

PERSPECTIVE ARTICLE

Advancing neurological care: The emerging role of pharmacists in patient-centered management

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Abstract

The role of pharmacists in healthcare is rapidly evolving, extending beyond traditional dispensing to encompass critical clinical functions within interdisciplinary teams. In neurological care, where patients often face complex, long-term pharmacotherapy, pharmacists remain an underutilized resource despite their specialized expertise. This perspective article explores the growing involvement of pharmacists in managing neurological disorders such as epilepsy, Parkinson's disease, stroke, and dementia. It highlights their expanding contributions across medication optimization, adherence support, patient education, