).

2.4. Statistical analysis

The statistical analyses were carried out using STATA version 16.0 (StataCorp, USA). Descriptive analyses and correlation analyses were employed to assess the data, with a specific focus on person correlation analysis for evaluating the associations among numerical variables. A $p \leq 0.05$ was used to determine statistical significance.

3. Results

3.1. Characteristics of the studied population

The social demographic characteristics of the participants (N = 476), as extracted from the self-administered questionnaire, are shown in Table 1. Among the participants, the majority were males (257 [54%]). The age group 60 – 69 years comprised 251 participants (52.7%), and most of the participants were married (273 [57.3%]). More than four-fifths of the participants (385 [80.8%]) were Hindu, and most were from other backward classes (205 [43%]). In addition, 305 participants (64%) were illiterate and had no formal primary education. In terms of wealth, most of the participants (249 [52.3%]) were poor. Fewer than one-fourth of the participants (114 [23.9%]) were employed.

3.2. Mean scores of QOL and perceived social support of the studied population

On average, participants rated their social relationship QOL the highest, with a mean score of 53.12 ± 17.60. The physical domain, which had a mean score of 40.55 ± 9.41, was the most affected. The overall total QOL score (44.90 ± 8.91) falls between these domains, indicating a moderately balanced QOL among the studied participants.

The study participants perceived family as providing the highest level of social assistance (19.41 ± 3.52), followed by friends (18.19 ± 2.47). However, the majority of study participants felt that their significant others provided minimal social support (16.82 ± 3.07) (Table 2).

Table 1. Characteristics of the studied population (*N*=476)

Characteristics	Number (*n*)	Percent
Sociodemographic characteristics		
Gender		
Female	219	46.01
Male	257	53.99
Age category		
60 – 69 years	251	52.73
70 – 79 years	163	34.24
≥80 years	062	13.03
Marital status		
Currently married	273	57.35
Widows/widowers	201	42.23
Separated/divorced	002	00.42
Religion		
Muslim	091	19.12
Hindu	385	80.88
Caste		
General	163	34.24
OBC	205	43.07
SC/ST	108	22.69
Socioeconomic characteristics		
Educational status		
Literate	171	35.93
Illiterate	305	64.08
Wealth category		
Poor	249	52.32
Middle class	135	28.37
Rich	092	19.31
Employment status		
Working	114	23.90
Not working	362	76.10
Total	476	100

Abbreviations: OBC: Other backward classes; SC: Scheduled castes; ST: Scheduled tribes.

3.3. Description of intercorrelation matrix of WHOQOL of the studied population

An intercorrelation matrix of the QOL (WHOQOL) is shown in Table 3. This intercorrelation matrix provides insights into how different dimensions of QOL are linked to each other and to the total QOL score among the studied participants. The analysis demonstrated that all domains of QOL were positively associated with each other and with the total QOL score. Among domains of QOL, the highest correlation coefficient (0.546) was observed between physical QOL and psychological QOL, while the lowest correlation coefficient (0.357) was noted between social QOL and environmental QOL. In addition, the total QOL score was highly correlated with all subdomains, with correlation coefficients varying from 0.685 to 0.830. The highest correlation coefficient was observed between the total QOL and environmental QOL (0.830), while the lowest was between the total QOL and social QOL (0.685). All correlation coefficients were statistically significant ($p \leq 0.05$).

Table 2. Examining the quality of life and perceived social support among the studied population

Items	Minimum–Maximum	Mean±SD
Quality of life		
Social relationship domain	0 – 100	53.12±17.60
Environmental domain	0 – 87.50	47.18±11.74
Psychological domain	16.67 – 75	42.84±9.83
Physical domain	17.86 – 75	40.55±9.41
Total quality of life	12.50 – 71.88	44.90±8.91
Perceived social support		
Social support from family	9 – 27	19.41±3.52
Social support from friends	9 – 26	18.19±2.47
Social support from significant others	7 – 26	16.82±3.07
Total social support	37 – 72	54.42±6.14

3.4. Description of the intercorrelation matrix of the Multidimensional Scale of Perceived Social Support of the studied population

An intercorrelation matrix of the MSPSS is shown in Table 4. This intercorrelation matrix provides insights into how different dimensions of social support are interconnected and how they relate to the overall perceived social support score among the studied participants. The analysis showed that the levels of social support perceived by friends, family, and significant others were positively associated with each other and with the overall perceived social support. Specifically, the correlation between "social support from family" and "social support from friends" was 0.363, which was statistically significant ($p \leq 0.05$). Similarly, the correlation between "social support from friends" and "social support from significant others" was 0.170, also reaching statistical significance ($p \leq 0.05$). However, the correlation between "social support from family" and "social support from significant others" was 0.038, which did not attain statistical significance ($p \leq 0.05$). The highest correlation coefficient (0.363) was observed between "social support from family" and "social support from friends," while the lowest correlation coefficient (0.170) was noted between "social support from friends"

Table 3. Intercorrelation matrix of quality of life (WHOQOL) among the studied population

WHOQOL	Physical QOL	Psychological QOL	Social QOL	Environmental QOL	Total QOL
Physical QOL	1				
Psychological QOL	0.546*	1			
Social QOL	0.510*	0.451*	1		
Environmental QOL	0.499*	0.541*	0.357*	1	
Total QOL	0.804*	0.793*	0.685*	0.830*	1

Notes: QOL: Quality of life; Significance level: *$p \leq 0.05$.

Table 4. Intercorrelation matrix of the multidimensional scale of perceived social support among the study population

Social support subcomponents	Social support from family	Social support from friends	Social support from significant others	Total social support
Social support from family	1			
Social support from friends	0.363*	1		
Social support from significant others	0.038	0.170*	1	
Total social support	0.739*	0.696*	0.590*	1

Note: Significance level: *$p \leq 0.05$.

and "social support from significant others." On the other hand, the overall MSPSS was highly correlated with all subdomains, with correlation coefficients varying from 0.590 to 0.739. The highest correlation coefficient (0.739) was observed between the total score and social support from family, while the lowest correlation coefficient (0.590) was found between the total score and social assistance from significant others.

3.5. Correlation between perceived social support (MSPSS) and QOL (WHOQOL) among the studied population

The relationship between the QOL (WHOQOL) and perceived social support (MSPSS) among the studied population is presented in Table 5. The result of the analysis revealed a significant and positive correlation between QOL and various dimensions of perceived social support among elderly participants. More importantly, statistically significant positive correlations were observed between the total QOL and perceived social support from both family (r = 0.417) and friends (r = 0.319). Furthermore, the Pearson correlation analysis, which aimed to determine the effect of MSPSS on QOL, indicated a statistically significant positive correlation between overall QOL and total social support (r = 0.477; p < 0.0001). These findings suggest that higher perceived social support is associated with better QOL among the study population, thus confirming the hypothesis.

Table 5. Correlation between the multidimensional scale of perceived social support and quality of life (WHOQOL) among the study population (*N*=476)

Social support subcomponents	Total quality of life	
	r	*p*-value
Social support from family	0.417*	<0.0001*
Social support from friends	0.319*	<0.0001*
Social support from significant others	0.409	0.1080
Total social support	0.477*	<0.0001*

Notes: *r*: Pearson correlation coefficient; Significance level: *$p \leq 0.05$.

4. Discussion

The primary objective of this study was to explore the correlation between MSPSS and QOL (WHOQOL) among individuals aged 60 years and older. The existing gap in research investigating the interrelation between these two variables – MSPSS and QOL – emphasizes the necessity for in-depth exploration in this area.

The sociodemographic data of the study revealed a higher number of male elderly participants compared to females. Remarkably, our findings indicated that the social relationship domain exhibited the highest mean QOL score. This observation highlights the significant impact of social contacts and the support derived from personal relations and peer groups on the overall QOL for the elderly. According to research conducted by Barua *et al.* (2005) in Karnataka, involving 70 older adults and utilizing the Kannada version of WHOQOL-BREF, consistent with our findings, the social relationship domain exhibited the highest QOL score. Shah *et al.* (2017) also observed in their study that the mean score of the social domain was the highest, aligning with the outcomes of our research.

Similarly, Khan *et al.* (2014), in their investigation of the elderly population in rural Bangladesh using WHOQOL-BREF, found that the social relationship domain had the highest average score. Ghosh *et al.* (2014), in their study involving 132 older individuals in Burdwan Municipality, reported the maximum mean score in the social domain. In contrast, Praveen & Rani (2016), in their study involving 50 older individuals in the Thiruvallur district of Tamil Nādu, discovered that the domain of social relationships scored the lowest among all QOL domains. Likewise, Datta *et al.* (2015), in their research among older individuals in the urban municipal zone of Sonarpur and Kolkata in West Bengal, India, revealed that the average score in the social domain was notably low. The outcomes of our study revealed that the physical domain attained the lowest mean QOL score. Likewise, Mondal *et al.* (2020) also reported the lowest mean score in the physical health domain among all four domains of QOL in their study. Conversely, Thadathil *et al.* (2015), in their study involving 220 elderly individuals using the WHOQOL-BREF scale in a rural setting of Kerala, observed that the highest mean scores for QOL were identified in the domain of physical health.

A study conducted by Sowmiya & Nagarani (2012), involving 476 elderly individuals in Tamil Nadu, revealed that the social relationships domain garnered the highest mean QOL score, while the physical domain obtained the lowest mean QOL score. Similarly, findings from the study by Qadri *et al.* (2013) in the Ambala district of Haryana indicated that the domain with the greatest mean QOL score was social interactions, contrasting with the lowest mean QOL score observed in the physical domain. Another investigation by Kumar & Shankar (2018) on 402 older residents in remote areas in the Varanasi district demonstrated that the mean score in the social relationship domain surpassed all other domains of QOL. These consistent findings resonate with the results obtained in our present study.

The present study indicates that people in their later years continue to view their QOL as moderate, aligning with previous research findings (Ercan Şahin & Emiroğlu, 2014; Arpaci *et al.*, 2015; Altay *et al.*, 2016). Furthermore, our results reveal positive associations among the various domains of QOL and with the total QOL score. In addition, perceived social support from family, friends, and significant others exhibits positive correlations with each other and with the overall perceived social support. This finding is consistent with a study conducted in Egypt by Banovcinova & Baskova (2016), which identified a positive correlation between all functional domains of QOL, total QOL, and the total social support from family, friends, and significant others subscale.

The findings of this study highlight that the participants perceived the highest social support from their families. This trend is possibly attributed to the robust family bonds prevalent in Northern India, where familial connections are integral and often serve as a significant form of social support. This outcome aligns with earlier research, such as the study by Banovcinova & Baskova (2016), which also identified family as the primary source of perceived social support. A study from Pakistan conducted by Naz *et al.* (2014) similarly emphasized the pivotal role of family as the immediate source of social support. However, it is important to note that there are variations in findings. For instance, Mahmoud *et al.* (2017) found that patients perceived the highest social support from significant others. This discrepancy may be explained by the nature of support provided to mental health patients; where significant others such as doctors, nurses, clerks, or partners play a crucial role in offering assistance beyond that provided by family members.

The results observed in the present study emphasized noteworthy and statistically significant positive associations between overall QOL and the comprehensive social support received from family, friends, and significant others. This positive relationship underscores the pivotal role that close relationships – family, friends, and significant others – play in shaping individuals' lives. Social support emerges as a crucial factor with a beneficial impact on both the physical and psychological well-being of the elderly population. It acts as a buffer against the adverse effects of life stressors, fostering coping mechanisms and resilience. These findings align with prior research. For instance, Mahmoud *et al.* (2017) found statistically significant positive associations between perceived social support and QOL among psychiatric patients in Egypt. Yanos *et al.* (2001) similarly identified positive associations between social interactions and QOL among individuals diagnosed with severe mental illness in the United States. In addition, Eom *et al.* (2013) observed that declined QOL was linked to lower perceived social support, while studies by Smith *et al.* (2010) and Zhou *et al.* (2010) indicated that higher perceived social support correlated with elevated QOL. Charles & Kulandai (2020) also found statistically significant positive associations between total QOL and total social support, suggesting that individuals with higher perceived social support scores exhibited a superior QOL.

The results of the regression analysis conducted by Şahin *et al.* (2019) further substantiate a positive relationship between MSPSS and QOL, with increased social support associated with improved QOL. Similarly, Kumcagiz & Shahin (2017) identified a positive relationship between support from friends and family

and physical health, psychosocial health, and overall QOL. Neogi (2014) established a noteworthy correlation between social assistance networks and QOL. Costa *et al*. (2012) highlighted the moderate predictive role of social support in health-related QOL (HRQOL), particularly in the context of multiple sclerosis patients. Furthermore, Unsar *et al*. (2016) reported positive correlations between the EQ-5D index score and total social support, as well as subgroups of family, friends, and significant others. In summation, these collective findings reinforce the notion that robust social support networks, encompassing relationships with family, friends, and significant others, are integral to enhancing the overall QOL among elderly populations. Our present study is consistent with these findings.

Despite the relevance of the results derived from this study, certain limitations should be acknowledged. First, the study exclusively involved elderly respondents residing in the Siwan district of Bihar, India. Consequently, the findings may not be fully generalizable to the broader Indian elderly population. Second, due to the cross-sectional design, causative factors underlying the observed association between social support and QOL among the participants cannot be definitively established. As a result, future research employing longitudinal designs should be conducted to comprehensively explore these relationships.

5. Conclusion

The present study found a moderate and statistically significant positive correlation between total QOL and total social support among the elderly in the Siwan district of Bihar, India. The correlational examination of these two variables yielded significant results, highlighting the potential for improved QOL through increased efforts to enhance social support for elderly individuals. Furthermore, the study identified positive correlations among various domains of QOL and between these domains and the overall QOL. Similarly, perceived social support from family, friends, and significant others exhibited positive correlations with each other and with total perceived social support. More importantly, the participants reported a high perception of social assistance from their families, reinforcing the pivotal role of the family as an immediate and robust source of support. Families are often viewed as the strongest sources of support in a person's life, but when those links break, and elderly parents are left on their own, society should assist them in creating a social support network. Family moral support and social reorganization of support networks at the participant level are suggested to provide gerontological counseling. The QOL associated with physical health was shown to be lower among the elderly. These findings suggest a call for policy attention at the level of state government for the elderly population of the study area. In conclusion, to enhance the general health condition of older people, effective health promotion measures are required.

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Conflict of interest

The authors declare no competing interests.

Author contributions

Conceptualization: Mukesh Kumar Gupta, Dewaram A. Nagdeve
Formal analysis: Mukesh Kumar Gupta
Investigation: Mukesh Kumar Gupta
Methodology: Mukesh Kumar Gupta
Writing – original draft: Mukesh Kumar Gupta
Writing – review & editing: Dewaram A. Nagdeve, Jitendra Kumar

Ethics approval and consent to participate

The study was approved by the Student Research Ethics Committee of the International Institute for Population Sciences, Mumbai, India (No./IIPS/SREC/597/2021). The informed consent was obtained from all individual participants included in this study.

Availability of data

Data used in this work are available from the corresponding author on reasonable request.

References

Altay, B., Cavusoglu, F., & Cal, A. (2016). The factors affecting the perception of elderly patients towards health, quality of life, and health-related quality of life. *TAF Preventive Medicine Bulletin*, 15(3):181.

https://doi.org/10.5455/pmb.1-1438765038

Arpaci, F., Tokyurek, S., & Bilgili, N. (2015). Life quality of elderly living in the nursing home. *Elderly Issues Research Journal*, 8(1):1-11.

Banovcinova, L., & Baskova, M. (2016). Role of the family, friends, and significant others in providing social support and enhancing quality of life in cancer patients. *SHS Web of Conferences*, 30:00020.

https://doi.org/10.1051/shsconf/20163000020

Barua, A., Mangesh, R., Kumar, H.H., & Saajan, M. (2005). Assessment of the domains of quality of life in the geriatric population. *Indian Journal of Psychiatry*, 47(3):157.

https://doi.org/10.4103/0019-5545.55940

Charles, S., & Kulandai, A. (2020). Perceived social support and quality of life of pensioners. *Journal of Xi'an University of Architecture and Technology*, 7(3), 1153-1165.

Costa, D.C., Sá, M.J., & Calheiros, J.M. (2012). The effect of social support on the quality of life of patients with multiple sclerosis. *Arquivos de Neuro-Psiquiatria*, 70:108-113.

https://doi.org/10.1590/S0004-282X2012000200007

Coswosck, K.H., Moreira, J.A., Navarro, J.H., Guandalini, V.R., & Marques-Rocha, J.L. (2022). Factors associated with poor quality of life of transgender people. *Discover Social Science and Health*, 2(1):17.

https://doi.org/10.1007/s44155-022-00020-2

Datta, D., Datta, P.P., & Majumdar, K.K. (2015). Role of social interaction on quality of life. *National Journal of Medical Research*, 5(4):290-292.

Deshmukh, P.R., Dongre, A.R., Rajendran, K.P., & Kumar, S. (2015). Role of social, cultural and economic capitals in perceived quality of life among old age people in Kerala, India. *Indian Journal of Palliative Care*, 21(1):39.

https://doi.org/10.4103/0973-1075.150175

Donmez, L., Gokkoca, Z., & Dedeoglu, N. (2005). Disability and its effects on quality of life among older people living in Antalya city centre, Turkey. *Archives of Gerontology and Geriatrics*, 40(2):213-223.

https://doi.org/10.1016/j.archger.2004.08.006

Eom, C.S., Shin, D.W., Kim, S.Y., Yang, H.K., Jo, H.S., Kweon, S.S., *et al.* (2013). Impact of perceived social support on the mental health and health-related quality of life in cancer patients: results from a nationwide, multicenter survey in South Korea. *Psycho-Oncology*, 22(6):1283-1290.

https://doi.org/10.1002/pon.3133

Ercan Şahin, N., & Emiroğlu, O.N. (2014). Quality of life and related factors of older people in nursing home. *Journal of Hacettepe University Faculty of Nursing*, 1(1):57-66.

Ghosh, S., Bandyopadhyay, S., Bhattacharya, S., Misra, R., & Das, S. (2014). Quality of life of older people in an urban slum of India. *Psychogeriatrics*, 14(4):241-246.

https://doi.org/10.1111/psyg.12073

Golden, J., Conroy, R.M., Bruce, I., Denihan, A., Greene, E., Kirby, M., *et al.* (2009). Loneliness, social support networks, mood and wellbeing in community-dwelling elderly. *International Journal of Geriatric Psychiatry: A Journal of the Psychiatry of Late Life and Allied Sciences*, 24(7):694-700.

https://doi.org/10.1002/gps.2181

Gupta, A., Mohan, U., Tiwari, S.C., Singh, S.K., & Singh, V.K. (2014). Dimensions and determinants of quality of life among senior citizens of Lucknow, India. *International Journal of Medicine and Public Health*, 4(4):477-481.

https://doi.org/10.4103/2230-8598.144122

Holmén, K., & Furukawa, H. (2002). Loneliness, health and social network among elderly people-a follow-up study. *Archives of Gerontology and Geriatrics*, 35(3):261-274.

https://doi.org/10.1016/S0167-4943(02)00049-3

Kahn, J.H., Hessling, R.M., & Russell, D.W. (2003). Social support, health, and well-being among the elderly: What is the role of negative affectivity? *Personality and Individual Differences*, 35(1):5-17.

https://doi.org/10.1016/S0191-8869(02)00135-6

Kasprzak, E. (2010). Perceived social support and life satisfaction. *Polish Psychological Bulletin*, 41(4):144-154.

https://doi.org/10.2478/v10059-010-0019-x

Khan, M.N., Mondal, M.N.I., Hoque, N., Islam, M.S., & Shahiduzzaman, M.D. (2014). A study on quality of life of elderly population in Bangladesh. *American Journal of Health Research*, 2(4):152-157.

https://doi.org/10.11648/j.ajhr.20140204.18

Kumar, D., & Shankar, H. (2018). Prevalence of chronic diseases and quality of life among elderly people of rural Varanasi. *International Journal of Contemporary Medical Research*, 5(7):2454-7379.

https://doi.org/10.21276/ijcmr.2018.5.7.16

Kumcagiz, H., & Sahin, C. (2017). The relationship between quality of life and social support among adolescents. *SHS Web of Conferences*, 37:01053.

https://doi.org/10.1051/shsconf/20173701053

Lawton, M.P. (1991). A multidimensional view of the quality of life in frail elders. In: *The Concept and Measurement of Quality of Life in the Frail Elderly*. United States: Academic Press, p.3-27.

Mahmoud, A.S., Berma, A.E., & Gabal, S.A.A.S. (2017). Relationship between social support and the quality of life among psychiatric patients. *Journal of Psychiatry and Psychiatric Disorders*, 1(2):57-75.

Mondal, N.A., Kannaujiya, A.K., & Ali, B. (2020). Quality of life of elderly in rural Murshidabad (West Bengal). *Social Science Spectrum*, 5(1):42-49.

Naz, S., Naz, S., & Gul, S. (2014). Relationship between economic independence, social support and quality of life among elderly people. *Journal of the Indian Academy of Applied Psychology*, 40(2):255.

Neogi, S.G. (2014). Persuade of coping with loneliness on quality of life of elderly. *International Journal of Interdisciplinary and Multidisciplinary Studies* (*IJIMS*), 1(6), 185-193.

Ono, E., Nozawa, T., Ogata, T., Motohashi, M., Higo, N., Kobayashi, T., & Miyake, Y. (2011), Relationship between Social Interaction and Mental Health. In: *2011 IEEE/SICE International Symposium on System Integration* (*SII*). United States: IEEE, p.246-249.

https://doi.org/10.1109/SII.2011.6147454

Ozbay, F., Johnson, D.C., Dimoulas, E., Morgan Iii, C.A., Charney, D., & Southwick, S. (2007). Social support and resilience to stress: From neurobiology to clinical practice. *Psychiatry (Edgmont)*, 4(5):35-40.

Ponirou, P., Diomidous, M., Kalokairinou, A., Mantas, J., Tsimahidou, C., & Tzavara, C. (2014). Health-related quality of life in a sample of older people who are members of Open Care Centres for the Elderly. In: *Integrating Information Technology and Management for Quality of Care*. Amsterdam: IOS Press, p.269-272.

https://doi.org/10.3233/978-1-61499-423-7-269

Praveen, V., & Rani, A.M. (2016). Quality of life among elderly in a rural area. *International Journal of Community Medicine and Public Health*, 3(3):754-757.

https://doi.org/10.18203/2394-6040.ijcmph20160646

Qadri, S., Ahluwalia, S.K., Ganai, A., Bali, S., Wani, F., & Bashir, H. (2013). An epidemiological study on quality of life among rural elderly population of Northern India. *International Journal of Medical Science and Public Health Research*, 2(3):514-522.

https://doi.org/10.5455/ijmsph.2013.2.492-500

RGI. (2011). Census of India 2011: Provisional Population Totals. New Delhi: Government of India, p.409-413.

Şahin, D.S., Özer, Ö., & Yanardağ, M.Z. (2019). Perceived social support, quality of life, and satisfaction with life in elderly people. *Educational Gerontology*, 45(1):69-77.

https://doi.org/10.1080/03601277.2019.1585065

Sapp, A.L., Trentham-Dietz, A., Newcomb, P.A., Hampton, J.M., Moinpour, C.M., & Remington, P.L. (2003). Social networks and quality of life among female long-term colorectal cancer survivors. *Cancer: Interdisciplinary International Journal of the American Cancer Society*, 98(8):1749-1758.

https://doi.org/10.1002/cncr.11717

Sarason, I.G., Levine, H.M., Basham, R.B., & Sarason, B.R. (1983). Assessing social support: the social support questionnaire. *Journal of Personality and Social Psychology*, 44(1):127.

https://doi.org/10.1037/0022-3514.44.1.127

Shah, V.R., Christian, D.S., Prajapati, A.C., Patel, M.M., & Sonaliya, K.N. (2017). Quality of life among elderly population residing in urban field practice area of a tertiary care institute of Ahmedabad city, Gujarat. *Journal of Family Medicine and Primary Care*, 6(1):101.

https://doi.org/10.4103/2249-4863.214965

Shin, S.H., & Sok, S.R. (2012). A comparison of the factors influencing life satisfaction between Korean older people living with family and living alone. *International Nursing Review*, 59(2):252-258.

https://doi.org/10.1111/j.1466-7657.2011.00946.x

Smith, S.K., Crespi, C.M., Petersen, L., Zimmerman, S., & Ganz, P.A. (2010). The impact of cancer and quality of life for post-treatment non-Hodgkin lymphoma survivors. *Psychooncology*, 19(12):1259-1267.

https://doi.org/10.1002/pon.1684

Sowmiya, K.R., & Nagarani, N. (2012). A study on quality of life of elderly population in Mettupalayam, a rural area of Tamil Nādu. *National Journal of Research in Community Medicine*, 1(3):123-177.

https://doi.org/10.26727/NJRCM.2012.1.3.139-143

Terzi, Ş. (2008). The relationship between the psychological endurance of university students and the social support they perceive. *Turkish Psychological Counseling and Guidance Journal,* 3(29):1-11.

Thadathil, S.E., Jose, R., & Varghese, S. (2015). Assessment of domain-wise quality of life among elderly population using WHO-BREF scale and its determinants in a rural setting of Kerala. *Int J Curr Med Appl Sci*, 7(1):43-46.

Umberson, D., & Karas Montez, J. (2010). Social relationships and health: A flashpoint for health policy. *Journal of Health and Social Behavior*, 51(1 suppl):S54-S66.

https://doi.org/10.1177/0022146510383501

United Nations. (2007). World Population Ageing 2007. New York: UN, Department of Economic and Social Affairs, Population Division. Available from https://www.un.org/en/development/desa/population/publications/pdf/ageing/worldpopulationageingreport2007.pdf [Last accessed on 2023 Nov 10].

United Nations. (2020). World Population Ageing 2020 Highlights: Living Arrangements of Older Persons. New York: United Nations.

Unsar, S., Erol, O., & Sut, N. (2016). Social support and quality of life among older adults. *International Journal of Caring Sciences*, 9(1):249-257.

Varma, G.R., Kusuma, Y.S., & Babu, B.V. (2010). Health-related quality of life of elderly living in the rural community and homes for the elderly in a district of India. *ZeitschriftFürGerontologie und Geriatrie*, 43(4):259-263.

https://doi.org/10.1007/s00391-009-0077-x

WHOQOL Group. (1993). Study protocol for the World Health Organization project to develop a Quality of Life assessment instrument (WHOQOL). *Quality of Life Research*, 2:153-159.

https://doi.org/10.1007/BF00435734

WHOQOL Group, T.W. (1998). The World Health Organization

quality of life assessment (WHOQOL): development and general psychometric properties. *Social Science and Medicine*, 46(12):1569-1585.

https://doi.org/10.1016/s0277-9536(98)00009-4

World Health Organization. (1996). WHOQOL-BREF: Introduction, Administration, Scoring and Generic Version of the Assessment: Field Trial Version WHOQOL-BREF. Geneva: World Health Organization. Available from: http://www.who.int/mental_health/media/en/76.pdf [Last accessed on 2023 Nov 12].

World Health Organization. (2005). Constitution of the World Health Organization. In: World Health Organization: Basic Documents. 45th ed. Geneva: WHO, p.1.

Yanos, P.T., Rosenfield, S., & Horwitz, A.V. (2001). Negative and supportive social interactions and quality of life among persons diagnosed with severe mental illness. *Community Mental Health Journal*, 37:405-419.

https://doi.org/10.1023/A:1017528029127

Zhou, E.S., Penedo, F.J., Lewis, J.E., Rasheed, M., Traeger, L., Lechner, S. *et al.* (2010). Perceived stress mediates the effects of social support on health-related quality of life among men treated for localized prostate cancer. *Journal of Psychosomatic Research*, 69(6):587-590.

https://doi.org/10.1016/j.jpsychores.2010.04.019

Zimet, G., Dahlem, N.W., Zimet, S.G., & Farley, G.K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52(1):30-41.

https://doi.org/10.1207/s15327752jpa5201_2

ACCSCIENCE PUBLISHING

Global Health Economics and Sustainability

ORIGINAL RESEARCH ARTICLE

Prevalence and causes of medication transcription errors among hospitalized patients: An observational study and survey of nurses at a faith-based hospital in Cameroon

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Abstract

Medication errors are a leading cause of death globally; with the burden on resource-limited countries more than double that in high-income countries. Errors can occur at all stages of the medication use process; however, there is limited information on medication transcription errors (MTEs) among hospitalized patients in Africa. This study sought to determine the prevalence and types of MTEs and to assess nurses' perceptions of the likely causes of MTEs within the pediatric and general wards at a faith-based hospital in Cameroon. A prospective chart review of medication orders transcribed for patients admitted from April 1 to April 30, 2021, was conducted. Data analyzed included patient demographics, prevalence and types of MTEs, medication classes involved in MTEs, and nurse's perceptions of the causes of MTEs. A total of 578 medication orders were reviewed for 75 patients, of whom 40 (53%) were female, and 30 were admitted to the pediatric ward. The results revealed that 38 MTEs were recorded, with 47% occurring on the medication administration sheet and dispensing cards. The most frequent MTEs were the omission of new and stop medication orders, involved in 28.9% and 26% of all MTEs, respectively. Antibacterials for systemic use were involved in the majority (55.3%) of MTEs. Illegible prescriptions (90.7%), distractions (87.0%), and high workload (77.8%) were ascribed as the most likely causes of MTEs. In conclusion, MTEs are common and pose a potential risk of patient harm in hospitalized patients. The adoption of a computerized provider order entry system could eliminate illegible prescriptions, reduce transcription processes, and alleviate workload, thereby improving patient safety.

Keywords: Patient safety; Transcription errors; Nurses

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1. Introduction

Medication errors are the leading cause of medication-related harm, with an estimated yearly cost of US$ 42 billion globally (World Health Organization, 2017). Resource-limited countries suffer twice as much burden from medication errors compared to high-income countries (World Health Organization, 2017). Weak medication systems and human factors such as fatigue, inadequate environmental conditions, lack of knowledge, and work overload have been shown to affect different stages of the medication use process and can cause severe harm or death (Elliott & Liu, 2010; South *et al.*, 2015;

World Health Organization, 2017). Hospitalized patients are particularly vulnerable to harm from medication errors due to the severity of their illness, complex medication regimens, and fragility (Shawahna *et al.*, 2019; World Health Organization, 2017).

Errors can occur at any stage of the hospital medication use process, including prescription, transcription, dispensing, and administration. A recent systematic review of medication errors in African hospitals estimated that errors occur in up to eight patients per 100 admissions. The majority of the medication errors reported was prescription and administration errors, and no study specifically examined transcription errors in hospital settings (Mekonnen *et al.*, 2018). Many hospitals in sub-Saharan Africa still use a paper-based system, where written doctor's prescriptions are often transcribed by nurses, posing a risk for errors. However, most of these institutions lack a system for monitoring medication transcription errors (MTEs) (Hartel *et al.*, 2011; Shawahna *et al.*, 2019). Evidence suggests that the majority of medication errors occur at the transcription stage (Ali *et al.*, 2017), yet there is limited information on the burden of MTEs within hospital settings in Africa.

In Mboppi Baptist Hospital, medicines are administered to patients within the wards following this protocol (Figure 1): The doctor manually writes all new prescriptions in the patient's chart, then the nursing staff transcribes every new prescription onto the patient's medication administration sheet, which includes the list of all medications the patient is on during admission. The nurse also transcribes each medication ordered into a separate dispensing card, which is taken to the inpatient pharmacy for the collection of daily supplies using the unit dose dispensing system. Every time a medication is administered, the nurse documents it on the medication administration sheet. Details documented include the name, dose, dosage form/route, frequency, and duration where specified. Transcription errors could occur at two stages of the medication use process: When each medication order is transferred (i) to the medication administration sheet or (ii) to the individual dispensing cards.

The aim of this study was to determine the prevalence and types of MTEs and to assess nurses' perceptions of the likely causes of MTEs within the pediatric and general wards in a faith-based hospital in Cameroon.

2. Methods

2.1. Study setting and design

This study was carried out at Mboppi Baptist Hospital, a faith-based hospital in Douala, Cameroon. All inpatients admitted into the pediatric and general ward (which included both medical and surgical patients) during the study period (April 1 – April 31, 2021) were considered for inclusion. The pediatric and general wards have a capacity of 38 and 50 beds, respectively. Nursing staff working in these wards were also surveyed to gather their opinions about the causes of MTEs. During the study period, there were 20 nurses in the pediatric ward and 37 nurses in the general ward. The pediatric ward was staffed by three general practitioners and one pediatrician, all responsible for prescribing medications to patients. Similarly, in the general ward, two general practitioners, one internist, and two general surgeons handled the medication prescriptions.

This study was a prospective observational chart review aimed at service improvement, focusing on patients admitted to the selected wards. In addition, the study included a survey of nurses working within those wards. The hospital administration and the senior nursing supervisor were informed of the rationale for the study. To prevent bias, ward heads and nurses were blinded by informing them that this activity was a routine pharmacy technician ward medicine review. When MTEs that could cause harm to the patients were identified, the clinical pharmacist was informed and intervened to make corrections. The study was carried out in accordance with the Declaration of Helsinki (Kong *et al.*, 2014).

2.2. Definition of MTEs

We adopted a consensus definition for MTEs from a study that used the Delphi technique among a panel of nursing health-care professionals in Palestine. MTEs were defined as any discrepancy between the doctor's medication order and the medication order transcribed onto the medication administration sheet and/or the individual dispensing card (Shawahna *et al.*, 2019).

2.3. Data collection

Demographic information collected included age, gender, and the number of medications ordered.

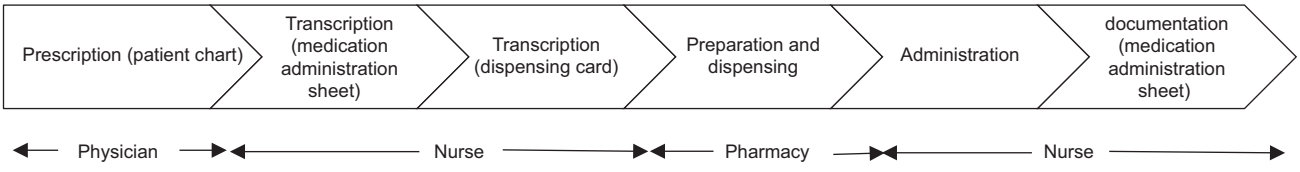

Figure 1. Inpatient medication use process. Image created using Microsoft Word

The medical records of 75 patients (30 from the pediatric ward and 45 from the general ward) were reviewed daily throughout the study period. One of the researcher's extracted details of each medication ordered during the admission and compared them to the nurses' transcriptions onto the medication administration sheet and the individual dispensing cards. A transcription error was identified if there were any modifications or omissions of the medication orders during these two transcription stages. MTEs were categorized according to where they occurred: Medication administration sheet only, dispensing card only, or both medication administration sheet and dispensing card. The MTEs were further categorized into the following types: wrong dose, missing dosage form, missing frequency, omission of stop medication order, omission of new medication order, wrong frequency, and wrong name. All medications involved in a transcription error were classified using the World Health Organization Anatomic Therapeutic Chemical (WHO ATC) classification methodology.

In the second stage of this study, a questionnaire was administered to assess nurse's perceptions of the causes of MTEs. The first section of the survey captured demographic information such as age, gender, work experience, marital status, and the ward where the nurse worked. The second section consisted of seven questions that captured information on participant's opinions about the causes of MTEs. Nurses were asked to express their perceptions in the second section using a 4-point Likert scale (1: Strongly disagree; 2: Disagree; 3: Agree; 4: Strongly agree). The questionnaire was pretested among five nurses from the maternity ward and refined to ensure relevance and appropriateness.

All data were collected by Yong Marie Noel Sangha (a 3rd-year pharmacy technician student) and verified daily for completeness and accuracy by Suh Nsutebu Ntani (the project supervisor, who is a clinical pharmacist).

2.4. Data analysis

Data were entered into a Microsoft Excel spreadsheet, cleaned, and transferred to Statistics for the Social Sciences version 23.0 (SPSS Inc., USA). Continuous variables were summarized as mean (standard deviation) or median (range), and categorical variables were expressed as frequencies (percentage). The demographic information of participants in each ward was summarized. In addition, the prevalence of MTEs in each ward and the proportion of MTEs by location where they occurred (administration sheet, dispensing card, and both) were determined. The proportion of each type of MTEs in the total sample was also summarized.

3. Results

3.1. Demographic characteristics of study patients

A total of 578 medication orders were issued for 75 patients admitted in the pediatric and general wards during the study period. Of the participants, 40 (53.3%) were female (Table 1). Thirty patients were admitted to the pediatric ward, with females constituting 15 (50%). The mean age in the pediatric ward was 1.39 ± 2.39 years, and the patients had a median of five medication orders (range: 1 – 16) during admission. In the general ward, 25 of the patients were female (55.6% of 45), with a mean age of 52.3 ± 16.33 years, and they had a median of six medication orders (range: 1 – 25) during admission.

3.2. MTEs rate

Overall, 20 (26.7%) patients had at least one MTE. Seven (23.3%) of the patients admitted to the pediatric ward had at least one error, while 13 (28.9%) from the general ward experienced at least one MTE (Figure 2). A total of 38 MTEs were recorded, with the majority (18 [47.4%]) occurring at both transcription stages (the medication administration sheet and the individual dispensing card). In addition, 11 (28.9%) occurred only on the medication administration sheet, and 9 (23.7%) occurred only on the individual dispensing card (Figure 3).

3.3. Types of errors and drug classification

The most frequent MTEs were the omission of new medication orders (11 [28.9%]), followed by the omission of stop medication orders (10 [26.3%]). There were 7 (18.4%) wrong dose MTEs, 3 (7.9%) MTEs each for missing dosage form and wrong frequency (Table 2).

The medications involved in transcription errors and their rates according to WHO ATC classification are described in Table 3. Antibacterials for systemic use had the highest number of MTEs (21 [55.3%]), followed by drugs used for diabetes and analgesics, each with three MTEs.

3.4. Survey of nurses' opinions about the causes of MTEs

Fifty-four (94.7%) nurses completed the survey questionnaire. Of these, 79.6% were female and 57.4%

Table 1. Demographic characteristics of patients

Variable	Pediatric ward	General ward	Total
Sex (*n* [%])			
Female	15 (50.0)	25 (55.6)	40 (53.3)
Male	15 (50.0)	20 (44.4)	35 (46.7)
Age (mean±*SD* year)	1.39±2.39)	52.3±16.33	
Mean number of medication orders (median [range])	5 (1 – 16)	6 (1 – 25)	

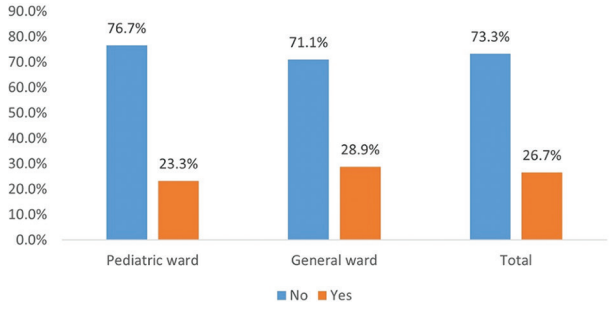

Figure 2. Prevalence of transcription error. Image created using Microsoft Excel

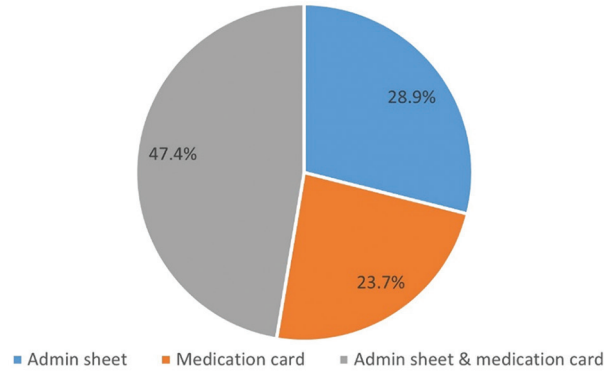

Figure 3. Stages where transcription errors occurred. Image created using Microsoft Excel

were married. The mean age of participants was 32.22 ± 4.90 years, with a mean service experience of 3.89 ± 3.47 years as nurse practitioners (Table 4).

Most of the surveyed nurses (90.7%) believed that illegible prescriber writings lead to transcription errors. In addition, 87% of nurses felt that distractions during transcribing contributed to errors. Forty-two nurses (74.8%) believed that a high workload could lead to transcription errors, 74.1% agreed that negligence from staff could contribute to errors, and 70.4% attributed inadequate knowledge of medicines as a potential cause of MTEs. The detailed distribution of the responses is outlined in Table 5.

4. Discussion

In the present study, MTEs were common among hospitalized patients, occurring in one out of every four patients. Almost half of all errors occurred during transcription to both the medication administration sheet and the individual dispensing card. With regards to the type of errors, omissions of a stop or a new medication order were the most frequent. Furthermore, antibacterials for systemic use were involved in more than half of all MTEs that occurred. The nurses in the wards identified illegible prescriptions, distractions, high workload, and negligence as the most likely causes of transcription errors.

The rate of MTEs observed in our study was higher than that reported in an earlier study of hospitalized

Table 2. Transcription errors classified by type

Transcription error	*n* (%)
Wrong dose	7 (18.4)
Missing dosage form	3 (7.9)
Missing frequency	2 (5.3)
Omission of stop medication order	10 (26.3)
Omission of new medication order	11 (28.9)
Wrong frequency	3 (7.9)
Wrong name	2 (5.3)

Table 3. Medications involved in transcription errors using WHO ATC classification

Drug ATC code	Pharmacological or therapeutic group	*n* (%)
A06	Drugs for constipation	1 (2.6)
A07	Antidiarrheal	1 (2.6)
A10	Drugs used in diabetes	3 (7.9)
B01	Antithrombotic agents	1 (2.6)
B03	Anti-anemic preparations	1 (2.6)
C08	Calcium channel blockers	2 (5.3)
H02	Corticosteroids for systemic use	1 (2.6)
J01	Antibacterials for systemic use	21 (55.3)
M01	Anti-inflammatory and anti-rheumatic products	2 (5.3)
N02	Analgesics	3 (7.9)
N03	Antiepileptics	1 (2.6)
N04	Anti-Parkinson drugs	1 (2.6)

Abbreviation: WHO ATC: World Health Organization Anatomic Therapeutic Chemical.

Table 4. Demographic characteristics of nurses in the general and pediatric wards

Variable	Pediatric ward	General ward	Total
Sex (*n* [%])			
Male	3 (15.8)	8 (22.9)	11 (20.4)
Female	16 (84.2)	27 (77.1)	43 (79.6)
Marital status (*n* [%])			
Single	10 (52.6)	13 (37.1)	23 (42.6)
Married	9 (47.4)	22 (62.9)	31 (57.4)
Age (mean±*SD* years)	31.47±5.99	31.09±4.33	31.22±4.90
Years of service (mean±*SD* years)	3.71±5.05	3.85±2.43	3.80±3.47

Table 5. Nurses' opinion about the likely causes of transcription errors

Variable	*n* (%)		
	Disagree	Neutral	Agree
Illegibility of the prescriber's writing can lead to transcription errors on the wards.	5 (9.3)	0 (0.0)	49 (90.7)
Transcription errors can occur when transcribed orders are not double-checked by a second nurse.	11 (20.4)	8 (14.8)	35 (64.8)
Poor knowledge of medicines, e.g., the strength of a drug by the nurse transcribing, can lead to a transcription error.	8 (14.8)	8 (14.8)	38 (70.4)
Distractions like chatting with colleagues or chatting on the phone while transcribing can lead to transcription errors.	7 (13.0)	0 (0.0)	47 (87.0)
High workload, e.g., having fewer staff members to work on the wards, can lead to transcription errors since one nurse will have to carry out many procedures alone.	8 (14.8)	4 (7.4)	42 (77.8)
Negligence on the part of the nurse transcribing can lead to errors.	6 (11.1)	8 (14.8)	40 (74.1)

children in Ethiopia, where five MTEs were observed for every 100 admissions (Dedefo *et al*., 2016). However, in another study conducted within an intensive care unit in Morocco, more than 400 MTEs occurred per 100 admissions (Jennane *et al.*, 2011). Moreover, in a more recent report from a tertiary hospital in Sri Lanka, researchers observed a higher rate of transcription errors (88.6%) compared to our study (Ratnapala *et al.*, 2022). The differences in these findings might be attributed to variations in the medication use process, targeted populations, severity of illness, lack of uniformity in definitions for MTEs, and methods of reporting errors. Literature shows that studies focusing on the reporting of prescription and administration errors typically report low MTE rates (Mekonnen *et al.*, 2018). In our setting, the transcription step of the medication use process is duplicated, and the majority of the MTEs occurred in both stages. There is evidence that multiple steps in the medicine use process increase the likelihood of errors. Approaches that standardize and simplify the medication use process can improve medication safety (McComas *et al*., 2014).

In this study, the omission of start and stop orders was the most frequent MTEs observed, which is in coherence with an earlier report in an oncology unit that used a similar two-step transcription process (Pichon *et al.*, 2002). However, other reports indicate that the most frequent MTEs included errors related to the patient, route of administration, frequency, and medication (Jennane *et al.*, 2011; Ratnapala *et al.*, 2022); Shehata *et al*., 2016; South *et al.*, 2015. Data from certain studies carried out in hospitals in Africa suggest that wrong dose errors were consistently high, which corroborates our findings, where wrong doses constituted over 18% of MTEs (Mekonnen *et al.*, 2018). The frequency of different error types reported depends on factors such as the study methodology, the medication use process within a particular setting, and the classification used for different error types. Most of the studies that categorized errors by type focused on prescription and administration errors, and differences in approach and methodology might account for the discrepancies observed.

In our study, antibacterials for systemic use were most frequently involved in MTEs, which corroborates with findings from other studies in resource-limited settings (Dedefo *et al*., 2016; Jennane *et al*., 2011; Mekonnen *et al*., 2018; Shehata *et al*., 2016). In the prospective observational study within an intensive care unit in Morocco, Jennane *et al.* (2011) found that anti-infective medications were involved in the highest proportion of errors (33%), which was lower than what was observed in our study. Another study conducted among hospitalized children in Ethiopia reported a higher rate (71%) of antimicrobials implicated in MTEs compared to our findings (Dedefo *et al*., 2016). Despite the differences in rates across studies, anti-infective medications were consistently involved in the highest number of medication errors in most studies from resource-limited settings (Dedefo *et al*., 2016; Jennane *et al.*, 2011; Mekonnen *et al.*, 2018; Shehata *et al*., 2016). This observation might be partially explained by the high prevalence of communicable diseases in these settings and the increased consumption of antimicrobials among hospitalized patients, leading to a higher chance of errors.

In a recent systematic review of MTEs and adverse events in hospitals across nine African countries, lack of knowledge, lack of training, distractions, and high workload were frequently cited as contributing factors to MTEs, which is consistent with our findings (Mekonnen *et al.*, 2018). Nurse's opinions on the likely causes of errors in our study are comparable to evidence from the literature, with the highest cause of MTEs attributed to illegible prescriptions, as observed in earlier reports (Armutlu *et al*., 2008; Mahmoud *et al*., 2020; Shehata *et al*., 2016). There are a number of strategies that could be implemented to reduce the incidence of errors, including clear and non-confusing writing of orders by prescribers, direct communication between all healthcare professionals involved in the medication use process, clarifications with prescribers for illegible prescriptions, adoption of computerized provider order entry systems, elimination of extended work schedules for physician and nurses, and

implementation of medication reconciliation tools (Callen *et al*., 2010; Jennane *et al*., 2011; Lane *et al*., 2014; Lloyd, 2020; Mahmoud *et al*., 2020; McComas *et al*., 2014).

This study had several strengths. It was a prospective observational study, and the ward staff was blinded to avoid the Hawthorne effect. In addition, the study setting was comprehensive, as medication orders transcribed for all patients were analyzed from admission to discharge throughout the study period. Despite these strengths, there are a few limitations in the study. It was a single-site study carried out with a small sample size in two wards over a short period, limiting the generalizability of the findings to other hospitals in Cameroon and beyond. Furthermore, we examined a single step in the medication use process (transcription; therefore, our findings do not present a comprehensive picture of medication safety practices in our setting. The incidence of MTEs might have decreased as the study progressed because the clinical pharmacist intervened when transcription errors were identified, and nurses in the wards might have become more cautious. In addition, we did not assess the potential severity of MTEs identified, which could provide a better understanding of the scale of the problem in future studies.

5. Conclusion

There is little information on the prevalence of transcription errors within hospitals in Africa, and this study adds to the literature on MTEs and their likely causes among hospitalized patients (Mekonnen *et al*., 2018). MTEs were common among patients, with similar rates observed in both pediatric and adult patients. In our hospital, medications are ordered using handwritten prescriptions, and the orders are transcribed in two stages. Our findings indicate that most of the errors occurred in both transcription stages, making them more likely to reach the patient. Nurses attributed illegible prescriptions, increased workload, and distractions as the most likely causes of transcription errors. Strategies such as the elimination of the transcription step in the medicine use process could reduce the workload on nurses and improve accuracy (Benoit *et al*., 2012; Callen *et al*., 2010). In the future, the hospital could further improve medication safety by acquiring a computerized provider order entry system, which would eliminate transcription of orders and illegible handwritten prescriptions, thereby reducing the workload on nurses and overall improving patient safety.

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Conflict of interest

The authors declare that they have no competing interests.

Author contributions

Conceptualization: All authors
Investigation: Yong Marie Noel Sangha
Writing – original draft: Suh Nsutebu Ntani
Writing – review & editing: All authors

Ethics approval and consent to participate

Ethical approval for this study was obtained from the Baptist Training School for Health Personnel Ethical Committee. Authorization to carry out the study was sought from the hospital administration. Participant's written informed consent was obtained after elaborating the purpose of the study. For participants below 16 years of age, informed consent was obtained from their parents/caregivers.

Consent for publication

Participant's written informed consent for publication was obtained after elaborating on the purpose of the study. For those below 16 years of age, informed consent for publication was obtained from their parents/caregivers.

Availability of data

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Further disclosure

A preprint of this manuscript has been posted in Research Square (https://doi.org/10.21203/rs.3.rs-2710592/v1).

References

Ali, S., Aboheimed, N.I., Al-Zaagi, I.A., & Al-Dossari, D.S. (2017). Analysis of medication errors at a large tertiary care hospital in Saudi Arabia: A retrospective analysis. *International Journal of Clinical Pharmacy*, 39(5):1004-1007.

https://doi.org/10.1007/s11096-017-0514-7

Armutlu, M., Foley, M.L., Surette, J., Belzile, E., & McCusker, J. (2008). Survey of nursing perceptions of medication administration practices, perceived sources of errors and reporting behaviours. *Healthcare Quarterly (Toronto, Ont)*, 11(3 Spec No):58-65.

https://doi.org/10.12927/hcq.2008.19651

Benoit, E., Eckert, P., Theytaz, C., Joris-Frasseren, M., Faouzi, M., & Beney, J. (2012). Streamlining the medication process improves safety in the intensive care unit. *Acta Anaesthesiologica Scandinavica*, 56(8):966-975.

https://doi.org/10.1111/j.1399-6576.2012.02707.x

Callen, J., McIntosh, J., & Li, J. (2010). Accuracy of medication documentation in hospital discharge summaries: A retrospective analysis of medication transcription errors in manual and electronic discharge summaries. *International Journal of Medical Informatics*, 79(1):58-64.

https://doi.org/10.1016/j.ijmedinf.2009.09.002

Dedefo, M.G., Mitike, A.H., & Angamo, M.T. (2016). Incidence and determinants of medication errors and adverse drug events among hospitalized children in West Ethiopia. *BMC Pediatrics*, 16(1):81.

https://doi.org/10.1186/s12887-016-0619-5

Elliott, M., & Liu, Y. (2010). The nine rights of medication administration : An overview. *British Journal of Nursing*, 19(5):300-305.

https://doi.org/10.12968/bjon.2010.19.5.47064

Hartel, M.J., Staub, L.P., Röder, C., & Eggli, S. (2011). High incidence of medication documentation errors in a Swiss university hospital due to the handwritten prescription process. *BMC Health Services Research*, 11:199.

https://doi.org/10.1186/1472-6963-11-199

Jennane, N., Madani, N., Oulderrkhis, R., Abidi, K., Dendane, T., Zeggwagh, A.A., *et al.* (2011). Incidence of medication errors in a Moroccan medical intensive care unit. *International Archives of Medicine*, 4(1):32.

https://doi.org/10.1186/1755-7682-4-32

Kong, H., West, S., & States, U. (2014). World medical association declaration of Helsinki: Ethical principles for medical research involving human subjects. *The Journal of the American College of Dentists*, 81(3):14-18.

https://doi.org/10.1093/acprofoso/9780199241323.003.0025

Lane, S.J., Troyer, J.L., Dienemann, J.A., Laditka, S.B., & Blanchette, C.M. (2014). Effects of skilled nursing facility structure and process factors on medication errors during nursing home admission. *Health Care Management Review*, 39(4):340-351.

https://doi.org/10.1097/HMR.0000000000000000

Lloyd, M. (2020). Comparison of pharmacy technicians' and doctors' medication transcribing errors at hospital discharge. *European Journal of Hospital Pharmacy*, 27(1):9-13.

https://doi.org/10.1136/ejhpharm-2018-001538

Mahmoud, M.A., Ibrahim, A.A.M., & Alolayan, S.O. (2020). Medication safety issues in four lower middle-income countries of northern and Eastern Africa: Challenges and recommendations. *Systematic Reviews in Pharmacy*, 11(11):482-486.

McComas, J., Riingen, M., & Kim, S.C. (2014). Impact of an electronic medication administration record on medication administration efficiency and errors. *CIN-Computers Informatics Nursing*, 32(12):589-595.

https://doi.org/10.1097/CIN.0000000000000116

Mekonnen, A.B., Alhawassi, T.M., McLachlan, A.J., & Brien JE. (2018). Adverse drug events and medication errors in African hospitals: A systematic review. *Drugs-Real World Outcomes*, 5(1):1-24.

https://doi.org/10.1007/s40801-017-0125-6

Pichon, R., Zelger, G.L., Wacker, P., Vodoz, A.L., & Humbert, J. (2002). Analysis and quantification of prescribing and transcription errors in a paediatric oncology service. *Pharmacy World and Science*, 24(1):12-15.

https://doi.org/10.1023/A:1014814713203

Ratnapala, U.S., Shazar, H., Pathirathna, H., Halahakoon, D., Hanwellage, K., Liyanage, C., *et al.* (2022). Medication transcription errors at a tertiary healthcare facility in Uva province, Sri Lanka: A retrospective study. *Ceylon Medical Journal*, 67(4):184-188.

https://doi.org/10.4038/cmj.v67i4.9748

Shawahna, R., Abbas, A., & Ghanem, A. (2019). Medication transcription errors in hospitalized patient settings: A consensual study in the Palestinian nursing practice. *BMC Health Services Research*, 19(1):644.

https://doi.org/10.1186/s12913-019-4485-3

Shehata, Z.H.A., Sabri, N.A., & Elmelegy, A.A. (2016). Descriptive analysis of medication errors reported to the Egyptian national online reporting system during six months. *Journal of the American Medical Informatics Association*, 23(2):366-374.

https://doi.org/10.1093/jamia/ocv096

South, D.A., Skelley, J.W., Dang, M., & Woolley, T. (2015). Near-miss transcription errors: A comparison of reporting rates between a novel error-reporting mechanism and a current formal reporting system. *Hospital Pharmacy*, 50(2):118-124.

https://doi.org/10.1310/hpj5002-118

World Health Organization. (2017). Medication without Harm-Global Patienti Safety Challenge on Medication Safety. Geneva: World Health Organization.

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ORIGINAL RESEARCH ARTICLE

Psychological distress in family caregivers of people with Alzheimer's disease: Positive and negative aspects of caregiving

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Abstract

Research focusing on family caregivers of people with Alzheimer's disease (PWAD) has predominantly highlighted the negative aspects of caregiving, reporting variables associated with poor mental health such as depression, anxiety, and burden. In recent decades, efforts have also been made to study positive variables associated with care, such as gain (positive results from the caregiving activity), satisfaction, and quality of life. The present study includes both positive and negative aspects of caregivers of PWAD, aiming to clarify their relationships and how they affect psychological distress. The study employed a cross-sectional descriptive design, enrolling a sample consisting of 140 family caregivers of PWAD. The variables assessed as negative aspects included hours of care per day, perceived burden, and psychological distress, while happiness, gain in caregiving, and quality of life were assessed as positive aspects. The results confirmed that family caregivers of PWAD experience both negative and positive aspects associated with caregiving. The relationship between these aspects is inversed: as the perceived burden increases, the mental health of the caregiver declines, and the positive aspects associated with caregiving decrease. Specifically, the perception of happiness begins to decrease with more than 15 h of care/day, while the perception of gain increases after 10 h of care/day. Respite care or financial aid that helps PWAD family caregivers reduce the number of hours dedicated to caring, along with psychological and support interventions to reduce subjective burden, would result in improved mental health of caregivers of PWAD.

Keywords: Family caregivers; Alzheimer's disease; Psychological distress; Perceived burden; Happiness; Gain in caregiving; Quality of life

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1. Introduction

According to the World Health Organization (WHO), the number of people with dementia worldwide reached 55 million in 2023, with 10 million new cases diagnosed each year. Alzheimer's disease is the most common form of dementia, accounting for 60 – 70% of the total cases, which represents between 33 and 38.5 million Alzheimer's disease cases globally. Dementia presents a gender bias, with women being more

affected and also serving as the primary caregivers for people with Alzheimer's disease (PWAD) more often than men. Economically, the cost of caring for a relative with Alzheimer's disease at home was estimated at USD 650 billion worldwide, based on an average of 5 h of care and supervision per day (WHO, 2023).

Feldman and Woodward (2005) proposed and described three stages in the development of Alzheimer's disease that directly affect both the care recipient and their caregivers. The progression of this neurological disease is as follows:

(i) First stage: Characterized by forgetfulness, mood swings, and apathy, while daily and work-related activities remain mostly intact. Caregiver tasks during this stage involve supervision and support.

(ii) Second stage: Defined by memory loss, forgetting recent events, behavior problems, progressive lack of movement coordination, and communication and language impairment that makes it difficult to communicate with the patient. Some instrumental activities of daily living are compromised, rendering the person with dementia unable to drive or use any transport without supervision. At this stage, the caregiver needs to be with the care recipient most of the time, assisting with nearly all activities.

(iii) Third stage: All aspects of the PWAD's life are affected. Behavior can become unpredictable, and communication, language, and basic activities are severely affected, resulting in total dependency. Although recent and long-term memory is lost, emotional memory is partially retained, allowing patients to be aware of the care, help, and love they receive. This stage is particularly challenging for caregivers, who must assist the PWAD with almost every activity, dedicating more and more time to the relative. This stage often leads to symptoms of depression in the caregiver, associated with anticipatory grief, which affects at least 75% of caregivers and is reported as one of the prominent difficulties in the final stages of Alzheimer's dementia (Frank, 2008).

The development of Alzheimer's disease, as described above, makes caring for a relative with this disease different from other types of caregiving (Brodaty & Donkin, 2009; Campbell *et al*., 2008). The negative aspects of caregiving have been extensively studied. Variables such as stress, burden, anxiety, and depression are consistently reported as factors that increase the risk of psychiatric disorders and significantly affect caregivers' mental health (Campbell *et al*., 2008; del Pino-Casado *et al*., 2021; Geng *et al*., 2018; Loh *et al*., 2017; Sallim *et al*., 2015). Several studies have centered their attention on the relationships between these negative aspects of caregiving, with the most recurrent finding being the important role played by burden in the prediction of psychological distress (Grano *et al*., 2017; Liu *et al*., 2020).

In general, the high levels of burden, anxiety, and depression associated with caring for PWAD predict a low probability of experiencing positive emotions (Pinquart & Sörenem, 2006). However, two key advancements have been noted in the investigation of the positive aspects of caregiving: The first review of positive aspects related to caregiving, performed by Kramer (1997), and the development of positive psychology, which focused on positive rather than negative aspects of human functioning (Seligman & Csikszentmihalyi, 2000). Using Lazarus & Folkman's stress and coping model (1984), Kramer proposed that both strain and gain could produce positive or negative indicators, leading to positive and negative outcomes in the well-being of caregivers. In parallel, Folkman (1997) proposed that both positive and negative emotions could arise in response to stressful situations, while Rapp & Chao (2000) criticized the excessive focus on negative aspects and the scarcity of studies including positive aspects of caregiving. In the last two decades, there has been an increasing amount of research focused on the positive aspects of caregiving, leading to the development of various scales and tools to measure these aspects (Schulz *et al*., 2003; Wang *et al*., 2018; Wennberg *et al*., 2022; Yap *et al*., 2010). Different positive variables related to caregiving have been identified as playing a relevant role in caregiver well-being (Carbonneau *et al*., 2010), such as happiness (van Campen *et al*., 2013), perception of gain or benefits (Tennen & Affleck, 2002), and quality of life (Glozman, 2004).

Happiness has been considered one of the best measures of subjective well-being, closely linked to physical and mental health (Argyle, 2001). There is also an assumption that burden is directly and negatively associated with happiness, such that higher levels of burden decrease happiness in caregivers (Chappell & Reid, 2002). However, in the study performed by van Campen *et al*. (2013), it was found that caregivers who provided care for <6 h a week reported higher happiness levels than non-caregivers, whereas caregivers who provided care for more than 11 h a week reported lower happiness levels. In the same line, a comparison between caregivers of cancer patients and the general population by de Camargos *et al*. (2020) revealed that caregivers were happier than the general population. From these studies, we could conclude that caring for fewer hours positively affects the happiness of caregivers. However, caring for <6 h a week is not typical for caregivers

of PWAD. Accordingly, these results highlight the need to combine family caregiving with paid or volunteering care to maintain the burden at an appropriate level compatible with higher happiness levels in family caregivers.

On the other hand, in a general view, gain in caregiving has been conceptualized as any positive result of caregiving activity (Kramer, 1997). Sanders (2005) identified three components of gain in caregiving: spiritual growth, personal growth, and a sense of mastering skills. Some years later, Netto *et al.* (2009) added the ability to develop deeper relations with the care recipient and other dependent adults as an additional component. The perception of gain or benefits from caregiving is associated with low burden and good mental health (García-Castro *et al.*, 2021; Liew *et al.*, 2010), and it is reported that caregivers need to provide care for at least 60% of the time, or about 14 h every day, to perceive these gains (Liew *et al.*, 2010).

Finally, quality of life in caregiver studies is defined as a multidimensional phenomenon influenced mainly by three types of determinants: the "clinical," related to the form, stage, duration, and cognitive and behavioral disorders of the care recipient's disease; the "psychological" component, associated with caregivers' coping strategies, social support, and family relations; and the "sociodemographic," encompassing variables including age, educative level, financial status, and the caregiving role (Glozman, 2004). The prevalence of one or more of these determinants has centered several studies. Andreakou *et al.* (2016) focused on the caregivers' mental health as a key element in their quality of life, highlighting the detrimental impact of depressive symptoms. Zuchella *et al.* (2015) also identified depressive symptoms as a significant factor affecting the quality of life, along with the burden and behavioral problems of the care recipient. Similarly, Gómez-Gallego *et al.* (2012) highlighted burden and behavioral problems, such as irritability in PWAD, as primary determinants. Behavioral problems displayed by the care recipient and perceived burden are the most frequently associated elements with caregivers' quality of life, but other factors, such as time dedicated to care and economic problems, also contribute (Vellone *et al.*, 2008).

In this context, the present study measured two groups of variables in family caregivers of PWAD: (i) the negative aspects of caregiving, with the variables including hours of care per day, perceived burden, and psychological distress; and (ii) the positive aspects of caregiving, with the variables including happiness, gain in caregiving, and quality of life. Considering the previous literature in the field, three hypotheses were proposed:

(i) Family caregivers of PWAD present both negative and positive aspects associated with caregiving.
(ii) Positive and negative aspects of caregiving are negatively related.
(iii) Caregivers' poor mental health can be predicted by high levels of negative aspects and low levels of positive aspects.

2. Data and methods

2.1. Participants

A sample of 140 caregivers (96 female and 44 male) were recruited from the Family of Alzheimer's Disease Associations in the Valencian Community in Spain. The inclusion criteria were: (i) the relative receiving care had been diagnosed with Alzheimer's disease, (ii) the relative with dementia was in a community-dwelling situation, and (iii) there were no reading or understanding problems that would prevent completing the requested information. The Alzheimer's disease diagnosis was performed by a neuropsychiatrist working at the corresponding health center.

2.2. Variables

2.2.1. Psychological distress

Mental health status was measured using the General Health Questionnaire, GHQ-12 (Goldberg & Williams, 1988), in its Spanish adaptation (Sánchez & Dresch, 2008). The 12-item questionnaire is a mental health screening tool that measures anxiety, depression, and social dysfunction. It uses a four-level response scale (0, 1, 2, 3) and the standard GHQ score method (0-0-1-1), with higher scores indicating greater levels of distress. The standard GHQ score was used to calculate the percentages of caregivers with and without psychological distress, with a GHQ Index ≥4 as the threshold (Lundin *et al.*, 2017), providing better sensibility (81.7%) and specificity (85.4%). The reliability of this variable in this study was adequate (Cronbach's $\alpha = 0.87$).

2.2.2. Burden

The Zarit's Caregiver Burden Interview (Zarit *et al.*, 1980), in its Spanish adaptation (Martín-Carrasco *et al.*, 2010), was used to assess perceived burden. The 22 items have a five-level response scale, scored between 0 and 4 ("0": never, "1": seldom, "2": sometimes, "3": often, "4": nearly always). Higher scores indicated higher perceived burdens. Mulund and McCarthy (2017) proposed four levels of perceived burden with three cut-points (≤20: No burden; 21 – 40: Mild burden; 41 – 60: Moderate burden; ≥60: Severe burden). The reliability of this variable in this study was adequate (Cronbach's $\alpha = 0.85$).

2.2.3. Gain

The perception of gain in caregiving was measured using the GAIN scale (Gain in Alzheimer Care Instrument)

(Yap *et al*., 2010) in its Spanish adaptation (Fabá & Villar, 2013). The 10 items were responded to using a Likert scale with five levels ranging from 0 (very disagree) to 4 (very agree). The scale assesses the perceived gain and benefits in caregivers of PWAD, with the higher scores indicating greater levels of perceived gain. The reliability of this variable in this study was adequate (Cronbach's $\alpha = 0.81$).

2.2.4. Happiness

The Subjective Happiness Scale (Lyubomirsky & Lepper, 1999) was used to assess happiness. The Spanish adaptation (Extremera & Fernández-Berrocal, 2014) of this unidimensional scale contains four items answered on a seven-level response scale (1 – 7), with the higher scores indicating greater levels of subjective happiness. The reliability of this variable in this study was adequate (Cronbach's $\alpha = 0.76$).

2.2.5. Quality of life

The quality of life in life-threatening illness-family carer version (Cohen *et al*., 2006) measures the quality of life in family caregivers of people with serious illness. It is composed of 16 items, each answered on a 10-level response scale (1 – 10). The higher scores indicate greater levels of quality of life. The reliability of this variable in this study was adequate (Cronbach's $\alpha = 0.81$).

2.2.6. Sociodemographic variables and caring aspects

Sociodemographic variables, such as age, marital status, educational level, care aspects, including the relationship between the caregiver and care recipient, and hours of care per day, were collected.

2.3. Design and procedure

The study employed a convenience sample and a cross-sectional descriptive design. Participants were recruited from Family Alzheimer's Disease Associations, and questionnaires were completed individually. All participants signed the informed consent, and their participation was voluntary. To ensure anonymity, each questionnaire and datasheet was assigned a unique number. Permissions to perform this research were obtained from both the Family Alzheimer's Disease Associations and the Ethical Committee for Scientific Research of the University of Valencia (H1367489852167).

2.4. Statistical analysis

Internal consistency was assessed using Cronbach's α coefficient. Descriptive statistics, including means, standard deviations, score ranges, and percentages, were calculated to describe the participant characteristics. Pearson's correlation coefficient was used to examine relationships between most variables, except for education and hours of care per day, which were analyzed using Spearman's rho. Based on these relationships, the following analyses were performed:

(i) Differences in happiness, gain in caregiving, quality of life, psychological distress, and perceived burden across four levels of hours of care per day.
(ii) Differences in happiness, gain, quality of life, and psychological distress across three levels of perceived burden.
(iii) Differences in psychological distress and perceived burden across two levels.

Finally, a three-step hierarchical multiple regression analysis was performed to determine the relevance of objective burden, subjective burden, and positive aspects of caregiving on the caregivers' psychological distress. In Model 1, participants' age, gender, and education level were entered to control for their effects. In Model 2, objective burden (measured as hours of care per day) and perceived burden (subjective burden) were added. In Model 3, gain, happiness, and quality of life were added. Statistical analyses were conducted using Statistical Package for the Social Sciences version 28.0 software (IBM Corporation, USA).

3. Results

3.1. Participants' characteristics

As shown in Table 1, the average age of the caregivers of PWAD was 55.89 years, with a wide range from 18 to 91 years old. The majority of the caregivers were women (68.4%), married (84.3%), and children of PWAD (67.9%). Half of the sample had an education level of high school or higher. The objective burden, measured as hours of care per day, revealed that almost half of the caregivers dedicated more than 15 h of care per day (44.3%). The positive aspects of caregiving, assessed through the variables gain, happiness, and quality of life, presented average scores higher than the medium point in the score range of each scale, indicating that these caregivers experienced positive emotions associated with caregiving. On the other hand, the negative aspect of caregiving, psychological distress, was also above the medium score in the scale range. According to the cut-point suggested by Lundin *et al*. (2017) of ≥4 to distinguish high from low levels of psychological distress, 71 caregivers (50.7%) had high levels of psychological distress, while 69 caregivers (49.3%) had low levels. Finally, according to the perceived burden levels proposed by Mulund and McCarthy (2017), no caregiver was in the no-burden level, 32 caregivers (22.9%) presented mild burden, 76 caregivers (54.2%) reported moderate burden, and 32 caregivers (22.9%) reported severe burden.

3.2. Relationships between the variables

The relationships between the variables are shown in Table 2. Pearson's coefficient was calculated for all variables except for hours of care per day and education, which have four and two intervals, respectively. The relationships between hours of care per day and the other variables were analyzed using Spearman's rho. Two patterns were observed. The first pattern includes the variables age, hours of care per day, perceived burden, and psychological distress, which show positive relationships with each other, most of which are significant. The second pattern includes the variables education, gain, happiness, and quality of life, which also exhibit positive relationships with each other, most of which are significant. Basically, the first group of variables represents negative aspects of caregiving, while the second group represents positive aspects of caregiving. Therefore, these two patterns present negative relationships between them.

Most of the relationships are significant, but two variables – happiness and gain – present few significant relationships with other variables. Both happiness and gain have a positive, significant correlation with quality of life and a negative, significant correlation with perceived burden and psychological distress. However, they do not show significant relationships with age, education, and hours of care per day. Although both variables measure positive aspects of caregiving, the relationship between happiness and gain is positive but not significant, suggesting that they capture two different positive aspects of caregiving.

Table 3 shows the means, standard deviations, and significant differences between the four levels of objective burden (hours of care per day) in terms of happiness, gain, quality of life, psychological distress, and perceived burden. Initially, comparisons were conducted between the four levels of hours of care per day using Bonferroni *post hoc* tests. Significant differences were found only in psychological distress (p = 0.038) and perceived burden (p = 0.012) between the two extreme levels, with lower scores in both variables for those providing <5 h of care per day compared to those providing >15 h.

To further analyze the data, the four levels were grouped into two categories. For happiness, due to similar means in the first three levels of hours of care per day, caregivers were grouped into those providing for ≤15 h of care per

Table 1. Participants' characteristics

Variables	Result	Sample range	Scale range
Age (M±standard deviation)	55.89±12.07	18 – 91	
Perceived burden	51.52±12.29	27 – 86	22 – 110
Psychological distress	14.79±5.54	2 – 30	0 – 36
Gain	30.63±7.12	5 – 40	0 – 40
Happiness	19.44±4.96	8 – 28	4 – 28
Quality of life	105.29±20.54	44 – 153	16 – 160
Hours/day caring (*n* [%])			
<5 h	26 (18.6%)		
5 – 10 h	34 (24.3%)		
11 – 15 h	18 (12.9%)		
>15 h	62 (44.3%)		
Gender (*n* [%])			
Women	96 (68.4%)		
Men	44 (31.4%)		
Education (*n* [%])			
High school	69 (49.3%)		
≥High school	71 (50.7%)		
Marital status (*n* [%])			
Married	118 (84.3%)		
Other	22 (15.7%)		
Relation with care recipient (*n* [%])			
Children	95 (67.9%)		
Other	45 (32.1%)		

Table 2. Relationships between the variables

Variables	1	2	3	4	5	6	7	8
1. Age	--							
2. Education+	−0.46***	--						
3. Hours caring+	0.45***	−0.47***	--					
4. Perceived burden	0.21**	−0.15	0.25**	--				
5. Psychological distress	0.27***	−0.22**	0.23**	0.55***	--			
6. Gain	−0.05	−0.04	0.12	−0.24**	−0.28***	--		
7. Happiness	−0.16	0.012	−0.15	−0.45***	−0.60***	0.14	--	
8. Quality of life	−0.23**	0.023**	−0.23**	−0.52***	−0.62***	0.24***	0.54***	--

Notes: + Spearman's rho; *p≤0.05; **p≤0.01; ***p≤0.001

Table 3. Happiness, gain, quality of life, psychological distress, and perceived burden in the four levels of hours of care per day

Hours day caring	*n*	Happiness	Gain	Quality of life	Psychological distress	Perceived burden
		M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
<5	26	20.00 (5.28)	29.81 (6.83)	114.96 (2.82)	12.46 (5.27)	45.15 (12.33)
5 – 10	34	20.27 (4.48)	28.88 (8.81)	105.77 (19.77	14.35 (5.19)	50,68 (10.04)
11 – 15	18	20.61 (5.12)	33.22 (5.00)	104.67 (21.61)	14.89 (6.17)	53.89 (11.46)
>15	62	18.40 (4.94)	31.18 (6.57)	101.16 (18.69)	15.98 (5.43)	53.97 (12.93)

Notes: Significant differences: i. Happiness: ≤15 h happier than 15 h or more*. ii. Gain: ≤10 h lower perception of gain than 11 h or more*. iii. Quality of life: ≤10 h higher quality of life than 11 h or more*. iv. Psychological distress: ≤10 h lower psychological distress than 11 h or more*. v. Perceived burden: ≤10 h lower psychological distress than 11 h or more**. *$p \leq 0.05$; **$p \leq 0.01$.
Abbreviation: SD: Standard deviation.

day and those providing >15 h. A significant difference was found between these groups, with higher happiness scores for caregivers providing ≤15 h of care per day (n = 78, M = 20.26, SD = 4.85) compared to those providing >15 h of care per day (n = 62, M = 18.40, SD = 4.94) (t [2,138]=2.23, p = 0.027). For gain, quality of life, psychological distress, and perceived burden, the four levels were grouped into two categories: ≤10 h and ≥11 h of care per day. Significant differences were found for the four variables between these two groups. The perception of gain or benefits increased significantly when the number of hours of care per day was ≥11 (≤ 10 h group: n = 60, M = 29.28, SD = 7.96; ≥11 h group: n = 80, M = 31.64, SD = 6.28; t [2,138] = 1.97, p = 0.050). In the opposite direction, quality of life declined when the number of hours of care per day was ≥11 (≤10 h group: n = 60, M = 109.75, SD = 21.45; ≥11 h group: n = 80, M = 101.96, SD = 19.30; t [2,138] = 2.26, p = 0.013).

Psychological distress and perceived burden followed a similar pattern, with higher scores for caregivers in the ≥11 h group (Psychological distress: ≤10 h group: n = 60, M = 13.53, SD = 5.27; ≥11 h group: n = 80, M = 15.74, SD = 5.78; t [2,138]=−2.37, p = 0.019. Perceived burden: ≤10 h group: n = 60, M = 48.28, SD = 11.33; ≥11 h group: n = 80, M = 53.95, SD = 12.49; t[2,138] = −2.76, p = 0.006).

Some of these results are shown in Figure 1, illustrating the variables happiness, gain, psychological distress, and perceived burden. It can be seen that happiness decreases for those providing >15 h of care per day, while gain, psychological distress, and perceived burden increase for those providing ≥11 h.

Table 4 shows the means, standard deviations, and significant differences between three levels of subjective burden, measured as perceived burden, in terms of happiness, gain, quality of life, and psychological distress. Comparisons were performed in the three higher levels of perceived burden, as none of the caregivers in our sample fell into the no-burden level. Using Bonferroni *post hoc* comparisons, significant differences were found between

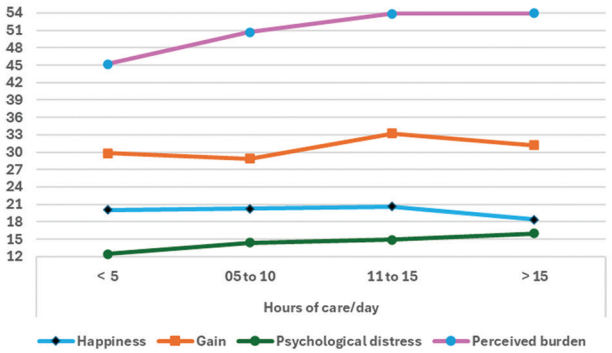

Figure 1. Happiness, gain, psychological distress, and perceived burden in the four intervals of hours caring a day. Image created using Microsoft Word

the three levels of perceived burden, with two exceptions: the comparisons between mild and moderate perceived burden in happiness and gain. Happiness, gain, and quality of life scores decreased as the perception of burden increased, while psychological distress increased as the perceived burden increased. These patterns are graphically shown in Figure 2.

When the two levels of psychological distress were divided using the cut-point of ≥4, significant differences in happiness, gain, quality of life, and perceived burden were observed between the high and low psychological distress groups, as shown in Table 5.

The last comparison, between the percentages of caregivers with low and high psychological distress, using the cut-point of ≥4 across the three levels of perceived burden, was significant (χ^2[2, n = 140] = 42.48, p < 0.001). Figure 3 illustrates these percentages, revealing an almost inverse symmetrical pattern: most caregivers with mild perceived burden were in the low psychological distress category, while most caregivers with severe perceived burden were in the high psychological distress category. Similar percentages of low and high psychological distress were observed in the moderate perceived burden level.

3.3. Hierarchical multiple regression

Table 6 presents the results of the hierarchical multiple regression analysis with psychological distress as the dependent variable. The analysis revealed that the coefficient of determination (R^2) significantly differed from zero at the end of each step, indicating a significant relationship between the predictor variables and the dependent variable. In the first step, where age, gender, and education were included in the equation, $R^2 = 0.13$ ($p < 0.001$). The change in R^2 from Model 1 to Model 2 ($R^2 = 0.36$, change in $R^2 = 0.23$, $p < 0.001$) underscores the relevance of perceived burden in the prediction of psychological distress. The inclusion of positive aspects of caregiving, such as happiness, gain, and quality of life, in Model 3 further increased R^2 ($R^2 = 0.56$, change in $R^2 = 0.20$, $p < 0.001$).

The beta values in Model 3, which includes all independent variables in the equation, demonstrate that happiness and quality of life are the strongest predictors of psychological distress. Perceived burden is the third most significant predictor, followed by gain. The adjusted R^2 of 0.53 indicates that 53% of the variability in psychological distress can be explained by higher levels of happiness, quality of life, and gain, and lower levels of perceived burden.

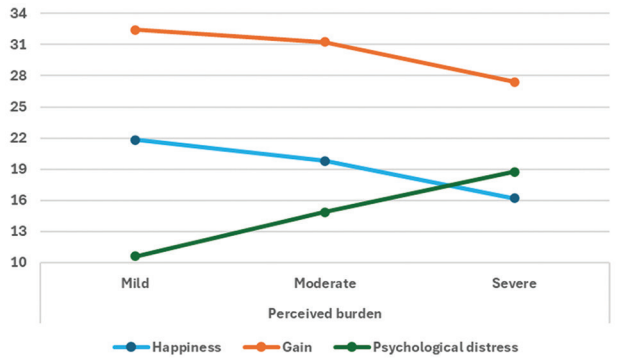

Figure 2. Happiness, gain, and psychological distress in three of the perceived burden levels. Image created using Microsoft Word

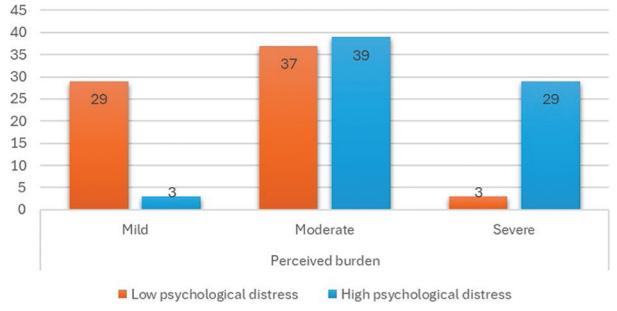

Figure 3. Percentages of caregivers with high and low psychological distress across three levels of perceived burden. Image created using Microsoft Word

4. Discussion

The description of the sample characteristics showed that family caregivers of PWAD present both negative

Table 4. Happiness, gain, quality of life, and psychological distress in perceived burden levels

Perceived burden	*n*	Happiness	Gain	Quality of life	Psychological distress
		M (SD)	*M (SD)*	*M (SD)*	*M (SD)*
No burden	0	-	-	-	-
Mild	32	21.84 (4.12)	32.41 (5.76)	122.00 (17.93)	10.63 (4.01)
Moderate	76	19.79 (4.84)	31.24 (7.12)	103.40 (17.60)	14.88 (5.24)
Severe	32	16.19 (4.41)	27.41 (7.52)	93.09 (19.27)	18.75 (5.56)

Notes: Significant differences: (i) Happiness: mild > moderate***; moderate > severe***. (ii) Gain: mild > moderate*; moderate > severe*. (iii) Quality of life: mild > moderate***; mild > severe***; moderate > severe*. (iv) Psychological distress: Severe > moderate***; severe > mild***; moderate > mild ***. *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$. Abbreviation: SD: Standard deviation.

Table 5. Happiness, gain, quality of life, and perceived burden in psychological distress levels

	Low (*n*=69)	High (*n*=71)	*t*	*P*
	M (SD)	*M (SD)*		
Happiness	21.87 (4.22)	17.07 (4.48)	6.53	<0.001***
Gain	32.36 (5.72)	28.94 (7.94)	2.93	0.004**
Quality of life	116.18 (18.69)	94.68 (16.34)	7.27	<0.001***
Perceived burden	44.04 (9.76)	58.79 (9.93)	−8.86	<0.001***

Notes: *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$.

Table 6. Hierarchical multiple regression for psychological distress as the dependent variable

	Model 1		Model 2		Model 3	
	β	*t*-value	β	*t*-value	β	*t*-value
Age	0.25	2.15**	0.15	1.79	0.09	1.23
Gender	−0.22	−2.77**	−0.17	−2.46*	−0.10	−1.45
Education	−0.11	−1.27	−0.07	−0.90	−0.04	−0.62
Hours of care per day			0.02	0.29	0.04	0.50
Perceived burden			0.49	6.78***	0.20	2.83**
Gain					−0.14	−2.23*
Happiness					−0.30	−4.36***
Quality of life					−0.28	−3.60***
R^2	0.13		0.36		0.56	
Adjusted R^2	0.11		0.34		0.53	
R^2 change	0.13		0.23		0.20	
ANOVA (*F*, *df*)	6.92*** (3,136)		15.23*** (5,134)		20.64*** (8,131)	

Notes: β: Standardized regression coefficient; R^2: Percentage of explained variance.; *$p \leq 0.05$; **$p \leq 0.01$; ***$p < 0.001$; t-value: Student's *t*.

and positive aspects of caregiving, confirming our first hypothesis. Regarding the negative aspects, most caregivers in our sample dedicate more than 15 h of care per day and reported a moderate perceived burden. This observation indicates a high objective and subjective burden, confirming results reported in other studies (Grano *et al*., 2017; Liu *et al*., 2020). In the other negative aspects of caregiving, psychological distress plays a key role as it can indicate the initial symptoms of mental health problems. Considering the cut-point of four suggested by Lundin *et al*. (2017) to identify individuals with a higher probability of presenting a non-specific affective disorder, half of our sample falls into this category. These caregivers exhibit behaviors associated with the three components of psychological distress: depression, anxiety, and social dysfunction. Our results confirm those reported previously, where high levels of psychological distress increase the risk of psychiatric disorders, significantly affecting the caregivers' mental health (Campbell *et al*., 2008; del Pino-Casado *et al*., 2021; Geng *et al*., 2018; Loh *et al*., 2017; Sallim *et al*., 2015). The high burden experienced by these caregivers, coupled with the close relationship between burden and psychological distress and other factors such as behavior problems in the care recipient and anticipated grief, differentiates them from caregivers of other dependent individuals (Brodaty & Donkin, 2009; Campbell *et al*., 2008). Despite the negative aspects of caring for PWAD, positive aspects of caregiving are also evident in the studied sample. The mean scores for the three variables associated with positive aspects of caregiving – happiness, gain, and quality of life – are high, consistently above the medium response level for each scale. This finding indicates that the sample experiences happiness, gain, and quality of life above the medium point. Therefore, these results confirm that both positive and negative responses to caregiving activities are present (Andren & Elmstahl, 2005; Schulz *et al*., 2003; Wang *et al*., 2018; Wennberg *et al*., 2022; Yap *et al*., 2010).

The second hypothesis of this work focused on the relationships between the positive and negative aspects of caregiving. Several studies have related high burdens with a lower likelihood of experiencing positive aspects of caregiving (Chappell & Reid, 2002; Pinquart & Sörenem, 2006). Examining the correlations between the variables associated with positive and negative aspects of caregiving, this hypothesis is partially confirmed. Perceived burden and psychological distress showed negative relationships with happiness, gain, and quality of life. Furthermore, levels of happiness, gain, and quality of life decrease as perceived levels of burden and psychological distress levels increase. Our results are consistent with previous studies: Chappell and Reid (2002) on caregivers' happiness; Kramer (1997), Sanders (2005), Liew *et al*. (2010), and García-Castro *et al*. (2021) on caregivers' gain; and Gómez-Gallego *et al*. (2012), Zuchella *et al*. (2015), and Andreakou *et al*. (2016) on caregivers' quality of life. In all these cases, mental health or perceived burden was negatively associated with happiness, gain, or quality of life. However, the relationship between positive aspects of caregiving and objective burden, measured as hours of care per day, is less clear compared to subjective burden and psychological distress. Happiness showed minimal variation when caregivers provided <15 h of care per day, with significant decreases in happiness only observed when providing more than 15 h of care per day. Our results suggest a higher level of happiness in caregivers of PWAD compared to the results reported by van Campen *et al*. (2013). The study used a threshold of 11 h of care per week, whereas our study used a threshold of 15 h of care per day. This substantial difference in the study setting can hardly explain the discrepancy in the findings, considering that both studies were conducted in European countries (van Campen *et al*. [2013] in Holland and ours in Spain). The discrepancy could be due to the fact that our study did not include a comparison with a sample of non-caregivers and only examined caregivers of relatives with Alzheimer's disease. In contrast, van Campen *et al*. (2013) compared caregivers and non-caregivers and used a broader definition of "caregiver" that included those providing one or more hours per week of free help to sick or disabled family members, acquaintances, or friends. In addition, van Campen *et al*. (2013) used a single question to assess happiness ("To what extent do you regard yourself as a happy person?"), while the Lyubomirsky & Lepper (1999) scale used in this study contains four questions. Therefore, differences in the types of caregivers studied and the tools used to measure happiness likely account for the discrepancies in results.

In the case of gain and quality of life, the number of hours of care for PWAD showed significant differences between caregivers providing ≤10 h of care per day and those providing ≥11 h. Gain did not follow the general expectation that providing a higher number of hours of care per day would result in lower perceived gain. Instead, the opposite was observed: PWAD caregivers providing a higher number of hours of care per day, particularly those providing 11 h or more, reported higher levels of perceived gain. This result aligns with the findings of Liew *et al*. (2010), who reported that primary caregivers of relatives with dementia perceived higher levels of perceived gain and benefits when they provided care in at least 60% of their time (14 h a day), similar to the 11 h or more observed in this study. This suggests that gain may require time for caregiver adaptation, allowing caregivers to develop resources where positive emotions can flourish

and enhancing their well-being (Fredrickson, 2004; Fredrickson *et al*., 2003; Tennen & Affleck, 2002). With regard to quality of life, there was a significant difference between caregivers providing ≤10 h of care per day and those providing ≥11 h of care per day, with a negative relationship indicating that providing a higher number of hours of care resulted in lower quality of life. This result confirms the qualitative study by Vellone *et al*. (2008), which explored the quality of life in relation to the time dedicated to caregiving in caregivers of PWAD. Caregivers expressed a need for respite care to reduce the time they dedicated to the task. The respite care provided by the day-care services had a direct impact on the mental health of caregivers of relatives with dementia (Gaugler *et al*., 2003).

Regression analysis results showed that both positive and negative aspects of caring play an important predictive role in the mental health of caregivers. Although age and gender are related to mental health, with women and older caregivers presenting poorer mental health than men and younger caregivers, their importance diminishes when perceived burden is introduced into the regression model. Furthermore, age and gender lose their significance entirely when positive aspects of caregiving, such as happiness, gain, and quality of life, are considered. The most salient predictor of psychological distress is perceived burden when no positive aspects are considered, confirming numerous studies that have associated these variables (Campbell *et al*., 2008; del Pino-Casado *et al*., 2021; Geng *et al*., 2018; Grano *et al*., 2017; Liu *et al*., 2020; Loh *et al*., 2017; Sallim *et al*., 2015). However, the introduction of positive aspects of caregiving in the regression equation makes low happiness the most relevant predictor of psychological distress. This finding is consistent with the studies performed by Argyle (2001) and de Camargos *et al*. (2020), which associate high levels of happiness with good mental health in caregivers. In the present study, both low quality of life and low gain in caregiving also played a predictive role in psychological distress. These findings converge with and expand on existing literature concerning the relationship between positive aspects of caregiving and mental health and the potential role they could play in mitigating the impact of stressors on mental health (Kulhara *et al*., 2012).

The relationship between burden and psychological distress, and the role of positive aspects, depends on how we define burden. Subjective burden, understood as the burden perceived by the caregiver, showed a strong positive relationship with psychological distress and had high predictive power, whereas positive aspects presented negative relationships with psychological stress. Promoting positive aspects of caregiving and reducing perceived burdens can improve caregivers' mental health. Therefore, support and therapeutic interventions can significantly benefit the mental health of caregivers. On the other hand, objective burden, measured as hours of care per day for PWAD, can be modulated to maintain a balance between positive and negative aspects of caregiving could maintain sustaining caregivers' mental health at an adequate level. Our results suggest that an adequate level of happiness, gain in caregiving, and quality of life can be achieved when the objective burden is around 10 h of care per day. At this level, perceived burden and psychological distress are at moderate levels, not the perfect situation. However, it should be noted that psychological distress has a mean score of 14.35, just above the threshold of 14 proposed by Lundin *et al*. (2017) as the cut-point to distinguish between caregivers with a higher likelihood of experiencing depression, anxiety, and adjustment symptoms, using the GHQ-12's Likert response scale. Although a dedication of 10 h of care per day may be considered high, it is important to note that in our sample, 44.3% of caregivers dedicated over 15 h of care per day, and 57.2% provided 11 h of care daily. This level of commitment makes it difficult for PWAD caregivers to maintain a full-time job. Caring for a relative with dementia is costly. In 1998, the annual cost of informal care was $17,000 (Moore *et al*., 2001). A systematic review by Schaller *et al*. (2014) estimated the cost of caring for PWAD at home varied with the stage of Alzheimer's disease: $15,478 for mild dementia, $31,104 for moderate dementia, and $38,403 for severe dementia. A more recent study reported the medium total lifetime cost of caring for a person with dementia as $225,140, considering the time of diagnosis as 83 years old (Jutkowitz *et al*., 2017). Given these costs, financial support is necessary to provide respite care for PWAD caregivers. Governments have a responsibility to provide this support, whether through daycare services or financial aid, as an investment that will, in the long term, result in savings in mental health treatment that these caregivers might otherwise require.

This study is not without limitations. One limitation is the use of self-report measures to assess the variables studied, which are subjected to biases such as memory distortions or social desirability bias. Another limitation is the generalizability of the results, which is restricted by the convenience sample used and the cross-sectional design. The results of this research were obtained from a sample with specific characteristics: half of the caregivers reported having a high school education, most were women, married, and primarily the children of the care recipients. Therefore, generalizing these results should be done with caution and limited to samples with similar characteristics. Using larger, randomly selected probabilistic samples in longitudinal studies could enhance our knowledge about the variations and causal relationships between the variables studied. In addition, employing different assessment

techniques could provide more detailed information about the relevant variables in the caregiving process. Despite these limitations, this work presents a general overview of both negative and primarily positive emotions in caregivers and how these emotions are interrelated.

5. Conclusion

This study confirms that caregivers of PWAD experience negative aspects associated with caring for their relatives, with burden and psychological distress playing an important role. However, these negative experiences did not reduce the relevance of the positive aspects they also perceived, such as happiness, gain, and quality of life. Given the high cost of care for a PWAD relative and the fact that most care is provided by family members, maintaining caregivers' mental health is a critical concern, as their well-being directly impacts the health of the care recipient. Therefore, the key finding of this study is that enhancing the positive aspects of caregiving, such as happiness, gain, and quality of life, by moderating the time spent on caregiving with the help of day-care services or financial aid, would benefit both the caregiver's and the care recipient's health, ultimately resulting in long-term savings for the public health services.

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Conflict of interest

The authors declare that they have no competing interests.

Author contributions

Conceptualization: All authors
Investigation: All authors
Methodology: All authors
Writing – original draft: All authors
Writing – review & editing: All authors

Ethics approval and consent to participate

Informed consent was obtained in written form from all subjects involved in the study. Permission to perform this research was obtained from both the Family Alzheimer's Disease Associations and the Ethical Committee for Scientific Research of the University of Valencia (H1367489852167).

Consent for publication

All the subjects gave consent to publish their data in this study.

Availability of data

The datasets generated and analyzed during the current study are available from the corresponding author on a reasonable request basis.

References

Andreakou, M.I., Papadopoulos, A.A., Panagiotakos, D.B., & Niakas, D. (2016). Assessment of health-related quality of life for caregivers of Alzheimer's disease patients. *International Journal of Alzheimer's Disease*, 2016:9213968.

https://doi.org/10.1155/2016/9213968

Andren, S., & Elmstahl, S. (2005). Family caregivers' subjective experiences of satisfaction in dementia care: Aspects of burden, subjective health and sense of coherence. *Scandinavian Journal of Caring Sciences*, 19(2):157-168.

https://doi.org/10.1111/j.1471-6712.2005.00328.x

Argyle, M. (2001). *The Psychology of Happiness*. London, UK: Routledge.

Brodaty, H., & Donkin, M. (2009). Family caregivers of people with dementia. *Dialogues in Clinical Neuroscience*, 11(2):217-228.

https://doi.org/10.31887/DCNS.2009.11.2/hbrodaty

Campbell, P., Wright, J., Oyebode, J., Job, D., Crome, P., Bentham, P., *et al*. (2008). Determinants of burden in those who care for someone with dementia. *International Journal of Geriatric Psychiatry,* 23:1078-1085.

https://doi.org/10.1002/gps.2071

Carbonneau, H., Caron, C., & Desrosiers, J. (2010). Development of a conceptual framework of positive aspects of caregiving in dementia. *Dementia*, 9(3):327-353.

https://doi.org/10.1177/1471301210375316

Chappell, N.L., & Reid, R.C. (2002). Burden and well-being among caregivers: Examining the distinction. *The Gerontologist*, 42(6):772-780.

https://doi.org/10.1093/geront/42.6.772

Cohen, R., Leis, A.M., Kuhl, D., Charbonneau, C., Ritvo, P., & Ashbury, F.D. (2006). QOLLTI-F: Measuring family career quality of life. *Palliative Medicine*, 20(8):755-767.

https://doi.org/10.1177/0269216306072764

De Camargos, M.G., Ribeiro Pavia, B.S., de Oliveira, M.A., de Souza Ferreira, P., Nardoto de Almeida, V.T., de Andrade Cadamuro, S., *et al*. (2020). An explorative analysis of the differences in levels of happiness between cancer patients, informal caregivers and the general population. *BMC Palliative Care*, 19:106.

https://doi.org/10.1186/s12904-020-00594-1

Del Pino-Casado, R., Priego-Cubero, E., López-Martínez, C., & Orgeta, V. (2021). Subjective caregiver burden and anxiety in informal caregivers: A systematic review and meta-analysis.

PLoS One, 16(3):e0247143.

https://doi.org/10.1371/journal.pone.0247143

Extremera, N., & Fernández-Berrocal, P. (2014). The subjective happiness scale: Translation and preliminary psychometric evaluation of a Spain version. *Social Indicators Research*, 119(1):473481.

https://doi.org/10.1007/s11205-013-0497-2

Fabá, J., & Villar, F. (2013). Ganancias asociadas al cuidado de personas con demencia: Adaptación al español de la escala GAIN [Gain associated with caring for people with dementia: A Spanish adaptation of the GAIN]. *Revista Española de Geriatría y Gerontología*, 48(3):109-114.

https://doi.org/10.1016/j.regg.2012.10.007

Feldman, H.H., & Woodward, M. (2005). The staging and assessment of moderate to severe Alzheimer disease. *Neurology*, 65(6):10-17.

https://doi.org/10.1212/WNL.65.6_suppl_3.S10

Folkman, S. (1997). Positive psychological states and coping with severe stress. *Social Science and Medicine*, 45:1207-1221.

https://doi.org/10.1016/S0277.9536(97).00040-3

Frank, J.B. (2008). Evidence for grief as the major barrier faced by Alzheimer caregivers: A qualitative analysis. *American Journal of Alzheimer's Disease and Other Dementias*, 22(6):516-527.

https://doi.org/10.1177/1533317507307787

Fredrickson, B.L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 359(1449):1367-1378.

https://doi.org/10.1098/rstb.2004.1512

Fredrickson, B.L., Tugade, M.M., Waugh, C.E., & Larkin, G.R. (2003). What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*, 84:365-376.

https://doi.org/10.1037/0022-3514.84.2.365

García-Castro, J., Holgado-Tello, F.P., & Blanca, M.J. (2021). New evidence for the psychometric properties of the Spanish Version of the Gain in Alzheimer Care Instrument. *Spanish Journal of Psychology*, 24:e25.

https://doi.org/10.1017/SJP.2021.32

Gaugler, J.E, Jarrott, S.E., Zarit, S.H., Stephens, M.A.P., Townsend, A., & Greene, R. (2003). Respite for dementia caregivers: The effects of adult day service use on caregiving hours and care demands. *International Psychogeriatrics*, 15(1):37-58.

https://doi.org/10.1017/S1041610203008743

Geng, H.M., Chuang, D.M., Yang, F., Yang, Y., Liu, W.M., Liu, L.H., *et al.* (2018). Prevalence and determinants of depression in caregivers of cancer patients: A systematic review and meta-analysis. *Medicine*, 97:e11863.

https://doi.org/10.1097/MD.0000000000011863

Glozman, J.M. (2004). Quality of life of caregivers. *Neuropsychology Review*, 14:183-196.

https://doi.org/10.1007/s11065-004-8158-5

Goldberg, D.P., & Williams, P. (1988). A User´s Guide to the General Health Questionnaire. Windsor, UK: NFER-NELSON.

Gómez-Gallego, M., Gómez-Amor, J., & Gómez-García, J. (2012). Determinants of quality of life in Alzheimer's disease: Perspective of patients, informal caregivers, and professional caregivers. *International Psychogeriatrics*, 24(11):1805-1815.

https://doi.org/10.1017/S1041610212001081

Grano, C., Lucidi, F., & Violani, C. (2017). The relationship between caregiving self-efficacy and depressive symptoms in family caregivers of patients with Alzheimer disease: A longitudinal study. *International Psychogeriatrics*, 29(7):1095-1103.

https://doi.org/10.1017/S1041610217000059

Jutkowitz, E., Kane, R.L., Gaugler, J.E., MacLehose, R.F., Dowd, B., & Kuntz, K.M. (2017). Societal and family lifetime cost of dementia: Implications for policy. *Journal of American Geriatrics Society*, 65:2169-2175.

https://doi.org/10.1111/jgs.15043

Kramer, B.J. (1997). Gain in the caregiving experience: Where are we? What next? *Gerontologist*, 37(2):218-232.

https://doi.org/10.1093/geront/37.2.218

Kulhara, P., Kate, N., Grover, S., & Nehra, R. (2012). Positive aspects of caregiving in schizophrenia: A review. *World Journal of Psychiatry*, 2(3):43-48.

https://doi.org/10.5498/wjp.v2.i3.43

Lazarus, R.S., & Folkman, S. (1984). Stress, Appraisal and Coping. New York, USA: Springer Publishing Company.

Liew, T.M., Luo, N., Ng, W.Y., Chionh, H.L., Goh, J., & Yap, P. (2010). Predicting gains in dementia caregiving. *Dementia and Geriatric Cognitive Disorders*, 29(2):115-122.

https://doi.org/10.1159/000275569

Liu, Z., Heffernan, C., & Tan, J. (2020). Caregiver burden: A concept analysis. *International Journal of Nursing Sciences,* 7(4):438-445.

https://doi.org/10.1016/j.ijnss.2020.07.012

Loh, A.Z., Tan, J.S., Zhang, M.W., & Ho, R.C. (2017). The global prevalence of anxiety and depressive symptoms among caregivers of stroke survivors. *Journal of the American Medical Directors Association*, 18:111-116.

https://doi.org/10. 1016/j.jamda.2016.08.014

Lundin, A., Åhs, J., Åsbring, N., Kosidou, K., Dal, H., Tinghög, P., *et al*. (2017). Discriminant validity of the 12-item version of the general health questionnaire in a Swedish case-control study. *Nordic Journal of Psychiatry*, 71(3):171-179.

https://doi.org/10.1080/08039488.2016.1246608

Lyubomirsky, S., & Lepper, H.S. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research*, 46(2):137-155.

https://doi.org/10.1023/A:1006824100041

Martín-Carrasco, M., Otermin, P., Pérez-Camo, V., Pujol, J., Agüera, L., Martín, M. J., *et al*. (2010). EDUCA study: Psychometric properties of the Spanish version of the Zarit Caregiver Burden Scale. *Aging and Mental Health*, 14(6):705-711.

https://doi.org/10.1080/13607860903586094

Moore, M.J., Zhu, C.W., & Clipp, E.C. (2001). Informal costs of dementia care: Estimates from the national longitudinal caregiver study. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 56(4):S219-S228.

https://doi.org/10.1093/geronb/56.4.S219

Mulud, Z.A., & McCarthy, G. (2017). Caregiver burden among caregivers of individuals with severe mental illness: Testing the moderation and mediation models of resilience. *Archives of Psychiatric Nursing*, 31:24-30.

https://doi.org/10.1016/j.apnu.2016.07.019

Netto, N.R., Jenny, G.Y.N., & Philip, Y.L.K. (2009). Growing and gaining through caring for a loved one with dementia. *Dementia*, 8(2):245-261.

https://doi.org/10.1177%2F1471301209103269

Pinquart, M., & Sörensen, S. (2006). Gender differences in caregiver stressors, social resources, and health: An updated meta-analysis. *Journal of Gerontology Series B: Psychological Sciences and Social Sciences,* 61:33-45.

https://doi.org/10.1093/geronb/61.1. p33

Rapp, S.R., & Chao, D. (2000). Appraisals of strain and of gain: Effects on psychological wellbeing of caregivers of dementia patients. *Aging and Mental Health*, 4(2):142-147.

https://doi.org/10.1080/13607860050008664

Sallim, A.B., Sayampanathan, A.A., Cuttilan, A., & Chun-Man, H.R. (2015). Prevalence of mental health disorders among caregivers of patients with Alzheimer Disease. *Journal of the American Medical Directors Association*, 16:1034-1041.

https://doi.org/10.1016/j.jamda.2015.09.007

Sánchez-López, M.P., & Dresch, V. (2008). The 12-item general health questionnaire (GHQ12): Reliability, external validity and factor structure in the Spanish population. *Psicothema*, 20:839-843.

Sanders, S. (2005). Is the glass half empty or half full? Reflections on strain and gain in caregivers of individuals with Alzheimer's disease. *Social Work Health Care*, 40(3):57-73.

https://doi.org/10.1300/J010v40n03_04

Schaller, S., Mauskopf, J., Kriza, C., Wahlster, P., & Kolominsky-Rabas, P.L. (2014). The main cost drivers in dementia: A systematic review. *International Journal of Geriatric Psychiatry*, 30:111-129.

https://doi.org/10.1002/gps.4198

Schulz, R., Burgio, L., Burns, R., Eisdorfer, C., Gallagher-Thompson, D., Gitlin, L.N., *et al*. (2003). Resources for enhancing Alzheimer's caregiver health (REACH): Overview, site-specific outcomes, and future directions. *The Gerontologist*, 43(4):514-520.

https://doi.org/10.1093/geront/43.4.514

Seligman, M., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *The American Psychologist*, 55:5-14.

https://doi.org/10.1037/0003-066X.55.1.5

Tennen, H., & Affleck, G. (2002). Benefit-finding and benefit-reminding. In: Snyder, C.R., & Lopez, S.J. (Eds.), *Handbook of Positive Psychology*. Oxford, UK: Oxford University Press.

Van Campen, C., de Boer, A.H., & Iedema, J. (2013). Are informal caregivers less happy than non-caregivers? Happiness and the intensity of caregiving in combination with paid and voluntary work. *Scandinavian Journal of Caring Sciences,* 27:44-50.

https://doi.org/10.1111/j.1471-6712.2012.00998.x

Vellone, E., Piras, G., Talucci, C., & Cohen, M.Z. (2008). Quality of life for caregivers of people with Alzheimer's disease. *Journal of Advanced Nursing*, 61:222-231.

https://doi.org/10.1111/j.1365-2648.2007.04494.x

Wang, Z., Ma, C., Han, H., He, R., Zhou, L., Liang, R., *et al*. (2018). Caregiver burden in Alzheimer's disease: Moderation effects of social support and mediation effects of positive aspects of caregiving. *International Journal of Geriatric Psychiatry*, 33(10):1198-1206.

https://doi.org/10.1002/gps.4910

Wennberg, A.M., Anderson, L.R., Chen-Edinboro, L.P., Cagnin, A., & Pini, L. (2022). Positive aspects of caregiving are associated with lower risk of frailty and sleep disruption in the national study of caregiving. *Innovation in Aging,* 6(7):igac058.

https://doi.org/10.1093/geroni/igac058

World Health Organization (WHO). (2023). *Dementia*. Available from: https://www.who.int/news-room/fact-sheets/detail/dementia [Last accessed on 2024 Feb 29].

Yap, P., Luo, N., Ng, W.Y., Chionh, H.L., Lim, J., & Goh, J. (2010). Gain in Alzheimer care INstrument - A new scale to measure caregiving gains in dementia. *The American Journal of Geriatric Psychiatry*, 18(1):68-76.

https://doi.org/10.1097/JGP.0b013e3181bd1dcd

Zarit, S.H., Reever, K.E., & Bach-Peterson, J. (1980). Relatives of the impaired elderly: Correlates of feelings of burden. *Gerontologist*, 20(6):649-655.

https://doi.org/10.1093/geront/20.6.649

Zuchella, C., Bartolo, M., Bernini, S., Picascia, M., & Sinforiani, E. (2015). Quality of life in Alzheimer Disease: A comparison of patients' and caregivers' points of view. *Alzheimer Disease and Associated Disorders,* 29(1):50-54.

https://doi.org/10.1097/WAD.0000000000000050

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Global Health Economics and Sustainability

ORIGINAL RESEARCH ARTICLE

An interpretative phenomenological study on nurses' perceived affective wellbeing at work

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Abstract

Nurses face increasingly complex and challenging workloads, exacerbated by high rates of absenteeism, mental health issues, and low morale, all of which significantly impact patient care. This study focuses on exploring nurses' perceived affective wellbeing, perceived workload burden, and the current working conditions they face. The objective was to understand nurses' perspectives on affective wellbeing, self-care, and work-life balance. We utilized an interpretative phenomenological approach to design the data collection and management for this study. Through open dialogue, we explored the notion of wellbeing at work with nurses of varying levels of work experience, from fairly novice to expert practitioners who have worked for decades in their fields. The broader responsibilities of nurses of nurses within the National Health Service (NHS) were also examined. Two experts in interpretative phenomenological analysis led the discussion in three different groups, which each consisted of nurses with similar years of work experience, averaging 13 years. Thirty-eight registered nurses volunteered to participate in these discussion groups, with participants recruited from postgraduate courses and representing both acute and community care settings in regional hospitals. Nurses shared insights into what makes nursing a rewarding job but also acknowledged the significant challenges they face. Discussions highlight the stressful and traumatic circumstances nurses often encounter, particularly noting a lack of collegiality among nurses at all levels, limited career aspirations, inadequate support with workloads, and the emotional distress experienced in daily work life. Nurses described their jobs as exhausting and draining, leading to physical and emotional fatigue, detachment, and isolation. These findings hold relevance within the current landscape of nurse and resource shortages in the NHS. Of note, this study identified deeper concerns within the nursing workforce, including emotional dissonance, role dissonance, and disengagement.

Keywords: Health; Dissonance; Workload; Perceived affective wellbeing; Work environment; Work-life balance

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1. Introduction

Nurses often face stressful and demanding work environments, operating both as part of a team and independently while managing caseloads and prioritizing care based on the

complexity and severity of patients' conditions. Currently, nursing workloads and staffing levels are particularly complex and challenging (Buchan *et al*., 2022; Hill, 2020; Marufu *et al*., 2021). Nurses encounter numerous obstacles in clinical practice, such as inflexible schedules, high rates of sickness and absenteeism, increasing mental health issues, low morale, and a lack of diverse skill sets at the frontline of patient care (Buchan *et al*., 2022; Nepali *et al*., 2022; National Health Service [NHS] Digital, 2022). These issues are of growing concern for nurse managers and educators, significantly impacting the organization and delivery of patient care (Paananen *et al*., 2021; Pirhonen *et al*., 2022; Sweeney *et al*., 2022). Workforce development initiatives, such as the Advanced Clinical Practice Apprenticeship programs and reforms in nurse training and education, exemplified by the new Future Nurse Standards, strive to enhance working conditions and tackle issues, such as low morale, retention challenges, and workforce shortages. These efforts made within the nursing workforce have the potential to bolster job prospects, enrich career pathways, and elevate levels of job satisfaction. As a result, nurses' motivation is expected to strengthen with the availability of further career opportunities and career progression.

In recent years, the nursing profession has witnessed a significant exodus of nurses due to a pervasive culture of discrimination within the NHS (the United Kingdom's publicly funded healthcare system), where ethnic minority staff are predominantly clustered in lower pay scales. These nurses encounter heightened uncertainties and formidable obstacles in their pursuit of selection and advancement into senior or leadership roles (Gill & Orgad, 2022; Jefferies *et al*., 2022; Kline, 2019; Lopez *et al*., 2021; Nepali *et al*., 2022; Royal College of Nursing, 2019; Williamson *et al*., 2022). In addition, prominent cases have raised doubts about nurses' professionalism and empathetic qualities, contributing to nurses' moral distress. Notably, the nursing workforce has been found to experience higher rates of mental health issues and suicides compared to other health-care professions, severely impacting nurses' morale, motivation, and general job satisfaction (Conolly *et al*., 2022; Couper *et al*., 2022), particularly in the post-pandemic era.

Recently, mental health illness among nurses has been cited as a primary factor contributing to their departure from the profession (Drennan & Ross, 2019). Similar patterns are observed in healthcare systems worldwide, all grappling with comparable challenges in developing and retaining their nursing workforce (Anderson *et al*., 2021; Galvin *et al*., 2020). At present, there is a notable lack of research in the nursing literature concerning nurses' perceived affective well-being and motivation (Buchan *et al*., 2022; Couper *et al*., 2022). Therefore, this study seeks to fill this void in the broader nursing literature.

This study aimed to investigate nurses' perspectives on their emotional well-being, opinions on achieving a balance between work and personal life, career aspirations, and the factors driving their motivation. The overarching objectives were to enhance our understanding of how nurses navigate both challenges and opportunities within their professional environment, and to explore their perspectives on how their work influences their motivation and affective well-being. In addition, the study sought to delineate the impact of years of work experience on nurses' perceptions of their affective wellbeing and overall job satisfaction. Given the inherent nature of their work, nurses often encounter a myriad of feelings and emotions simultaneously while on duty. These diverse emotions, stemming from their daily interactions with patients and colleagues, may contribute to the elevated levels of emotional labor experienced by nurses in their workplace. The study focused on two objectives: (i) To examine how nursing work and increased workloads impact nurses' affective wellbeing and (ii) to identify how available supportive mechanisms enable nurses to manage the emotional toll of balancing job demands with those of their mental health needs.

2. Data and methods

2.1. Study design and theoretical framework

This interpretative phenomenological research was designed to interpret and understand nurses' own lived experiences, emotions, and feelings (Creswell, 2014; Reid *et al*., 2018; Smith & Nizza, 2022; Smith, 2019). The internal processes of reflective discourse and making sense of experiences are critical for this research, as nurses often lack the space to re-think and re-evaluate experiences, typically reflecting on the emotional burden they carry only after the fact (Nepali *et al*., 2022; NHS Digital, 2022). The aim of this research was to facilitate debates and discussions about why they may feel the way they do, and to attempt to explain and articulate the intricate complexities of their working lives. In other words, nurses were asked to self-interpret their situation and lived experience.

2.2. Study setting and sample recruitment

The sample population consisted of registered nurses with several years of clinical experience who voluntarily took part in three discussion groups. A total of 38 nurses participated in the study. The enrolled nurses were grouped into three different discussion groups based on their years of experience as registered nurses. All participants

were also students enrolled in postgraduate courses at a university.

2.3. Inclusion and exclusion criteria

Participants met the following inclusion criteria: (i) Registered nurses working either full-time or part-time, (ii) with at least 1 year of experience in their current job, and (iii) who were enrolled in a postgraduate module or course at the university. None of the researchers were involved in the delivery of those courses or modules. The researcher visited the participants in class at the end of their lesson and explained the aims of the study.

2.4. Characteristics of participants

Participants were postgraduate students enrolled in a course or module at a British University in London, while also working at local and regional hospitals and clinics. Among the total participants, 33 nurses (86.8%) were female, and five nurses (13.2%) were male. The average age of the nurses was 37 years (standard deviation [SD] = 9), with an average of 13 years of work experience (mean = 13, median = 10, SD = 10).

2.5. Ethical considerations

Ethical clearance for this study was obtained from the Middlesex University's Research Ethics Committee with an approval ID of Ref. No 06/Q0504/59. Participants were thoroughly briefed on issues of consent, anonymity, and confidentiality related to the research. They were assured that their involvement was voluntary and that their identities would remain confidential and anonymous. Discussions were recorded, transcribed, anonymized, and analyzed by two experts in interpretative phenomenological analysis (IPA) who had received training in the methodology (Please refer to Appendices A1 and A2).

2.6. Rigor and reflexivity

During data analysis, the method of bracketing was employed, enabling the researchers to openly contemplate and reflect on the ideas and experiences conveyed in the data. This approach also allowed the researchers to consider their own views and perspectives on the issues at hand (Dodgson, 2019; Dunning *et al.*, 2021). Bracketing serves a dual purpose: it helps differentiate the researchers' thoughts from those expressed by participants, while also facilitating the clarification of the researchers' own ideas, thoughts, and feelings. This approach enables a more meaningful reflection and reconsideration of participants' narratives, as the researchers consciously engage with their own thoughts and values. This heightened awareness on the part of the researchers has the potential to enhance the credibility and reliability of the data during analysis. Consequently, there is a reduced likelihood of the researchers inadvertently biasing the data with their own ideas, as they become more cognizant of their thought processes. This approach aims to uphold and maintain the active presence of "the voice of the participants" throughout data collection and analysis.

2.7. Data collection

The integration of data from Groups A, B, and C involved analyzing and examining interviews through bracketing and line numbering directly on the transcripts. This process was followed by annotating notes and grouping common words and sentences (Love *et al.*, 2020; Palmer *et al.*, 2010). Group A comprised 14 junior nurses with work experience ranging from 2 to 6 years. Group B consisted of 14 experienced nurses with seven to 12 years of service, many of whom held senior nursing and managerial positions. Group C comprised nine highly experienced nurses in senior management roles, with work experience ranging from 21 to 25 years. In total, three discussion groups were conducted, and excerpts from these sessions are referenced in Appendices A1 and A2.

The researcher anticipated several challenges and planned accordingly, including ensuring that: (i) Nurses were respectful of each other's views and particularly managing those with a tendency to be more vocal; (ii) participants felt safe to share their true perspectives; and (iii) the groups behaved in a professional fashion during this process, with strong feelings around the issues being appropriately managed and diffused. With the help of another interviewer and an IPA expert, the researchers monitored group dynamics and carefully managed nurses' expectations and feelings to swiftly de-escalate potential clashes among participants.

To ensure a smooth operation of the discussion groups, the interview guide was piloted twice to check for leading or confusing questions and to ensure that the questions were clear, relevant, and coherent. Minimal modifications were required for some of the opening questions. With participants' consent, the interviews were recorded and transcribed. Furthermore, one of the interviewers maintained field notes throughout the discussions. These notes were useful in recounting the conversations held between the interviewer and the group and served as an *aide-memoir* for the interviewer's self-reflections and observations made at the time of the interview. Each interview lasted between 45 min and 60 min, with a mean duration of 55 min. The study spanned 7 months, during which no follow-up interviews were conducted. Participants were given the chance to review the transcripts within 6 weeks of their interviews.

2.8. Data analysis

The primary researcher and an expert in IPA analyzed the data following the nine-step process outlined in the IPA methodology. The transcripts, typed verbatim in Word, were used for analysis, and the IPA themes were synthesized (Love *et al*., 2020; Pietkiewicz & Smith, 2014). Each transcript was anonymized and independently analyzed before proceeding to the next stage. The idiographic approach inherent in the IPA method required each IPA expert to independently analyze the data and construct the coding framework. Subsequently, they convened to compare findings and confirm code saturation for each group. Numbered lines in the transcripts were color-coded to facilitate the visual identification of supporting quotes. Emerging themes were documented in a journal, with clear steps to the analysis meticulously recorded (Dodgson, 2019; Love *et al*., 2020; Miller *et al*., 2018). This approach aided in reducing personal biases, thereby safeguarding the integrity of the emerging themes and subthemes. In addition, through systematic analysis, the researchers meticulously documented commonalities and differences across the transcripts, thereby enriching the refinement and validation of the data. This qualitative method in psychology research was particularly well-suited for the study's objective, as it provided valuable insights into how specific groups of nurses within a particular context comprehend their distinct circumstances. The idiographic emphasis of IPA aligns closely with the focus of this research.

3. Results

Nurses, as employees, find motivation in the belief that their work is meaningful and that they are valuable and significant. However, the data suggests that when nurses feel "inadequate," their motivation can be undermined. The data analysis revealed that in their efforts to meet targets, nurses may unintentionally undermine the perceived importance of their work, which can lead to reduced confidence in the value of their contributions. The study found that nurses often express negative feelings about themselves and their jobs. Notably, profound emotions such as emotional exhaustion, frustration, disillusionment, and feelings of being undervalued are prevalent in discussions among nurses with extensive work experience compared to those with fewer years in their roles (please refer to Appendices A1 and A2). The disappointment expressed by these nurses is palpable in the transcripts reviewed during the data analysis. It is also clear that emotional exhaustion, anxiety, and frustration are particularly pronounced among nurses who have been in the profession for more than 10 years (Begley, 1998). Nurses frequently discuss the importance of aligning with the needs and values of their organization. However, they openly acknowledge their lack of acceptance or understanding of why such alignment is required. The emotional strain of their work has left nurses feeling frustrated and overwhelmed, leading them to question their professional and personal values, obligations, and responsibilities. Despite these pressures, they continue to work diligently.

Two group experiential themes (GETs), titled "emotional dissonance" (ED) and "role dissonance" (RD), are directly associated with nurses' affective wellbeing in the workplace, as depicted in Figure 1. The emergent theme or experiential statement (ES) (i) "negative feelings about self" contributes to the GET ED, while the ES (ii) "negative feelings about others" reinforces the GET RD. The ES "negative feelings about self" emerged from four sub-themes or personal experiential themes (PET): burden of work, exhausted, frustrated, and unworthy. Meanwhile, the ES "negative feelings about others" emerged from two PET: disillusioned and isolated.

3.1. ED

3.1.1. ED: Negative feelings about self

Nurses exhibited signs of agitation, anger, and a generally pessimistic attitude toward their work environment and their own professional identity. Notably, this theme revolves around nurses' negative outlook and the emotional struggle to cope with the demands and pressures of their work. Within this overarching theme, several sub-themes emerged, including the burden of work, exhausted, frustrated, and unworthy. The corresponding verbatim extracts supporting these sub-themes are provided in Appendix A1. These nurses experience a sense of disconnection and detachment from both their work and their own emotions, with their negativity evident throughout the extracts.

3.1.2. ED1: Negative feelings about self - Burden of work

This sub-theme pertains to nurses' perception of the burden imposed by their workloads and their strategies for coping with escalating demands. Nurses expressed concerns regarding the legislative requirements of their roles and the counterproductive paperwork they are compelled to complete to safeguard both themselves and their organizations. This aspect of the job, in their view, has significantly increased their workload beyond what is expected of a clinician. The relentless increase in workloads, paperwork, and training associated with these roles has raised questions about nurses' role effectiveness and the invisibility of some aspects of the job. Nurses also expressed a belief that they were set up for failure in their

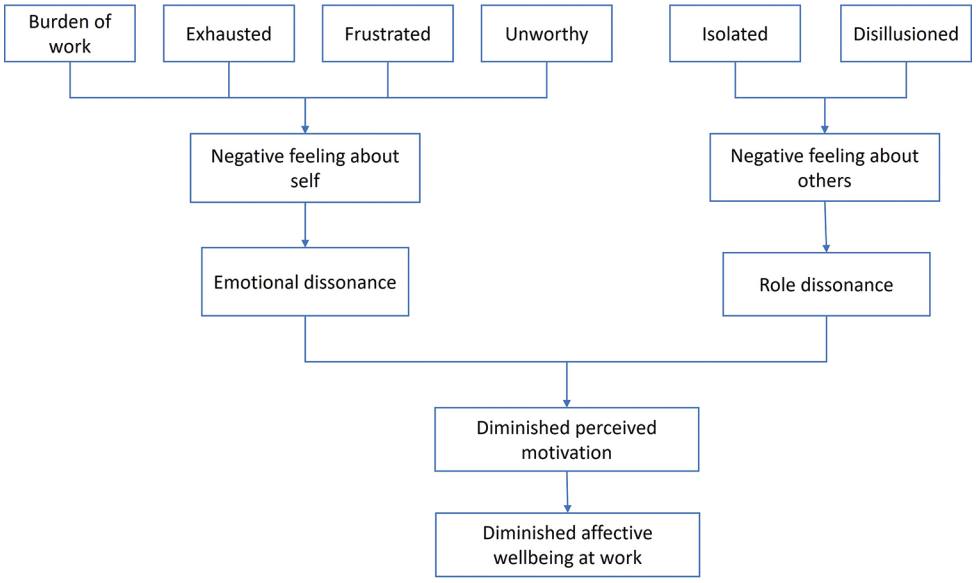

Figure 1. The impact of emotional dissonance and role dissonance on diminished perceived motivation and perceived affective well-being in the workplace

roles, as they were continually assigned additional tasks without sufficient time or resources to fulfill the increasing demands. Comparisons were made, with nurses feeling as if they were expected to perform duties akin to those of junior doctors, yet perceiving their work as contributing to systemic shortcomings and feeling inadequate in various aspects. The seven different quotes in the extracts illustrate nurses' ED and disconnect, as well as their distrust in leadership and management. Nurses expressed feelings of self-pity and disappointment, lamenting how "we (nurses) have been short for ages," and criticized the bureaucracy, noting that "it is more bureaucracy because some people who are in terms of requirements, they don't meet the requirements… " This sentiment underscores the lack of planning and support for nurses to progress and develop in their jobs. It is evident that nurses are grappling with the challenge of reconciling their perceived "nursing" and "non-nursing" responsibilities, resulting in increased effort and time commitment on a regular basis, while feeling pulled in various directions as a consequence.

3.1.3. ED2: Negative feelings about self - Exhausted

Nurses conveyed that the demands of nursing work are too great to continue beyond a certain age. They expressed feeling physically and emotionally drained by their nursing responsibilities, describing a sense of emotional overwhelm. Many indicated that, if given the choice, they would have opted out of the nursing profession long ago. The mounting pressures and demands faced by nurses have become increasingly overwhelming, leading to significant stress and exhaustion. In addition, nurses encounter challenges in navigating work relationships, often experiencing a lack of support from senior staff and managers, as well as a pervasive sense of mistrust and overbearing attitudes from other professionals. Obtaining support—both general and for career advancement—requires persistent effort and remains a continuous struggle. The frustration among nurses is palpable, particularly when discussing the lack of collegial support and effort. While nurses are resolute in defending their decisions and addressing the stress they face, there is a prevailing sense of sadness and disillusionment among those who feel demoralized by the actions of their peers and colleagues across different levels of nursing. It is evident that there is an immediate need for educators and managers to assess the support systems available to nurses on a daily basis and to establish pathways that facilitate career advancement or enable career reconfiguration for those who desire it.

3.1.4. ED3: Negative feelings about self - Frustrated

Nurses expressed frustrated and apprehensive feelings about voicing opinions that differ from those of their team members. They indicated that there was an expectation to comply and refrain from challenging the system, as dissent might be perceived as antiquated. They described feeling compelled to "toe the line" to be considered as understanding. As discussions progressed, nurse participants' demeanor shifted from negativity to vulnerability, with profound disappointment, anger, and frustration becoming evident. Many nurses reported feeling marginalized and embarrassed when seeking assistance and support from their colleagues. These feelings of isolation, neglect, and despondency were primarily

characterized by disappointment and frustration. Nurses struggled with interpersonal dynamics at work and felt trapped in their roles. They expressed discontent with collegiality, perceiving it as a lack of reciprocal support. They were hesitant to approach management for assistance, viewing them as ineffective and possibly dismissive, leading to resentment. Fear of retaliation deterred nurses from reporting unprofessional behavior among their peers. In addition, nurses voiced frustration and anger toward doctors, who, like nurse colleagues and managers, were perceived as dismissive. While senior nurses were perceived as more confident in challenging doctors, they were less likely to confront senior nurse peers. Nurses also expressed dissatisfaction and frustration regarding the lack of autonomy in their practice and felt disheartened when their efforts to assist others were not reciprocated.

3.1.5. ED4: Negative feelings about self - Unworthy

Nurses' efforts often go unrecognized despite a substantial increase in their workloads. This is evident as nurses acknowledge that they effectively perform three-quarters of a doctor's duties without receiving the corresponding recognition. Interestingly, some nurses admitted to feeling empowered by this perception. However, the sobering realization that nurses willingly take on additional tasks in hopes of being acknowledged for their dedication underscores a deeper disillusionment with the profession. This sentiment highlights a core issue contributing to nurses' diminished morale, self-esteem, and motivation: they perceive their work as unworthy and feel exhausted from constantly defending its worth against scrutiny from peers and other professionals who assume superiority. In this segment of the transcript, nurses' moods shift from sadness to agitation and despair. While nurses demonstrate loyalty and awareness of the broader issues affecting their profession, they also require validation and appreciation for their contributions and hard work. Nursing leadership plays a crucial role in reshaping the narrative surrounding nursing within the political sphere and in advocating for the profession's values. This is essential to inspire younger nurses to remain committed to their roles.

3.2. RD

3.2.1. Negative feelings about others

It is noteworthy that the experiences recounted by nurses in the three discussion groups shared a prevailing sense of negativity and low morale throughout the narratives. Across all discussion groups, nurses expressed feelings of isolation and disillusionment with their profession. The corresponding verbatim excerpts supporting this theme are provided in Appendix A2.

3.2.2. RD1: Negative feelings about others - Isolated

Nurses also conveyed sentiments regarding the perceived selfishness prevalent among their peers, noting a lack of mutual assistance. Concurrently, they expressed feelings of distress, powerlessness, and isolation. Being emotionally detached from their team and witnessing fellow nurses facing criticism were described as profoundly challenging experiences. Nurses expressed apprehension about being stigmatized and opted for silence, attributing this reluctance to the unkindness they perceived among women toward each other. Interestingly, nurses suggested that some may lack an understanding of supportive teamwork and expressed concerns about the perpetuation of such a culture, fearing it may endanger nurses' well-being. Nurses often endure their struggles silently, although they acknowledge the inclination to discuss problems among themselves without taking active or political steps to address them. They justify this behavior by citing a preference for discussing issues in small groups due to feeling powerless in their roles. However, this reluctance to engage may extend beyond seeking safety in isolation; it may serve as a coping mechanism for managing stressful situations. In addition, a pervasive sense of mistrust and a lack of confidence in building healthy working relationships among nurses and with other professionals were evident.

3.2.3. RD2: Negative feelings about others - disillusioned

Unlike the previous theme, this one is particularly pertinent to nurses with extensive work experience. These highly skilled and seasoned nurses subtly conveyed feelings of inadequacy due to the multitude of demanding expectations placed on their services. According to the narratives provided by the nurses, there exists a clear disconnect and disillusionment between meeting "targets" and managing "workloads," raising concerns that the best interest of the patient may not always align with the demands of their roles. Nurses find themselves overwhelmed, struggling to keep pace with their tasks, which increases the risks of errors or medication mistakes. The tension and exhaustion among nurses are palpable, particularly concerning the prioritization of targets, which often leads to contentious debates about hospital management. This dynamic fosters a hostile work environment, leaving nurses feeling vulnerable and deeply disillusioned with their profession. Many nurses find their own professional values diminishing as they strive to meet the expectations of their organizations, managers, and patients, often at the expense of their own needs and principles.

4. Discussion

Nurses in this study evidently grapple with the necessity of adhering to organizational expectations that they perceive

as unrealistic and dehumanizing. This dilemma creates a divergence between nurses' personal beliefs and values and those imposed by the organizations they serve (Cho *et al*., 2022; Dunning *et al*., 2021; Hill, 2020). Notably, nurses struggle to connect with peers, colleagues, and management, leading to profound feelings of frustration, anger, and isolation (Begley, 1998; Buchan *et al*., 2022; Jarden *et al*., 2021). Their narratives highlight issues of emotional insecurity in the workplace, alongside a tangible disconnect, mistrust, and emotional neglect. Younger nurses are leaving the profession prematurely each year, contributing to an anticipated shortfall of approximately 36,700 nurses by 2030/31 (Buchan *et al*., 2022; Hill, 2020; Shembavnekar *et al*., 2022). Nurses perceive themselves as "inadequate," as indicated by the data, which may explain their negative feelings toward themselves and others, such as emotional exhaustion, frustration, disillusionment, and feeling undervalued. Generally, high levels of emotional labor are associated with feelings of dissonance, anxiety, and distress (Bae *et al*., 2022; Catton, 2020; Lake *et al*., 2022; Maslach, 1982; Thompson *et al*., 2022). In this study, nurses reported "suffering" from their burdensome, unmanageable workloads, resulting in emotional detachment, isolation, disillusionment with their profession, and a desire to leave. They raised concerns about the devaluation of nursing as a profession and the struggle to cope with a job that drains them both physically and mentally. Nurses acknowledged that certain aspects of their profession remain invisible to the public but emphasized the importance of their management recognizing and rewarding these aspects to make nursing more attractive to younger generations (Thompson *et al*., 2022). A broad range of skills, such as the coaching skills used by senior nurses to supervise and support junior staff, should be acknowledged and rewarded to attract and recruit future generations of nurses.

Unmanageable work pressures can be demoralizing for staff, necessitating a strategic approach at both individual and organizational levels to reform nurses' future career trajectories and training (Priest *et al*., 2015; Shembavnekar *et al*., 2022). This approach is particularly crucial for nurses who are currently undecided about their career paths but may not yet exhibit clear signs of distress. This group of nurses may benefit most from careful coaching, early career engagement, and strategies aimed at protecting their well-being and enhancing their self-esteem (Festinger, 1957; Petrides & Furnham, 2001; Scher & Cooper, 1989). Fiabane *et al*. (2019) argue that discrepancies between perceived expectations and reality can evoke strong negative effects and agonizing feelings of despair, particularly when individuals feel personally responsible for their job situation. Without corresponding feelings of self-worth and self-esteem, this sense of personal responsibility can become overwhelming (Petrides *et al*., 2007). Individuals with high levels of personal responsibility may respond more negatively to emotionally charged experiences and struggle to maintain positive mental states over time (Zeidner & Shani-Zinovich, 2011). This may elucidate some of the feelings of hopelessness reported among nurses in other studies (Fiabane *et al*., 2019; Firouzkouhi *et al*., 2022; Rahman & Plummer, 2020). This study suggests that nurses experience ED and RD, which can have detrimental effects on their motivation and emotional well-being in the workplace.

This study, being exploratory in nature, involved a sample of 38 nurses. Increasing the sample size would bolster the applicability of the study's findings to a broader context. In addition, a more diverse sample could enhance the credibility of the research. While the proportion of female nurses in the sample outweighs that of male nurses, which is not ideal, it does align with the gender distribution typically observed in the NHS nursing workforce. Nonetheless, future research endeavors should strive for equal representation of both genders. This approach could unveil disparities in experiences and perceptions among staff of different genders and ethnic backgrounds, thereby shedding light on variations in dissonance and motivation. Such insights could inform future nurse education and training initiatives, aimed at enhancing motivation and emotional management to foster improved emotional well-being in the workplace.

5. Conclusion

This study indicates that nurses' negative perceptions of themselves and others may account for their diminished work motivation and lack of enthusiasm for nursing. Of utmost significance, the findings reveal that nurses expressed low job satisfaction and a sense of disconnection from their profession. The data subtly suggests that nurses' personal beliefs regarding the responsibilities of their role may influence their attitudes, work motivation, and perceptions of themselves and others, ultimately adversely affecting their affective well-being.

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Conflict of interest

The authors declare no conflicts of interest.

Author contributions

Conceptualization: Chrysi Leliopoulou
Investigation: Chrysi Leliopoulou
Methodology: Chrysi Leliopoulou
Writing-original draft: Chrysi Leliopoulou
Writing-review & editing: Theodora Stroumpouki, Linda Collins

Ethics approval and consent to participate

This study was granted ethical clearance from Middlesex University's Research Ethics Committee, with approval ID Ref. No 06/Q0504/59. Participants were briefed accordingly on consent, anonymity, and confidentiality related to the research. They were informed that their participation was voluntary, confidential, and anonymous. A written consent was obtained from each of the participants in the study.

Consent for publication

A written consent was obtained from each of the participants for publishing the data from this study.

Availability of data

The coded data are available upon reasonable request.

Further disclosure

These findings have been deposited in the Research Repository of Middlesex University (https://repository.mdx.ac.uk/item/89y39), where I earned my PhD.

References

Anderson, M., Onespository.mdx.ac.uk/item/89y39k/item/89y39" versity ntial, and anon *et al.* (2021). Securing a sustainable and fit-for-purpose UK health and care workforce. *The Lancet*, 397(10288):1992-2011.

https://doi.org/10.1016/S0140-6736(21)00231-2

Bae, S.Y., Yoon, H.J., Kim, Y., & Kim, J. (2022). Posttraumatic stress disorder and related factors among nurses working during the COVID-19 pandemic. *Journal of Nursing Management*, 30(5):1096-1104.

https://doi.org/10.1111/jonm.13615

Begley, T.M. (1998). Coping strategies as predictors of employee distress and turnover after an organizational consolidation: A longitudinal analysis. *Journal of Occupational and Organizational Psychology*, 71(4):305-330.

https://doi.org/10.1111/j.2044-8325.1998.tb00679.x

Buchan, J., Catton, C., & Shaffer, F. (2022). The Global Nursing Workforce and the COVID-19 Pandemic. ICN International Centre of Nurse Migration. Available from: https://www.sustain/and/retain/in/2022/and/beyond-/the/global/nursing/workforce/and/the/covid-19/pandemic.pdf/(icn.ch) [Last accessed on 2024 Aug 21].

Catton, H. (2020). Nursing in the COVID-19 pandemic and beyond: Protecting, saving, supporting and honouring nurses. *International Nursing Review*, 67(2):157-159.

https://doi.org/10.1111/inr.12593

Cho, O.H., Yoon, J., & Kim, M. (2022). Influencing factors of fatigue among public health nurses during the COVID-19 pandemic: A cross-sectional study. *Public Health Nursing*, 40(1):80-89.

https://doi.org/10.1111/phn.13131

Conolly, A., Abrams, R., Rowland, E., Harris, R., Couper, K., Kelly, D., *et al.* (2022). "What is the matter with me?" Or a "badge of honor": Nurses' constructions of resilience during Covid-19. *Global Qualitative Nursing Research*, 9:1-13.

https://doi.org/10.1177/2333393622109486

Couper, K., Murrells, T., Sanders, J., Anderson, J.E., Blake, H., Kelly, D., *et al.* (2022). The impact of COVID-19 on the wellbeing of the UK nursing and midwifery workforce during the first pandemic wave: A longitudinal survey study. *International Journal of Nursing Studies*, 127:104155.

https://doi.org/10.1016/j.ijnurstu.2021.104155

Creswell, J.W. (2014). Research Design: Qualitative, Quantitative and Mixed Methods Approaches. 4th ed. Los Angeles, CA: Sage Publications.

Dodgson, J.E. (2019). Reflexivity in qualitative research. *Journal of Human Lactation*, 35(2):220-222.

https://doi.org/10.1177/0890334419830990

Drennan, V.M., & Ross, F. (2019). Global nurse shortages-the facts, the impact and action for change. *British Medical Bulletin*, 130(1):25-37.

https://doi.org/10.1093/bmb/ldz014

Dunning, A., Louch, G., Grange, A., Spilsbury, K., & Johnson, J. (2021). Exploring nursessJ. (2021). Exploring nursesng nurses. Expperceived relationship with wellbeing and patient care and safety: A qualitative study. *Journal of Research in Nursing*, 26(1-2):135-146.

https://doi.org/10.1177/1744987120976172

Festinger, L. (1957). A Theory of Cognitive Dissonance. United States: Stanford University Press.

Fiabane, E., Dordoni, P., Setti, I., Cacciatori, I., Grossi, C., Pistarini, C., *et al.* (2019). Emotional dissonance and exhaustion among healthcare professionals: The role of the perceived quality of care. *International Journal of Occupational Medicine and Environmental Health*, 32(6):841-851.

https://doi.org/10.13075/ijomeh.1896.01388

Firouzkouhi, M., Abdollahimohammad, A., Rezaie-Kheikhaie, K., Mortazavi, H., Farzi, J., Masinaienezhad, N., *et al.* (2022).

Nurses).ezhad, N., N., N., N., had, N., N., naienezhad, N., N., inaienezhad, N., N. *Health Sciences Review* (*Oxf*), 3:100030.

https://doi.org/10.1016/j.hsr.2022.100030

Galvin, J., Richards, G., & Smith, A.P. (2020). A longitudinal cohort study investigating inadequate preparation in death and dying in nursing students: Implications for the aftermath of the COVID-19 pandemic. *Frontiers in Psychology,* 11:2206.

https://doi.org/10.3389/fpsyg.2020.02206

Gill, R., & Orgad, S. (2022). Confidence Culture Tells Women to be More self-Assured - but Ignores the Real Problems. The Conversation. Available from: https://theconversation.com/confidence-culturetells-women-to-be-more-self-assured-but-ignores-the-realproblems-176864 [Last accessed on 2022 Aug 23].

Hill, B. (2020). Protecting student nurses is crucial to saving the nursing workforce. *British Journal of Nursing*, 29(13):787.

https://doi.org/10.12968/bjon.2020.29.13.787

Jarden R.J., Jarden A., Weiland T.J., Taylor G., Brockenshire N., & Gerdtz M. (2021). Registered nursesnurses nursestered nurses Registered nurses nursesursesnurses nurses-realproblems-176864blems-176864" rmata-synthesis. *Journal of Advanced Nursing*, 77(3):1172-1187.

https://doi.org/10.1111/jan.14667

Jefferies, K., States, C., MacLennan, V., Helwig, M., Gahagan, J., Bernard, W.T., *et al.* (2022). Black nurses in the nursing profession in Canada: A scoping review. *International Journal for Equity in Health*, 21(1):102.

https://doi.org/10.1186/s12939-022-01673-w

Kline, R. (2019). Leadership in the NHS. *British Medical Journal Leader*, 3(4):129-132.

https://doi.org/10.1136/leader-2019-000159

Kline, R. (2022). Workforce Race Discrimination Adversely Impacts Patient Care Too. Available from: https://www.workforce/race/discrimination/adversely/impacts/patient/care/too/by/roger/kline-the/official/blog/of/bmj/leader [Last accessed on 2023 May 03].

Lake, E.T., Narva, A.M., Holland, S., Smith, J.G., Cramer, E., Rosenbaum, K.E.F., *et al.* (2022). Hospital nurses' moral distress and mental health during COVID-19. *Journal of Advanced Nursing*, 78(3):799-809.

https://doi.org/10.1111/jan.15013

Lopez, V., Anderson, J., West, S., & Cleary, M. (2021). Does the COVID-19 pandemic further impact nursing shortages? *Issues in Mental Health Nursing*, 43(3):293-295.

https://doi.org/10.1080/01612840.2021.1977875

Love, B., Vetere, A., & Davis, P. (2020). Should interpretative phenomenological analysis (IPA) be used with focus groups? Navigating the bumpy road of "iterative loops," idiographic journeys, and "phenomenological bridges". *International Journal of Qualitative Methods*, 19:1-17.

https://doi.org/10.1177/1609406920921600

Marufu, T.C., Collins, A., Vargas, L., Gillespie, L., & Almghairbi, D. (2021). Factors influencing retention among hospital nurses: Systematic review. *British Journal of Nursing*, 30(5):302-308.

https://doi.org/10.12968/bjon.2021.30.5.302

Maslach, C. (1982). Understanding burnout: Definitional issues in analyzing a complex phenomenon. In: Paine, W.S. (ed.). Job Stress and Burnout: Research, Theory and Intervention Perspectives. Beverly Hills, CA: Sage Publications, p.29-40.

Miller, R.M., Chan, C.D., & Farmer, L.B. (2018). Interpretative phenomenological analysis: A contemporary qualitative approach. *Counselor Education and Supervision*, 57(4):240-254.

https://doi.org/10.1002/ceas.12114

Nepali, S., Einboden, R., & Rudge, T. (2022). Control of resources in the nursing workplace: Power and patronage relations. *Nursing Inquiry*, 30(2):e12523.

https://doi.org/10.1111/nin.12523

NHS Digital. (2022). Nurses, Midwives and Support Staff by Care Setting, Level, Gender and Age. Available from: https://digital.nhs.uk/supplementary-information/2022/nurses-midwives-and-support-staff-by-care-settinglevel-gender-and-age-dec21 [Last accessed on 2022 Sep 26].

Paananen, J., Rannikko, J., Harju, M., & Pirhonen, J. (2021). The impact of Covid-19-related distancing on the well-being of nursing home residents and their family members: A qualitative study. *International Journal of Nursing Studies Advances*, 3:100031.

https://doi.org/10.1016/j.ijnsa.2021.100031

Palmer, M., Larkin, M., De Visser, R., & Fadden, G. (2010). Developing an interpretative phenomenological approach to focus group data. *Qualitative Research in Psychology*, 7(2):99-121.

https://doi.org/10.1080/14780880802513194

Petrides, K.V., & Furnham, A. (2001). Trait emotional intelligence: Psychometric investigation with reference to established trait taxonomies. *European Journal of Personality*, 15(6):425-448.

https://doi.org/10.1002/per.416

Petrides, K.V., Pita, R., & Kokkinaki, F. (2007). The location of trait emotional intelligence in personality factor space. *British Journal of Psychology*, 98(2):273-289.

https://doi.org/10.1348/000712606X120618

Pietkiewicz, I., & Smith, J.A. (2014). A practical guide to using interpretative phenomenological analysis in qualitative research psychology. *Psychological Journal*, 20(1):7-14.

https://doi.org/10.14691/CPPJ.20.1.7

Pirhonen, J., Forma, L., & PietilF, I. (2022). COVID-19 related

visiting ban in nursing homes as a source of concern for residentsor residentshology. ative research psychol *BMC Nurs*, 21(1):255.

https://doi.org/10.1186/s12912-022-01036-4

Priest, N., Esmail, A., Kline, R., Rao, M., Coghill, Y., & Williams, D.R. (2015). Promoting equality for ethnic minority NHS staff--what works? *BMJ*, 351:h3297.

https://doi.org/10.1136/bmj.h3297

Rahman, A., & Plummer, V. (2020). COVID-19 related suicide among hospital nurses; Case study evidence from worldwide media reports. *Psychiatry Research*, 291:113272.

https://doi.org/10.1016/j.psychres.2020.113272

Reid, K., Elliot, D., Witayarat, N., & Wilson-Smith, K. (2018). Reflecting on the Use of Photo-elicitation Methods in IPA Research. Enhancing the Interpretative Lens and Re-balancing Power Back to the Participant. A Review of Published Studies. Available from: http://eprints.gla.ac.uk/17182 [Last accessed on 2022 Sep 20].

Royal College of Nursing. (2019). RCN Employment Status. RCN. Available from: https://www.rcn.org.uk/-/media/royal-college-of-nursing/documents/publications/2019/november/007-927.pdf [Last accessed on 2022 Sep 26].

Scher, S.J., & Cooper, J. (1989). Motivational basis of dissonance: The singular role of behavioral consequences. *Journal of Personality and Social Psychology*, 56(6):899-906.

https://doi.org/10.1037/0022-3514.56.6.899

Shembavnekar, N., Buchan, J., Bazeer, N., Kelly, E., Beech, J., Charlesworth, A., *et al*. (2022). NHS Workforce Projections 2022. The Health Foundation. Available from: https://www.health.org.uk/publications/nhs-workforce-projections-2022 [Last accessed on 2024 Aug 21].

Smith, J.A. (2019). Participants and researchers searching for meaning: Conceptual developments for interpretative phenomenological analysis. *Qualitative Research in Psychology*, 16(2):166-181.

https://doi.org/10.1080/14780887.2018.1540648

Smith, J.A., & Nizza, I.E. (2022). Essentials of Interpretative Phenomenological Analysis. United States: American Psychological Association.

Sweeney, M.R., Boilson, A., White, C., Nevin, M., Casey, B., Boylan, P., *et al*. (2022). Experiences of residents, family members and staff in residential care settings for older people during COVID-19: A mixed methods study. *Journal of Nursing Management*, 30(4):872-882.

https://doi.org/10.1111/jonm.13574

Thompson, L., Bidwell, S., & Seaton, P. (2022). The COVID-19 pandemic: Analysing nursing risk, care and careerscapes. *Nursing Inquiry*, 29(3):e12468.

https://doi.org/10.1111/nin.12468

Williamson, L., Burog, W., & Taylor, R.M. (2022). A scoping review of strategies used to recruit and retain nurses in the health care workforce. *Journal of Nursing Management*, 30(7):2845-2853.

https://doi.org/10.1111/jonm.13786

Zeidner, M., & Shani-Zinovich, I. (2011). Do academically gifted and nongifted students differ on the Big-Five and adaptive status? Some recent data and conclusions. *Personality and Individual Differences*, 51(5):566-570.

https://doi.org/10.1016/j.paid.2011.05.007

Appendices

Appendix A1. Experiential statement 1: "Negative feelings about self" and associated personal experiential themes

Personal Experiential Themes

- Burden of work

  "The continuing care is now so difficult to get; it makes you feel inadequate in a lot of ways, but it's not your fault because the services and the way they are organized it's not fair anymore. I think there is an unrealistic portrayal of what care is available. Like all the advertising about people being able to die at home and you will be able to see a nurse every day. All those things when, in reality, it doesn't happen. There isn't the funding really for it." Group A

  "…I find that things are moving so fast…especially in secondary care pushing patients out, you know, without perhaps sometimes spending, you know, taking time to make sure that the discharge is proper. But it all falls, you know, insufficient resources to give, you know, to organize the care, and they end up back in the hospital because it wasn't properly sorted out..this idea that everything must be out, out, out in the community..because there is a culture now that everything should be straight out of the hospital." Group A

  "Too much work is put upon them (nurses) because we have so many tasks on board like cannulation and all these extra tasks, and you have your paperwork. To do all the proper things you need for a discharge to work takes a lot of time. It's a system's failure, really. You are putting more and more jobs and more and more tasks on the nurses and fewer people (to do the job) with no extra resources, you know. You are doing a junior doctor's role." Group B.

  " …We have been short for ages, and I think it's more bureaucracy because some people who are in terms of requirements, they don't meet the requirements; I mean, I've seen one of them has not taken the mentorship course that's right, some people are qualified to do…but they can't be shortlisted because they haven't done the mentorship course…." Group B

  "There is more paperwork. The risk of legislation is always there now. Documentation, documentation, documentation, and that's on top of the physical care, the more senior staff get roped into paperwork instead of providing physical care, which is what we want to instead of filling bits of paper." Group C

  "If you have a conversation, if you don't record it doesn't count or you are open to complain or disciplinary if there is a problem in the future. You get some nurses who are far better at doing the paperwork than actually looking after the patients." Group C

  "..you can't absorb emotions forevermore; you have to have an outlet, and if you don't have…find an outlet that works for you, then you're gonna pop…you're gonna get chest pains or your hair's going to fall out..50% it's a hell of a lot and organizing social services, MDTs you know getting all these people together just takes up tons of your time probably it takes up possibly more than 50% of your time." Group C

- Exhausted

  "When I wake up the following day, I feel so exhausted and you know I feel all tight before I start the following day. I don't really have a way to solve the stress situation personally; I lay down there in no lights. I use this one to solve my stress situation definitely." Group A

  "… for me, my first line of enquiry and support would be my mentor. From there, I have my line manager and my link lecturers and personal tutors… you have to be forceful to get anywhere and take the bull by the horns and tell them I'm going to do some revision, please. I got an allocated mentor who is always away from me, and if I approach to ask about something, they say, 'Oh, didn't she tell you this? Ask her, stop asking me!'" Group B

  "When I have a bad day, I carry that bad mood from the workplace to my house, and then I'll have a sleepless night." Group B

  "There was a time I thought about opting out from nursing and doing another thing but on a second thought, I said, I have been in this (nursing) all the time; all that I know is nursing, you know? So, I can't opt out and start all over again. If only I knew I would have started before going into nursing." Group B

  "I was thinking about changing my career but it never came. It was just a dream, really I don't know, just needed a change maybe." Group C

  "You can't keep carrying being a nurse with that day job when you are 50 or whatever. It's so physical and emotional." Group C

  "..I get really mad toward the doctors…if you are unsure, you send somebody for a CT scan or something… or even a plain spine neck tray would have shown the compression…but the worst thing was that straight away, all fingers went out. And we all of us nurses had to write statements, and we wanted to know what was going on here…but that was the consultant. I actually told the registrar on the ward round to F** off in the middle of the ward…." Group C

- Frustrated

  "You can't say anything because then they say you have been unreasonable, so you don't say anything, so you feel frustrated because things are happening, and you don't say much because you never know when the cards are going to turn on you and the issue is not going to be about what they are doing but about you are saying something." Group A

  "I don't think that nurses are ever truly autonomous because they were always looking at the guidelines; they always regard the job autonomous to a degree, but not truly in the full sense of the word in that we can work totally independent of anyone. Doctors are truly autonomous, but I don't think nurses are." Group A

  "I think if you go against the system, if you start speaking out against it. (You are told by your manager) you don't understand; you are old-fashioned. So, you have to toe the line. If you don't toe the line you do not understand you are old fashioned." Group B

  "She (another nurse) keeps pushing me away, and while three, four times I asked and feel somehow embarrassed to keep asking about something which is not your personal issue, it's something to do with the job, and it's a professional matter! Then you give up and you take a step back and feel isolated, you feel ignored, and then you lose your confidence, you lose the wish to do something, and you feel low. And sometimes I feel disappointed that I have ever started this I shouldn't." Group B

  "They (other nurses) would ask for the help, but they are not happy to return the help back; they may say to a colleague, Well, they can't do it (help), and you will be stuck going solo with your patients. Many, many times I have experienced that." Group C

  "They (medical teams) don't treat you with respect and not realizing that you've got some expertise and they are just dismissive… this team had a patient admitted with fluid in his lung, and they said he is going to go down for a scan because they are going to do a pleural tap on him. And I took one look, and I thought, 'My god, if they take him off the ward, he is going to be arrested,' and I said, 'he is not safe to go downstairs,' but they insisted on taking him down there without the crash trolley." Group C

Cont'd...

Appendix A1. *(Continued)*

"And I was so cross, and I said to the doctor, 'I think you should go and have a look at this patient instead of sitting here,' and she looked at me, and she was so dismissive. I went back there, and I said, 'Well, I am going to go and get the relatives now to come and sit with him while he dies because he is dying now, not tomorrow, next week, or next month when it suits you, now!', so I went and got the relatives out, and he died 5e min later." Group C

- Unworthy

"The workload on the ward is so much; for instance, if a nurse is allocated as your mentor, she has to always strike a delicate balance between patient care, managerial duties and other things and her own personal things to do." Group A

"There is a lot of pressure from above (management) to get people out of the hospitals; we also have to look at the fact that so many hospital beds have been decreased; there is a big push in the past 10 years, and hospital beds have been halved to what they were 10 years ago." Group B

"There is a lot more pressure on recording data and writing because your job is at risk if your data are not good enough; they can cut members of your staff, and you have insufficient staff to do what is the proper standard. You are also expected to take on increasing amounts of GP's work, but at the same time, it can be very, very satisfying." Group B

"The biggest change is probably professionally in that we are taking on a lot of doctor's roles but not being recognized for it. You are doing, in fact, three-quarters of a doctor's job, and we are all on this course trying to be mini doctors, but we don't get the status that goes with it professionally; it has changed (the job) a lot, nurses are willing to do all the doctors' jobs because we think in that way we might have a bit of a powering thing to the job." Group C

"There is a lack of staff for a start, so it's very difficult for all these multi-agencies to supply to your demand or to meet your demand because they are also constricted and restricted by changes in government policy, which has cut out the budget so every single area under that umbrella has been suffering and I think; as a result, every single one of them is frustrated not just the nurses." Group C

"Hospital nurses can say their beds are full. District nurses have to admit and admit and admit ad infinitum with insufficient staff, which makes it very dangerous… it's paying Peter robbing Peter to pay Paul." Group C

"They (doctors) seem to think they know best. I mean, how long have you been qualified? What's that 5 min? Maybe a nurse with twenty years' experience might actually have something useful to say." Group C

Appendix A2. Experiential statement 2: "Negative feelings about others" and associated personal experiential themes

Personal Experiential Themes

- Isolated

"Most of them (nurses) are selfish. They probably hear the same level… the same as we do." Group A

"Especially if you are managing another caseload of patients and it's really busy, and there are things that you haven't managed to do, but sometimes you go home and think, 'oh, I should have done that, and you wake up, and you know'…" Group A

"It was the hardest thing in the world for me not to burst into tears, and I am not exactly a teary person. I am not exactly a shrinking violet, but the hardest thing I had to do was to sit there that afternoon (for the team building day) and watch and crucify my manager at the time, who's now retired; that was it for her. But I was so upset at how vicious, bloody-minded, and ignorant these people were. And I went to the pub and got absolutely pissed…" Group B

"If you are a bit more vocal or want to take it to the public arena, you are troublemaker, militant troublemaker. You get the stigma. Women are very unkind to women... if you work in an environment where you feel unsupported, then you don't want to support because you haven't learned what supporting teamwork is all about, so of course, this culture continues somehow; it is linked to status and local power and make us nurses to become a danger to ourselves." Group B

"I was just going to say that as nurses we are lacking involvement in the political side of the NHS. Nurses, who are mainly women, like to talk about it, but we don't like to get involved actively or politically and be vocal about our rights. We tend to talk about these things in small groups, and we don't take it up in the public arena and this is because we don't feel powerful in the job." Group B

- Disillusioned

"From my experience, I think the sister on the ward has to be involved somehow… when I approached my mentor and asked why I couldn't attend the CPR training, she kept pushing me away..for me personally, I have somebody I call a life coach I always whatever happens. He's always been a very resourceful person…and if I'm angry, I cry." Group A

"We have got targets. The government has set the targets for our matrons or whatever. The only thing is they forget that what these targets are about is not machines; these are people." Group B

"You can't say I can't assess a patient in 20 min; it might be that the patient is upset and uncooperative. Some patients come in particularly unwell they can't help it if the patient needs to be calmed down. That will take an extra ten or 20 min." Group B

"You know that the patient's best interest might not be what the best interest of your role is. It's like the 4 h wait; it might be better for the patient to stay and be observed, and it doesn't fit. I just think that the aim of the business is different from the aim of the professionals; there are a lot more targets now, there are always targets, and for our managers, all they are interested in is the number of face-to-face contacts we have and patients they are not interested in anything else." Group C

"I think most of us suffer with this idea that the patient comes first. How would you defend that in court? If this is your sort of rule stick if you are standing in a court, you want to have a damn good argument, and at the end of the day, is your license." Group C

"Because they are (nurses) so short staffed, everyone is kind of depending on everyone else at ward level but also out in the community… people doing the nursing care and the acute care are run off their feet, and there are always risks for mistakes or drug errors or whatever. A lot of nurses (in the community) work in isolation because of a shortage of staff. They (community nurses) have got the doctor, but you (the nurse) have to make decisions. You can have some good GPs who are very responsive… there are other doctors that you can't get hold of; they are like mercury." Group C

"What is different today to what was before is that the patient was paramount. We are now getting this sort of business concept and sort of saying to reduce admissions, and you have got a dichotomy." Group C

"You can make your own decisions, but if your manager is pressurized by this business idea of how to run the hospital, you end up arguing." Group C

ACCSCIENCE PUBLISHING

Global Health Economics and Sustainability

ORIGINAL RESEARCH ARTICLE

Parenting in a changing climate: The relationship between discussing climate change with children aged 5–11, family eco-behaviors, and climate change anxiety

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Abstract

Climate change has a substantial impact on human health, and the rising levels of climate change anxiety have led to a global call for action. However, data exploring the relationship between climate change, mental health, and individuals with parental responsibility is limited. This study examined the association between parental climate anxiety and their discussions with their children about climate change, eco-behaviors, and demographic factors. This cross-sectional study employed an anonymous online questionnaire comprised of the 22-item climate change anxiety and eco-behaviors validated scale, disseminated using a snowball sampling technique. Participants were eligible if they (i) were guardians with parental responsibilities of at least one primary school-age child (5 – 11 years old) and (ii) lived in the United Kingdom (UK). A total of 153 participants were included in the analysis. The findings revealed that parents who reported discussing climate change with their children, engaging in eco-friendly and pro-environmental actions, and noticing that their child/children were worried about climate change experienced higher levels of climate change anxiety. This study offers valuable insights into the nuanced engagements around climate change and mental health among those with parental responsibility in the UK. The implications of these findings extend to informing policies, interventions, and educational strategies aimed at supporting parents and guardians to mitigate the adverse effects of climate change on mental health.

Keywords: Climate change; Parenting; Mental health; Eco-behavior; Climate change anxiety

1. Introduction

Climate change, reported as "the defining crisis of our time" (United Nations, 2020), has a significant impact on human health. However, there is a paucity of data regarding the

relationship between climate change and mental health, and as such, there is a necessity for evidence on measures to mitigate the impact (Wu *et al*., 2020). Climate change anxiety is a prominent term associated with the effect of the climate crisis on mental health and mental distress. It is considered a heightened emotional or mental distress in response to the extreme changes in the climate (Alliance, 2020). However, worrying about the climate crisis is a rational reaction to the potential threat to life and a fear for the future (Wray, 2023), with parenthood found to cause an increase in climate change worries when compared to individuals without parental responsibilities (Ekholm, 2020).

Parental climate anxiety has also been reported by Gaziulusoy (2020), who reported that parents not only expressed their worries, sadness, and hopelessness for their children but also their perceived inadequacy to sufficiently prepare them for the future. This presents a significant challenge for parents, particularly as Corner *et al*. (2015) identify them as among the trusted messengers of climate change, highlighting their potential to positively influence the actions and outlook of their children. This role is concurred by Madden *et al*. (2023), while Léger-Goodes *et al*. (2023) argue that parents can also influence the extent to which their children experience climate change anxiety. That said, it has also been found that parents may not be aware of their children's worries about climate change. Indeed, during interviews with parent-child dyads, Léger-Goodes *et al*. (2023) found that while some parents reported their children were unconcerned about climate change, the children themselves divulged their worry. This indicates that parents may not only need to manage their own anxieties toward climate change but also navigate preparing their child/children for an uncertain future while anticipating and indeed managing potential climate anxiety.

Growing symptoms related to climate change anxiety have led organizations worldwide to raise this psychological phenomenon as in need of action. Current evidence highlights that the issue of climate change exacerbates mental distress, particularly among young people, even for individuals who are not directly affected (Lawrance *et al*., 2021). This phenomenon is recognized as a global mental health risk, with its incidence increasing (Swim *et al*., 2022). Climate change anxiety has been operationalized as a multi-factor construct, measurable by self-report, and differentiated from general anxiety (Clayton & Karazsia, 2020). The emotional reaction to climate change in this formulation is seen to cluster around a factor termed cognitive-emotional impairment, which captures the self-perceived impact on affective and cognitive resources. Self-perceived impact on fulfilling life roles, such as attending to work and family responsibilities, clusters around a separate factor termed functional impairment. Those scoring highly on validated scales report specific anxieties around climate change as causing a significant impact on mental health (Coffey *et al*., 2021). Climate change anxiety is correlated with depression (Clayton & Karazsia, 2020; Larionow *et al*., 2022) and generalized anxiety (Clayton & Karazsia, 2020), though further research is required to establish cause-effect relations (Heeren *et al*., 2023) and cross-cultural validity (Larionow *et al*., 2022).

Research indicates several variables associated with climate change anxiety, indicating that some people are more likely to be affected (Clayton, 2020; Hickman, 2020; Jackson *et al*., 2023; Lee *et al*., 2020; Ojala, 2012; van Nieuwenhuizen *et al*., 2021; Vergunst & Berry, 2022; Wu *et al*., 2023). An individual's personality, age, and where they live can influence the degree to which they experience climate change anxiety (Clayton, 2020). Young adults (Wu *et al*., 2020), farming communities, and those living in areas directly impacted by climate change-induced weather events are particularly susceptible (Cunsolo *et al*., 2020). Those with knowledge about climate change (Asgarizadeh *et al*., 2023), engaging in eco-behaviors (Lukacs *et al*., 2023), studying environmental topics (Daeninck *et al*., 2023), and those who feel an affinity with nature (Coffey *et al*., 2021) are also more likely to experience climate anxiety. Despite these associations, there is a limited understanding of how conversations between children and their parents about climate change relate to parental climate change anxiety. Therefore, this study aims to explore the relationship between United Kingdom (UK) parents'/carers' engagement with their children aged 5 – 11 years regarding climate change and (i) climate change anxiety, (ii) eco-behaviors, or (iii) parental demographics.

2. Methods

2.1. Study design

The study adopted a cross-sectional approach for data collection from parents with at least one child aged 5 – 11 years (UK primary school age) using an online questionnaire (Appendix A1). The anonymous questionnaire incorporated the Climate Change Anxiety Scale (Clayton & Karazsia, 2020) to explore differences in climate change anxiety and eco-behaviors across demographic characteristics. The Climate Change Anxiety Scale comprises 22 items. Items 1 – 13 evaluate climate change anxiety, consisting of cognitive-emotional impairment (Items 1 – 8, Cronbach's alpha = 0.79) and functional impairment (Items 9 – 13, Cronbach's alpha = 0.78). Items 14 – 16 evaluate eco-behavior,

consisting of experience of climate change (Items 14 – 16, Cronbach's alpha = 0.82), and behavioral engagement (Items 17 – 22, Cronbach's alpha = 0.81). The demographic variables were designed using recommendations from the Government Statistical Service (Civil Service, 2024). All variables are presented in Table 1.

2.2. Data collection

Snowballing techniques were adopted as a convenient, low-cost, and efficient way to access parents with at least one child aged 5 – 11 years on social media platforms (Leighton *et al.*, 2021). Informed consent was obtained before participants responded to the questionnaire. Ethical approval was obtained by the Institution's College Ethics Committee for full consent and a questionnaire. There were 153 out of 196 participants who completed the full questionnaire and were included in the analysis.

2.3. Analysis

The data were analyzed using IBM Statistical Package for the Social Sciences 28 software to examine relationships across and within the pre-determined characteristics. We used null hypotheses to test for significant differences between variables. The normality test by Kolmogorov–Smirnov indicated the scale was not evenly distributed (0.080, p = 0.018). Therefore, non-parametric statistical tests were performed (Mann–Whitney U test for two-group comparisons or Kruskal–Wallis for more than two-group comparisons). Dependent variables (DVs) were climate change anxiety (cognitive-emotional impairment, functional impairment) and eco-behaviors (experience of climate change, behavioral engagement), and independent variables (IVs) were demographic variables. We analyzed whether the DVs differed across each IV. We checked for reliability with the McDonald's Coefficient Omega (0.852, mean [M] = 48.08, standard deviation = 9.632, coefficient of variation = 92.768). An effect size ($r = z \div \sqrt{N}$) was calculated for the Mann–Whitney U tests, and $eta^2(H) = (H - K + 1)/(n - k)$ for Kruskal–Wallis and determined as either small, medium, or large. The results are summarized in Table 2.

Table 1. Categories of key variables

Categories	Variables	Instruments
Climate change anxiety	(i) Cognitive-emotional impairment (ii) Functional impairment	Items 1 – 13 in the Climate Change Anxiety Scale
Eco-behavior	(i) Experience of climate change (ii) Behavioral engagement	Items 14 – 22 in the Climate Change Anxiety Scale
Demographic variables	(i) Age (ii) Relationship to child (iii) No. of children (iv) School type (v) Ethnic group (vi) Education (vii) Employment status (viii) Geographical location (ix) Child's climate change (x) Education	Questionnaire informed by the Government Statistical Service

3. Results

3.1. Demographic variables

There was a significant difference in the category "cognitive and emotional impairment" across different participant ages (H[2] = 6.556; p = 0.038) with a small effect size (0.03). Younger parents (<35 years) had a higher mean rank (MR) = 85.73 compared to their older counterparts, with those aged 36 – 45 years having an MR of 66.16 and those >45 years having an MR of 76.44. A significant difference was also found in "climate change anxiety" between participants with a qualification of "degree level or higher" (median [Md] = 2.21; n = 89) and those with other qualifications (Md = 2.07; n = 32). The Mann–Whitney U test results were U = 1054.5; z = −2.173; p = 0.03, with a small effect size (0.2). Similarly, there was a significant difference in the category "experience of climate change" based on educational qualifications. Participants with a "degree level of higher" had Md = 2; n = 88 compared to those with "other" qualifications (Md = 1.67; n = 32; U = 1022; z = −2.329; p = 0.02), with a small effect size (0.21). There was a significant difference in the category "experience of climate change and geographical area," based on geographical area (H[3] = 13.075; p = 0.0004) with a small/moderate effect size (0.06). Participants living in an "inner-city" area ranked higher (MR = 98.18) than those in their more rural counterparts (MR: village = 82.51; suburbs = 78.32; town = 60.22).

3.2. Child/children talks about climate change

There was a significant difference in "climate change anxiety" between participants who reported "yes" that their child/children talks about climate change (Md = 2.3; n = 78) and those who reported "no" that their child/children does not (Md = 2.04; n = 75; U = 1870.5; z = −3.85; p < 0.001), with a medium effect size (0.31). There was also a significant difference in "functional impairment" (Md: "yes" = 1.4; "no" = 1; U = 2172; z = −2.754; p = 0.006) with a small effect size (0.23), "experience of climate change" (Md: "yes" = 2.33; "no" = 1.67; U = 2136.5; z = −2.812; p = 0.005) with a small effect size (0.22), and "behavioral engagement" (Md: "yes" = 4.17; "no" = 3.83; U = 1920; z = −3.580; p < 0.001) with a small effect size (0.29). This

Table 2. Summary of findings

Characteristics				Climate change anxiety scale		Cognitive and emotional impairment		Functional impairment		Experience of climate change		Behavioral engagement	
	n (%)	*SD*	*M*	*H, U*†	*p*	*H, U*†	*p*	*H, U*†	*p*	*H, U*†	*p*	*H, U*†	*p*
Age													
<36	59 (38.6)	0.709	0.767	1.181	0.477	6.556	0.038*	1.031	0.597	2.604	0.272	0.290	0.865
36 – 45	67 (43.8)												
>45	24 (15.7)												
Relationship													
Father	44 (29)	0.668	1.12	2.085	0.353	4.718	0.095	0.246	0.884	0.591	0.744	0.469	0.791
Mother	83 (54)												
Other	26 (17)												
No. of children													
1	69 (45.1)	0.499	0.549	2654.5†	0.372	2638.5†	0.335	2256.5†	0.02*	2799.5†	0.832	2437.5†	0.119
>2	84 (54.2)												
School type													
Academy	19 (12.4)	0.766	2.7	0.437	0.933	1.411	0.703	3.295	0.348	0.214	0.975	2.387	0.496
Free school	16 (10.5)												
Local authority	106 (69.3)												
Other	9 (6)												
Ethnic group													
White	125 (81.7)	0.369	0.839	1288.0†	0.273	1459.0†	0.83	1164.5†	0.131	1373.5†	0.731	1079†	0.057
Other	24 (15.8)												
Education													
Degree or above	89 (58.2)	0.443	0.736	1054.5†	0.03*	1324†	0.551	1331†	0.633	1022†	0.02*	1095.5†	0.063
Other	64 (58)												
Employment													
Employed	133 (89)	0.318	0.887	876.0†	0.131	967†	0.326	984.5†	0.391	1000.5†	0.461	880†	0.147
Other	17 (11)												
Geographic area													
Inner city	22 (14.4)	1.0	2.65	4.448	0.217	1.476	0.688	2.899	0.408	13.075	0.004**	3.867	0.276
Suburbs of a city	46 (30.1)												
Town	48 (30.4)												
Village	36 (23.5)												
Child/children learns about climate change in school													
No	23 (15)	0.738	2.41	2.026	0.363	0.504	0.777	2.104	0.349	1.197	0.55	3.464	0.177
Unsure	45 (29.4)												
Yes	85 (55.6)												
Child/children talks about climate change													
No	75 (49)	0.502	0.51	1870.5†	<0.001***	2483.0†	0.102	2172†	0.006**	2136.5†	0.005**	1920†	<0.001***
Yes	78 (51)												

(Cont'd...)

Table 2. ***(Continued)***

Characteristics				Climate change anxiety scale		Cognitive and emotional impairment		Functional impairment		Experience of climate change		Behavioral engagement	
	n (%)	*SD*	*M*	*H, U*†	*p*	*H, U*†	*p*	*H, U*†	*p*	*H, U*†	*p*	*H, U*†	*p*
Environmental or pro-environmental action													
No	10 (6.5)	0.426	1.05	17.307	<0.001***	7.122	0.028*	6.756	0.034*	10.296	0.006**	20.074	<0.001***
Unsure	18 (11.8)												
Yes	125 (81.7)												
Child/children worries about climate change													
No	74 (48.4)	0.448	0.27	28.171	<0.001***	10.662	0.005**	10.548	0.005*	9.985	0.007**	21.182	<0.001***
Unsure	51 (33.3)												
Yes	28 (18.3)												

Notes: *indicates $p<0.05$. **indicates $p<0.01$. ***indicates $p<0.001$; †U - This indicates a Mann Whitney U was performed; H indicates a Kruskal–Wallis test was performed.
Abbreviation: Standard deviation.

indicates that parents whose child/children talked to them about climate change are at higher risk of climate change anxiety.

3.3. Eco-friendly and pro-environmentally friendly behavior

There was a significant difference in "climate change anxiety" and participants who reported that they take "environmentally friendly or pro-environmental action" ($H[2] = 17.307$; $p < 0.001$) with a moderate effect size (0.09). Participants who reported "yes" ranked higher (MR = 82.53) than those who were "unsure" (MR = 68.42) or who reported "no" (MR = 23.32). There was also a significant difference in all four categories: "cognitive and emotional impairment" ($H[2] = 7.122$; $p = 0.028$) with a small effect size (0.02), "functional impairment" ($H[2] = 6.756$, $p = 0.034$) with a small effect size (0.04), "experience of climate change" ($H[2] = 10.296$; $p = 0.006$) with a small effect size (0.4), and "behavioral engagement" ($H[2] = 21.182$; $p < 0.001$) with a moderate effect size (0.11). This indicates that those who engage in eco-friendly and pro-environmentally friendly behavior are more likely to experience higher levels of climate change anxiety.

3.4. Child/children worries about climate change

There was a significant difference in "climate change anxiety" and participants who reported that their "child/children worries about climate change" ($H[2] = 28.171$; $p < 0.001$) with a moderate effect size (0.16). Participants who reported "yes" ranked higher (MR = 98.71) than those who were "unsure" (MR = 93.43) or who reported "no" (MR = 57.46). There was also a significant difference in all four categories: "cognitive and emotional impairment" ($H[2] = 10.662$; $p = 0.005$) with a small effect size (0.05), "functional impairment" ($H[2] = 10.548$; $p = 0.005$) with a small effect size (0.04), "experience of climate change" ($H[2]= 9.985$; $p = 0.007$) with a small effect size (0.4), and "behavioral engagement" ($H[2] = 21.182$; $p < 0.001$) with a moderate effect size (0.12). This indicates that parents who report that their child/children worry about climate are more likely to experience higher levels of climate change anxiety.

4. Discussion

These findings indicate that although there was no overall difference in climate change anxiety for parents of different ages, younger parents were more likely to rank higher in the category of "cognitive and emotional impairment." This finding corroborates the original scale development study by Clayton & Karazsia (2020) and a study from Poland by Larionow *et al.* (2022). The greater impact on younger adults may be partly attributable to the increasing prevalence of climate change discussions during a critical period of their identity development (Swim *et al.*, 2022). Psychological practitioners and climate change activists have commented that climate change anxiety is not pathological but an understandable reaction to real existential threats (Wray, 2023). Weintrobe (2018) posits that confronting the painful realization of the impact of climate change on our species' existence is a necessary first step to taking action to address the threat. Therefore, acute cognitive and emotional disturbance in the younger generational cohorts may signal a turning point toward a more responsible approach to sustainable living. However, further research is required to understand the specific impact on mental health for different age groups.

These findings indicate that parents who had studied to a "degree level or above" ranked higher in "climate change anxiety" and the specific category "experiences of climate change." This is supported by Niedzwiedz & Katikireddi (2023), who reported that those with higher tertiary education are more likely to experience concerns. However, this variable is largely absent from current publications; instead, the focus is specifically on the correlation between environmental education and the increase in climate change anxiety (Asgarizadeh *et al*., 2023; Daeninck *et al*., 2023). University graduates have been identified as a group more likely to engage in learning (Hall *et al*., 2023). Therefore, it could be that they are more aware of global issues impacted by climate change and, thus, more susceptible to climate change anxiety. However, the original scale development and validation (Clayton & Karazsia, 2020; Wullenkord *et al*., 2021) found no significant differences associated with education, which, combined with the apparent paucity of data on this variable, presents an interesting finding that warrants further investigation.

An individual's personality, age, and where they live can influence the degree to which they experience climate change anxiety (Clayton, 2020). Young adults (Wu *et al*., 2020), farming communities, and those living in areas directly impacted by climate change-induced weather events are particularly susceptible (Cunsolo *et al*., 2020). Those with knowledge about climate change (Asgarizadeh *et al*., 2023), engaging in eco-behaviors (Lukacs *et al*., 2023), studying environmental topics (Daeninck *et al*., 2023), and those who feel an affinity with nature (Coffey *et al*., 2021) have also been found to be more likely to experience climate anxiety.

Although there was no overall difference in climate change anxiety for parents living in different areas, those who live in inner-city areas were found to report higher experiences of climate change. This aligns with the review by Cianconi *et al*. (2023), who state that communities are more vulnerable to the impacts of climate change in urban spaces, which in turn adversely affect mental health. Such vulnerability may be influenced by exposure to climate change-related civic schemes recently enacted in cities that are highly salient to urban residents' experiences, such as flood defenses (Oubennaceur *et al*., 2022), clean air zones (Sarmiento *et al*., 2023), and rewilding of green spaces (Root-Bernstein, 2022). Since avoidance of such exposure is not feasible, recommendations for coping with the negative effects of climate change anxiety draw on recent empirical findings that indicate collective climate activism reduces anxiety and depression (Schwartz *et al*., 2023). Joining collective climate efforts fosters meaning-focused coping, which is shown to protect against the adverse psychological effects of climate change anxiety (Ojala & Bengtsson, 2019). Non-hierarchical organization of collective climate action has shown promising findings in building intergenerational agency and efficacy while addressing climate change (Gallay *et al*., 2022). Such action should be facilitated at all levels of urban governance in a manner that does not introduce or exacerbate systemic disadvantage to any population (Cianconi *et al*., 2023).

Arguably, the most important finding highlighted in this study is that parents ranked significantly higher in climate change anxiety and scale categories, whether they report their child/children talking about climate change, engage in eco-friendly and pro-environmentally friendly behavior or worry about climate change. In reverse, this also indicates that families who are less concerned with climate change are less likely to engage in eco-behaviors. While this approach will lower their susceptibility to climate change anxiety, it will, in turn, restrict their potential to reduce household environmental impacts as well as their influence on the actions and outlook of their children, a role Corner *et al*. (2015) identified for parents. Cordero *et al*. (2020) highlight that receiving appropriate climate change education facilitates pro-environmental behaviors. Therefore, developing climate literacy by educating parents could encourage them to make pro-environmental decisions and have long-term benefits for their children as well as local communities and society. However, the findings highlight that UK families who are currently experiencing the impact of climate change and are engaging in eco-behaviors require psychological support. Understanding climate change and its impact can be a challenge, even for those comfortable with their knowledge. However, for parents or guardians, there is an additional responsibility to alleviate the significant impact of climate change on future generations.

The findings here also link with wider literature suggesting that those who know about climate change are more likely to be impacted by it (Jackson *et al*., 2023), highlighting the importance of parents seeking help for their mental health and climate change education. A World Health Organization-UNICEF-Lancet Commission recommended coalitions across sectors to overcome commercial and environmental pressures on children (Clark *et al*., 2020). Earlier education, not only about mental health and the environment but also about housing, energy, agriculture, and transport, was particularly helpful in protecting their mental health. In these education opportunities, it is advisable that parents clarify what children can do about climate change (Murthy, 2022), identify positive climate change actions that can improve children's mental health (Trott, 2022), and

cultivate empowerment (Trott, 2020). Moreover, parental education can be done collectively in a community, which is often more conducive to children's mental health as it can address a sense of loneliness (Trott, 2019). A sense of loneliness is a risk factor for children's mental health, particularly those in minority groups (Murthy, 2022). Learning that other children share similar concerns, leading to common humanity, can reduce distress (Kotera *et al*., 2024a). Methods for climate change education can be diversified. For example, climate change education can be offered digitally, supported by parents, so that children can see images or videos to understand climate change (Trott, 2020). Parents can also embed a conversation about climate change in their daily routine with children (Trott, 2022). Long-term and informal engagement by both children and parents about climate change can enable children's perspectives to shift, which can prevent children from feeling overwhelmed by the magnitude of climate change. Families must be provided with age-appropriate interventions and education to support their understanding while simultaneously safeguarding and developing their emotional resilience.

While our study offers helpful insights into climate change anxiety and family communication, several limitations should be noted. First, our sample size did not reach the number estimated in our power calculation, and participants were recruited using a non-probabilistic sampling technique. Second, the use of self-report measures introduces potential response biases (Kotera *et al*., 2022). Third, as a cross-sectional study, it cannot determine the causal direction of the observed effects – whether high anxiety leads to more conversations about climate change or vice versa. Relatedly, climate change anxiety is a newly defined construct, and its long-term impact remains unknown (e.g., longitudinal studies of COVID-19 report changes in mental health) (Kotera *et al*., 2024b). Future research should employ larger data sets (e.g., national level) and conduct longitudinal evaluations to address these gaps.

5. Conclusion

The study contributes valuable insights into the nuanced relationship between climate change anxiety and mental health among parents in the UK. It reveals that families with younger parents tend to be more concerned regarding the impact of climate change. Parents who were particularly vulnerable to climate change anxiety were those living in inner-city communities. However, parents who feel they are directly experiencing the impact of climate change are more likely to engage in environmentally friendly or pro-environmental behaviors and have discussions with their families about their concerns. The study, therefore, highlights the importance of providing sufficient support, education, and opportunities for action to parents, helping them manage climate anxiety for both themselves and their children. These implications are crucial for shaping policies, interventions, and educational strategies aimed at mitigating the adverse effects of climate change on mental well-being, particularly among the younger generation. Therefore, further empirical and pragmatic studies are needed to ascertain the impact of parental education on children.

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Conflict of interest

The authors declare that they have no competing interests.

Author contributions

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Writing–original draft: All authors
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Ethics approval and consent to participate

This study received ethical approval from the College of Health, Psychology, and Social Care, University of Derby (ethics reference number: ETH2223-2559). Online consent was obtained from all participants before completing the questionnaire.

Consent for publication

This online questionnaire was anonymous, and all participants took part with the understanding that the results would be published.

Availability of data

The data are available from the authors on reasonable request.

References

Alliance, C.P. (2020). Climate Psychology Handbook. Available from: https://www.climatepsychologyalliance.org/index.php/component/content/article/climate-psychology-handbook?catid=15&Itemid=101 [Last accessed on 2024

Sep 06].

Asgarizadeh, Z., Gifford, R., & Colborne, L. (2023). Predicting climate change anxiety. *Journal of Environmental Psychology*, 90:102087.

https://doi.org/10.1016/j.jenvp.2023.102087

Cianconi, P., Hanife, B., Hirsch, D., & Janiri, L. (2023). Is climate change affecting mental health of urban populations? *Current Opinion in Psychiatry*, 36(3):213-218.

https://doi.org/10.3389/fpsyt.2020.00074

Civil Service. (2024). Guidance Hub. Available from: https://analysisfunction.civilservice.gov.uk/policy-store [Last accessed on 2024 Sep 06].

Clark, H., Coll-Seck, A.M., Banerjee, A., Peterson, S., Dalglish, S.L., Ameratunga, S., *et al*. (2020). A future for the world's children? A WHO-UNICEF-lancet commission. *The Lancet*, 395(10224):605-658.

https://doi.org/10.1016/S0140-6736(19)32540-1

Clayton, S. (2020). Climate anxiety: Psychological responses to climate change. *Journal of Anxiety Disorders*, 74:102263.

https://doi.org/10.1016/j.janxdis.2020.102263

Clayton, S., & Karazsia, B.T. (2020). Development and validation of a measure of climate change anxiety. *Journal of Environmental Psychology*, 69:101434.

https://doi.org/10.1016/j.jenvp.2020.101434

Coffey, Y., Bhullar, N., Durkin, J., Islam, M.S., & Usher, K. (2021). Understanding eco-anxiety: A systematic scoping review of current literature and identified knowledge gaps. *The Journal of Climate Change and Health*, 3:100047.

https://doi.org/10.1016/j.joclim.2021.100047

Cordero, E.C., Centeno, D., & Todd, A.M. (2020). The role of climate change education on individual lifetime carbon emissions. *PLoS One*, 15(2):e0206266.

https://doi.org/10.1371/journal.pone.020626

Corner, A., Roberts, O., Chiari, S., Völler, S., Mayrhuber, E.S., Mandl, S., *et al*. (2015). How do young people engage with climate change? The role of knowledge, values, message framing, and trusted communicators. *Wiley Interdisciplinary Reviews: Climate Change*, 6(5):523-534.

https://doi.org/10.1002/wcc.353

Cunsolo, A., Harper, S.L., Minor, K., Hayes, K., Williams, K.G., & Howard, C. (2020). Ecological grief and anxiety: The start of a healthy response to climate change? *The Lancet Planetary Health*, 4(7):e261-e263.

https://doi.org/10.1016/S2542-5196(20)30144-3

Daeninck, C., Kioupi, V., & Vercammen, A. (2023). Climate anxiety, coping strategies and planning for the future in environmental degree students in the UK. *Frontiers in Psychology*, 14:1126031.

https://doi.org/10.3389/fpsyg.2023.1126031

Ekholm, S. (2020). Swedish mothers' and fathers' worries about climate change: A gendered story. *Journal of Risk Research*, 23(3):288-296.

https://doi.org/10.1080/13669877.2019.1569091

Gallay, E., Furlan Brighente, M., Flanagan, C., & Lowenstein, E. (2022). Place-based civic science-collective environmental action and solidarity for eco-resilience. *Child and Adolescent Mental Health*. 27:39-46.

https://doi.org/10.1111/camh.12537

Gaziulusoy, A.İ. (2020). The experiences of parents raising children in times of climate change: Towards a caring research agenda. *Current Research in Environmental Sustainability*, 2:100017.

https://doi.org/10.1016/j.crsust.2020.100017

Hall, S., Jones, E, & Evans, S. (2023). Adult Participation in Learning Survey 2023 National Learning and Work Institute. Available from: https://learningandwork.org.uk/resources/research-and-reports/adult-participation-in-learning-survey-2023 [Last accessed on 2024 Sep 06].

Heeren, A., Mouguiama-Daouda, C., & McNally, R.J. (2023). A network approach to climate change anxiety and its key related features. *Journal of Anxiety Disorders*, 93:102625.

https://doi.org/10.1016/j.janxdis.2022.102625

Hickman, C. (2020). We need to (find a way to) talk about. Eco-anxiety. *Journal of Social Work Practice*, 34(4):411-424.

https://doi.org/10.1080/02650533.2020.1844166

Jackson, J., Rawson, R., Colman, R., Brooks-Ucheaga, M., & Kotera, Y. (2023). Understanding how children are coping with climate change anxiety by exploring coping strategies and supportive interventions. *International Journal of Population Studies*, 10(2):71-77.

https://doi.org/10.36922/ijps.0850

Kotera, Y., Dosedlova, J., Andrzejewski, D., Kaluzeviciute, G., & Sakai, M. (2022). From stress to psychopathology: Relationship with self-reassurance and self-criticism in Czech University students. *International Journal of Mental Health and Addiction*, 20(4):2321-2332.

https://doi.org/10.1007/s11469-021-00516-z

Kotera, Y., Edwards, A.M., Wilkes, J., Taylor, E., Colman, R., Jackson, J., *et al*. (2024a). Self-compassion and mental well-being among youth. In: Mindfulness for Child and Adolescent Well-Being. United Kingdom: Routledge. p. 143-165.

https://doi.org/10.4324/9781003314882-10

Kotera, Y., Liu, G., Colman, R., Young, H., Ozaki, A., Miyatake, H., *et al*. (2024b). A longitudinal study of mental health in healthcare workers in Japan during the initial phase of COVID-19 pandemic: Comparison with the general

population. *Current Psychology*, 43(14):12934-12937.

https://doi.org/10.1007/s12144-023-04444-0

Larionow, P., Sołtys, M., Izdebski, P., Mudło-Głagolska, K., Golonka, J., Demski, M., *et al.* (2022). Climate change anxiety assessment: The psychometric properties of the Polish version of the climate anxiety scale. *Frontiers in Psychology*, 13:870392.

https://doi.org/10.3389/fpsyg.2022.870392

Lawrance, E., Thompson, R., Fontana, G., & Jennings, N. (2021). The impact of climate change on mental health and emotional wellbeing: A narrative review of current evidence and implications for policy and practice. *International Review of Psychiatry*, 34(5):443-498.

https://doi.org/10.1080/09540261.2022.2128725

Lee, K., Gjersoe, N., O'Neill, S., & Barnett, J. (2020). Youth perceptions of climate change: A narrative synthesis. *Wiley Interdisciplinary Reviews: Climate Change*, 11(3):e641.

https://doi.org/10.1002/wcc.641

Léger-Goodes, T., Malboeuf-Hurtubise, C., Hurtubise, K., Simons, K., Boucher, A., Paradis, P.O., *et al.* (2023). How children make sense of climate change: A descriptive qualitative study of eco-anxiety in parent-child dyads. *PLoS One*, 18(4):e0284774.

https://doi.org/10.1371/journal.pone.0284774

Leighton, K., Kardong-Edgren, S., Schneidereith, T., & Foisy-Doll, C. (2021). Using social media and snowball sampling as an alternative recruitment strategy for research. *Clinical Simulation in Nursing*, 55:37-42.

https://doi.org/10.1016/j.ecns.2021.03.006

Lukacs, J.N., Bratu, A., Adams, S., Logie, C., Tok, N., McCunn, L.J., *et al.* (2023). The concerned steward effect: Exploring the relationship between climate anxiety, psychological distress, and self-reported climate related behavioural engagement. *Journal of Environmental Psychology*, 90:102091.

https://doi.org/10.1016/j.jenvp.2023.102091

Madden, L., Joshi, A., Wang, M., Turner, J., & Lindsay, S. (2023). Parents' perspectives on climate change education: A case study From New Jersey. *ECNU Review of Education*:20965311231200507.

https://doi.org/10.1177/20965311231200507

Murthy, V.H. (2022). The mental health of minority and marginalized young people: An opportunity for action. *Public Health Reports*, 137(4):613-616.

https://doi.org/10.1177/003335492211023

Niedzwiedz, C., & Katikireddi, S.V. (2023). Determinants of eco-anxiety: Cross-national study of 52,219 participants from 25 European countries. *The European Journal of Public Health*, 33(Suppl 2):ckad160.069.

https://doi.org/10.1093/eurpub/ckad160.069

Ojala, M. (2012). How do children cope with global climate change? Coping strategies, engagement, and well-being. *Journal of Environmental Psychology*, 32(3):225-233.

https://doi.org/10.1016/j.jenvp.2012.02.004

Ojala, M., & Bengtsson, H. (2019). Young people's coping strategies concerning climate change: Relations to perceived communication with parents and friends and proenvironmental behavior. *Environment and Behavior*, 51(8):907-935.

https://doi.org/10.1177/0013916518763894

Oubennaceur, K., Chokmani, K., Lessard, F., Gauthier, Y., Baltazar, C., & Toussaint, J.P. (2022). Understanding flood risk perception: A case study from Canada. *Sustainability*, 14(5):3087.

https://doi.org/10.3390/su14053087

Root-Bernstein, M. (2022). Measuring Success in Rewilding? United Kingdom: Routledge.

Sarmiento, L., Wägner, N., & Zaklan, A. (2023). The air quality and well-being effects of low emission zones. *Journal of Public Economics*, 227:105014.

https://doi.org/10.1016/j.jpubeco.2023.105014

Schwartz, S.E., Benoit, L., Clayton, S., Parnes, M.F., Swenson, L., & Lowe, S.R. (2023). Climate change anxiety and mental health: Environmental activism as buffer. *Current Psychology*, 42(20):16708-16721.

https://doi.org/10.1007/s12144-022-02735-6

Swim, J.K., Aviste, R., Lengieza, M.L., & Fasano, C.J. (2022). OK boomer: A decade of generational differences in feelings about climate change. *Global Environmental Change*, 73:102479.

https://doi.org/10.1016/j.gloenvcha.2022.102479

Trott, C.D. (2019). Reshaping our world: Collaborating with children for community-based climate change action. *Action Research*, 17(1):42-62.

https://doi.org/10.1177/1476750319829209

Trott, C.D. (2020). Children's constructive climate change engagement: Empowering awareness, agency, and action. *Environmental Education Research*, 26(4):532-554.

https://doi.org/10.1080/13504622.2019.1675594

Trott, C.D. (2022). Climate change education for transformation: Exploring the affective and attitudinal dimensions of children's learning and action. *Environmental Education Research*, 28(7):1023-1042.

https://doi.org/10.1080/13504622.2021.2007223

United Nations. (2020). The Climate Crisis-a Race We Can Win. United Nations. Available from: https://www.un.org/en/un75/climate-crisis-race-we-can-win [Last accessed on

2024 Sep 06].

Van Nieuwenhuizen, A., Hudson, K., Chen, X., & Hwong, A.R. (2021). The effects of climate change on child and adolescent mental health: Clinical considerations. *Current Psychiatry Reports*, 23:88.

https://doi.org/10.1007/s11920-021-01296-y

Vergunst, F., & Berry, H.L. (2022). Climate change and children's mental health: A developmental perspective. *Clinical Psychological Science*, 10(4):767-785.

https://doi.org/10.1177/21677026211040787

Weintrobe, S. (2018). Climate change: The moral dimension. *The Challenges for Psychotherapy in Today's World*, 21(Part 2):64.

Wray, B. (2023). Generation Dread: Finding Purpose in an Age of Climate Anxiety. New York: Experiment, LLC. Knopf.

Wu, J., Long, D., Hafez, N., Maloney, J., Lim, Y., & Samji, H. (2023). Development and validation of a youth climate anxiety scale for the youth development instrument survey. *International Journal of Mental Health Nursing*, 32(6):1473-1483.

https://doi.org/10.1111/inm.13201

Wu, J., Snell, G., & Samji, H. (2020). Climate anxiety in young people: A call to action. *The Lancet Planetary Health*, 4(10):e435-e436.

https://doi.org/10.1016/s2542-5196(20)30223-0

Wullenkord, M.C., Tröger, J., Hamann, K.R.S., Loy, L.S., & Reese, G. (2021). Anxiety and climate change: A validation of the climate anxiety scale in a german-speaking quota sample and an investigation of psychological correlates. *Climatic Change*, 168:20.

https://doi.org/10.1007/s10584-021-03234-6

Appendix

New Page – Online Questionnaire

1. Do you live in the UK? Yes / No

No = statement: Thank you for your interest in the study. Unfortunately, because we are wanting to ask UK parents for this study, you are not able to take part.

Yes = Which country in UK do you live in? Choose: [England] [Scotland] [Wales] [Northern Ireland]

2. Do you have at least one child who is aged between 5 and 11 years old?

No= Thank you for your interest in the study. Unfortunately, because you do not have a child within this age group you are not able to take part. This is because we are looking at how parents communicate about climate change with this age group.

Yes= How many children do you have?

If click A, B, C or D the number of boxes will appear asking for age of child.

A. 1 [age]
B. 2 [age 1st] [age 2nd]
C. 3 [age 1st] [age 2nd] [age 3rd]
D. More than 4 [age 1st] [age 2nd] [age 3rd] [age 4th] [age other]
E. Prefer not to say

3. What is your relationship to the child or children?

A. Mother
B. Father
C. Non-binary parent
D. Guardian
E. Grandparent
F. Carer

4. What is your age?

A. 18-25
B. 26-35
C. 36-45
D. 46-55
E. 55 and above
F. Prefer not to answer

5. What is your ethnic group?

Sensitivity: Internal

Appendix A1. Online questionnaire

These are the recommended ethnic group question for use in England (both paper and electronic) from the Government Statistical Service (2019)

Choose one option that best describes your ethnic group or background

White

1. English / Welsh / Scottish / Northern Irish / British
2. Irish
3. Gypsy or Irish Traveller
4. Any other White background, please describe

Mixed / Multiple ethnic groups

5. White and Black Caribbean
6. White and Black African
7. White and Asian
8. Any other Mixed / Multiple ethnic background, please describe

Asian / Asian British

9. Indian
10. Pakistani
11. Bangladeshi
12. Chinese
13. Any other Asian background, please describe

Black / African / Caribbean / Black British

14. African
15. Caribbean
16. Any other Black / African / Caribbean background, please describe

Other ethnic group

17. Arab
18. Any other ethnic group, please describe

6. Do you have any educational qualifications for which you received a certificate?

A. Yes
B. No
C. Prefer not to say

If Question 6=No

7. Do you have any professional, vocational, or other work-related qualifications for which you received a certificate?

A. Yes
B. No
C. Prefer not to say

Sensitivity: Internal

Appendix A1. Online questionnaire

If Question 6=Yes OR Question 7=Yes

8. Was your highest qualification?

A. at degree level or above
B. or another kind of qualification
C. Prefer not to say

9. What is your employment status

A. Full time employment
B. Part time employment
C. Unemployed
D. Other (please state)
E. Prefer not to say

10. What area do you live in?

A. Inner city
B. Suburbs of a city
C. Town
D. Village
E. Other, please describe
F. Prefer not to say

11. Please choose which applies to your child's (or children's) primary school:

A. Local authority school
B. Academy
C. Free school (Funded by the government but not run by the local authority)
D. Faith school
E. Private school
F. Prefer not to say
G. Home School

12. Please rate your level of awareness regarding climate change

0 = unaware of climate change	1 = very low level of awareness	2 = low level of awareness	3 = moderate level of awareness	4 = high level of awareness	5 = Very high level of awareness

13. Has your child (or children) learned about climate change at primary school?

_____ yes _____ no _____ unsure

Sensitivity: Internal

Appendix A1. Online questionnaire

If yes, please provide further details on what they have learned and how old they were

14. Do you think your child/ren should be learning about climate change at primary school?

_____ yes _____ no _____ unsure

Please provide further details on your opinion

15. Does your child (or children) talk about climate change with you?

_____ yes _____ no

Yes = how often do you talk about climate change with your child or children?

A. Somewhat (e.g., you remember you talked about it with them, but not regularly)

B. Often (e.g., you talk about it once-a-week basis)

C. Very often (e.g., more frequent than once a week)

16. Have you learned anything new about climate change because of talking to your child (or children)?

_____ yes _____ no

If yes, please add some detail on what you have learned

17. Do you/would you feel comfortable to discuss climate change with your child (or children)?

_____ yes _____ no _____ unsure

Yes = why do you/would feel comfortable? No = why do you/would you not feel comfortable?

18. Would any of the following options help to increase your confidence talking about climate change and other global environmental conditions with your child (or children)? Please select all that apply

A. Meetings with your child's primary school to discuss the content taught
B. Workshops on climate change and other global conditions to help increase your own understanding

Sensitivity: Internal

Appendix A1. Online questionnaire

C. Leaflets and online materials on climate change and other global conditions that you could read at home
D. Books you could read to your child to help you discuss on climate change and other global conditions
E. Other, please state
F. None of the above

19. Do you and/or your household do anything you would consider an environmentally friendly or pro environmental action?

_____ yes _____ no _____ unsure

If yes, please provide further details on what you and/or your household do

20. Do you feel your child or children are worried about climate change?

_____ yes _____ no _____ unsure

If yes, please provide further details on why you think they may be worried

The Climate Change Anxiety Scale (Clayton and Karazsia, 2020)

Please rate how often the following statements are true of you.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Almost always

1	Thinking about climate change makes it difficult for me to concentrate.	
2	Thinking about climate change makes it difficult for me to sleep.	
3	I have nightmares about climate change	
4	I find myself crying because of climate change	
5	I think, "why can't I handle climate change better?"	
6	I go away by myself and think about why I feel this way about climate change	
7	I write down my thoughts about climate change and analyse them	
8	I think, "why do I react to climate change this way?"	
9	My concerns about climate change make it hard for me to have fun with my family or friends.	
10	I have problems balancing my concerns about sustainability with the needs of my family.	
11	My concerns about climate change interfere with my ability to get work or school assignments done.	
12	My concerns about climate change undermine my ability to work to my potential.	
13	My friends say I think about climate change too much	
14	I have been directly affected by climate change	

Sensitivity: Internal

Appendix A1. Online questionnaire

15	I know someone who has been directly affected by climate change	
16	I have noticed a change in a place that is important to me due to climate change	
17	I wish I behaved more sustainably	
18	I recycle	
19	I turn off lights	
20	I try to reduce my behaviours that contribute to climate change	
21	I feel guilty if I waste energy	
22	I believe I can do something to help address the problem of climate change	

Please Click Submit your responses and consent to data being used for the purpose of this study.

Online Questionnaire Show **Debrief**

Sensitivity: Internal

Appendix A1. Online questionnaire

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Global Health Economics and Sustainability

LETTER TO EDITOR

Global solutions for long COVID: The necessity of sustainable vagal tone restoration

Claire-Marie Rangon[1]* and Peter Staats[2]

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Long COVID (LC) is a major global health challenge, threatening not only the quality of life but also the ability to work for a growing number of individuals who are still awaiting effective therapeutic solutions. Interestingly, the repurposing of non-invasive vagus nerve stimulation (nVNS) offers a sustainable paradigm to alleviate the economic burden of LC. This is particularly relevant given that two recent studies, published in *Science* (Al-Aly & Topol, 2024; Cervia-Hasler *et al*., 2024), have highlighted the potential of addressing microbiome dysbiosis and complement dysfunction – two domains where nVNS has shown efficacy – as crucial strategies for solving LC. Nevertheless, despite these compelling insights, there has yet to be a renewed impetus for clinical trials investigating nVNS in the context of LC, even though nVNS is a validated, ready-to-use, safe, and affordable therapeutic tool. This letter aims to emphasize the scientific rationale for accelerating research on the use of nVNS in LC, on a global scale.

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Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection has been shown to induce long-lasting disruptions in the gut microbiota, specifically in COVID-19-recovered patients who subsequently develop LC (Zhang *et al*., 2023). Nevertheless, vagotomy experiments have convincingly demonstrated that the integrity of the vagus nerve is necessary for mediating the effects of gut microbiota changes on brain functions, thereby maintaining homeostasis (Siopi *et al*., 2023). Moreover, recent research published in *Nature* acknowledges the vagus nerve as a pivotal component of the body–brain circuit that regulates the immune response (Jin *et al*., 2024). Consistent with this, selective atrophy of the vagus nerve has been observed in patients with LC (Papadopoulou *et al*., 2023), alongside the activation of complement pathways and platelets (Cervia-Hasler *et al*., 2024). The complement system plays a critical role in both gut microbiota composition (Petrisko *et al*., 2023) and macrophage polarization (Bohlson *et al*., 2014). Interestingly, macrophages that produce complement proteins (Pendse *et al*., 2023) and contribute to inflammation can also express the α7-nicotinic acetylcholine receptor (α7nAChR), a key protein in the cholinergic anti-inflammatory pathway that links the nervous and immune systems, thereby providing organ protection (Nakamura *et al*., 2023).

Vagus nerve stimulation (VNS) can efficiently activate the α7nAChR on complement-producing macrophages (Sévoz-Couche *et al*., 2024), which, in turn, inhibits the production of proinflammatory cytokines (Pendse *et al*., 2023), while leaving anti-inflammatory cytokines unaffected. Besides, α7nAChR is expressed by platelets (Schedel *et al*., 2011) and several other cell types, supporting VNS-mediated mitigation of the multiple etiologies underpinning LC pathogenesis (Rangon, 2024), including coagulation disorders (Van Westerloo *et al*., 2006), microbiota dysbiosis (Zhou *et al*., 2013), autoimmune conditions, immune dysregulation fostering viral reservoirs (Jakob

et al., 2020), neurological dysfunction in the brainstem and vagus nerve (Lladós *et al*., 2023), blood–brain barrier disruption (Yang *et al*., 2018), and mitochondrial dysfunction (Kim *et al*., 2022).

Finally, the nVNS approach has the potential to address healthcare needs in both developing and developed countries. Whether through transcutaneous or percutaneous methods, electrical or mechanical stimulation of the auricular or cervical branch of the vagus nerve offers safe, patient-centered solutions that are simple to implement, portable, and affordable (Rangon *et al*., 2021). Given that vaccines do not uniformly prevent COVID-19, harnessing nVNS could prove beneficial and equitable in managing both the acute and chronic phases of SARS-CoV-2 infection (Rangon & Staats, 2024). Heart rate variability, an easy-to-monitor index of vagal tone (notably with smartphones), meets all criteria to become the eagerly awaited comprehensive marker of LC (Al-Aly & Topol, 2024). Indeed, heart rate variability assessment could help to distinguish between different LC subtypes besides the prediction of prognosis (Rangon & Staats, 2024), even in countries where resources for research and clinical care might be scarce.

To date, only nine clinical trials have been launched worldwide, including one at the prestigious Mayo Clinic (NCT05445427) and notably, two in Turkey (NCT05679505, NCT05764070). These studies are relatively heterogeneous and have enrolled a limited number of patients, likely due to the constrained funding available for clinical trials assessing non-pharmacological interventions in LC. Nevertheless, one of these pilot trials has recently been published (Zheng *et al*., 2024), revealing significant improvements in various cognitive functions, anxiety, depression, and sleep, with benefits persisting or even progressing at a 1-month follow-up.

Given these promising results, research on nVNS in LC definitely deserves stronger financial support from international stakeholders, notably to promote decentralized clinical trials, which allow research to be conducted outside academic centers, anywhere in the world. Funding these trials could be a profitable investment, potentially leading to more advanced treatments for chronic diseases, including neurodegenerative disorders (Rangon *et al*., 2020) and cancers (Kumaria & Ashkan, 2023).

Conflict of interest

Peter Staats owns patents on VNS for viral infections such as COVID-19 and is the founder of the company electroCore. Meanwhile, Claire-Marie Rangon declares no competing of interests.

References

Al-Aly, Z., & Topol, E. (2024). Solving the puzzle of Long Covid. *Science*, 383(6685):830-832.

https://doi.org/10.1126/science.adl0867

Bohlson, S.S., O'Conner, S.D., Hulsebus, H.J., Ho, M.M., & Fraser, D.A. (2014). Complement, C1q, and C1q-related molecules regulate macrophage polarization. *Frontiers in Immunology*, 5:402.

https://doi.org/10.3389/fimmu.2014.00402

Cervia-Hasler, C., Brüningk, S.C., Hoch, T., Fan, B., Muzio, G., Thompson, R.C., *et al*. (2024). Persistent complement dysregulation with signs of thromboinflammation in active Long Covid. *Science*, 383(6680):eadg7942.

https://doi.org/10.1126/science.adg7942

Jakob, M.O., Murugan, S., & Klose, C.S.N. (2020). Neuro-immune circuits regulate immune responses in tissues and organ homeostasis. *Frontiers in Immunology*, 11:308.

https://doi.org/10.3389/fimmu.2020.00308

Jin, H., Li, M., Jeong, E., Castro-Martinez, F., & Zuker, C.S. (2024). A body-brain circuit that regulates body inflammatory responses. *Nature*, 630(8017):695-703.

https://doi.org/10.1038/s41586-024-07469-y

Kim, S., Park, I., Lee, J.H., Kim, S., Jang, D.H., & Jo, Y.H. (2022). Vagus nerve stimulation improves mitochondrial dysfunction in post-cardiac arrest syndrome in the asphyxial cardiac arrest model in rats. *Frontiers in Neuroscience*, 16:762007.

https://doi.org/10.3389/fnins.2022.762007

Kumaria, A., & Ashkan, K. (2023). Neuromodulation as an anticancer strategy. *Cancer Medicine*, 12(21):20521-20522.

https://doi.org/10.1002/cam4.6624

Lladós, G., Massanella, M., Coll-Fernández, R., Rodríguez, R., Hernández, E., Lucente, G., *et al*. (2023). Vagus nerve dysfunction in the post-COVID-19 condition : A pilot cross-sectional study. *Clinical Microbiology and Infection*, 30(4):515-521.

https://doi.org/10.1016/j.cmi.2023.11.007

Nakamura, Y., Matsumoto, H., Wu, C.H., Fukaya, D., Uni, R., Hirakawa, Y., *et al*. (2023). Alpha 7 nicotinic acetylcholine receptors signaling boosts cell-cell interactions in macrophages effecting anti-inflammatory and organ protection. *Communications Biology*, 6(1):666.

https://doi.org/10.1038/s42003-023-05051-2

Papadopoulou, M., Bakola, E., Papapostolou, A., Stefanou, M.I., Andreadou, E., Zouvelou, V., *et al*. (2023). Autonomic dysfunction entwined with post-COVID but absent in non-post-COVID patients: A neurophysiological and neurosonology study. *Therapeutic Advances in Neurological*

Disorders, 16:eCollection 2023.

https://doi.org/10.1177/17562864231180711

Pendse, M., De Selle, H., Vo, N., Quinn, G., Dende, C., Li, Y., *et al.* (2023). Macrophages regulate gastrointestinal motility through complement component 1q. *Elife*, 12:e78558.

https://doi.org/10.7554/eLife.78558

Petrisko, T.J., Gargus, M., Chu, S.H., Selvan, P., Whiteson, K.L., & Tenner, A.J. (2023). Influence of complement protein C1q or complement receptor C5aR1 on gut microbiota composition in wildtype and Alzheimer's mouse models. *Journal of Neuroinflammation*, 20(1):211.

https://doi.org/10.1186/s12974-023-02885-9

Rangon, C.M. (2024). VNS in Long COVID. In: Vagus Nerve Stimulation. United States: Academic Press Inc.

Rangon, C.M., & Staats, P. (2024). Benefit of noninvasive vagus nerve stimulation in vaccine optimization for young children. *Microbes and Immunity*, 1(1):2598.

https://doi.org/10.36922/mi.2598

Rangon, C.M., Barruet, R., Mazouni, A., Le Cossec, C., Thevenin, S., Guillaume, J., *et al.* (2021). Auricular neuromodulation for mass vagus nerve stimulation: Insights from SOS COVID-19 a multicentric, randomized, controlled, double-blind French pilot study. *Frontiers in Physiology*, 12:704599.

https://doi.org/10.3389/fphys.2021.704599

Rangon, C.M., Krantic, S., Moyse, E., & Fougère, B. (2020). The vagal autonomic pathway of COVID-19 at the crossroad of Alzheimer's Disease and aging: A review of knowledge. *Journal of Alzheimers Disease Reports*, 4(1):537-551.

https://doi.org/10.3233/ADR-200273

Schedel, A., Thornton, S., Schloss, P., Klüter, H., & Bugert, P. (2011). Human platelets express functional Alpha7-nicotinic acetylcholine receptors. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 31(4):928-934.

https://doi.org/10.1161/ATVBAHA.110.218297

Sévoz-Couche, C., Liao, W., Foo, H.Y.C., Bonne, I., Lu, T.B., Tan Qi Hui, C., *et al.* (2024). Direct vagus nerve stimulation: A new tool to control allergic airway inflammation through α7 nicotinic acetylcholine receptor. *British Journal of Pharmacology*, 181(13):1916-1934.

https://doi.org/10.1111/bph.16334

Siopi, E., Galerne, M., Rivagorda, M., Saha, S., Moigneu, C., Moriceau, S., *et al.* (2023). Gut microbiota changes require vagus nerve integrity to promote depressive-like behaviors in mice. *Molecular Psychiatry*, 28(7):3002-3012.

https://doi.org/10.1038/s41380-023-02071-6

Van Westerloo, D.J., Giebelen, I.A.J., Meijers, J.C.M., Daalhuisen, J., De Vos, A.F., Levi, M., *et al.* (2006). Vagus nerve stimulation inhibits activation of coagulation and fibrinolysis during endotoxemia in rats. *Journal of Thrombosis and Haemostasis*, 4(9):1997-2002.

https://doi.org/10.1111/j.1538-7836.2006.02112.x

Yang, Y., Yang, L.Y., Orban, L., Cuylear, D., Thompson, J., Simon, B., *et al.* (2018). Non-invasive vagus nerve stimulation reduces blood-brain barrier disruption in a rat model of ischemic stroke. *Brain Stimulation*, 11(4):689-698.

https://doi.org/10.1016/j.brs.2018.01.034

Zhang, D., Zhou, Y., Ma, Y., Chen, P., Tang, J., Yang, B., *et al.* (2023). Gut microbiota dysbiosis correlates with Long COVID-19 at one-year after discharge. *Journal of Korean Medical Science*, 38(15):e120.

https://doi.org/10.3346/jkms.2023.38.e120

Zheng, Z.S., Simonian, N., Wang, J., & Rosario, E.R. (2024), Transcutaneous vagus nerve stimulation improves Long COVID symptoms in a female cohort: A pilot study. *Frontiers in Neurology*, 15:1393371.

https://doi.org/10.3389/fneur.2024.1393371

Zhou, H., Liang, H., Li, Z.F., Xiang, H., Liu, W., & Li, J.G. (2013). Vagus nerve stimulation attenuates intestinal epithelial tight junctions disruption in endotoxemic mice through α7 nicotinic acetylcholine receptors. *Shock*, 40(2):144-151.

https://doi.org/10.1097/SHK.0b013e318299e9c0

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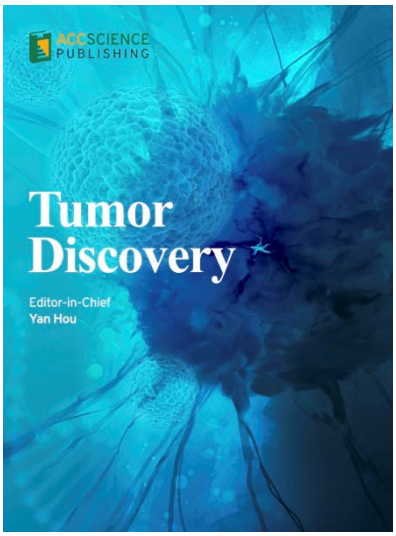

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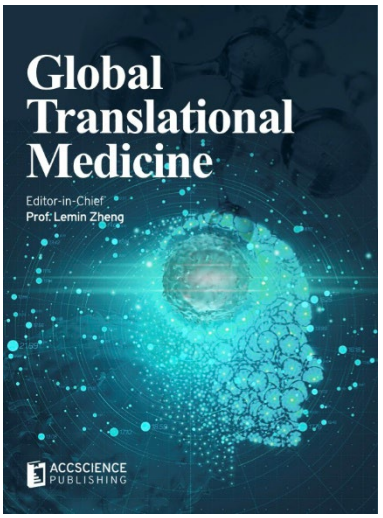

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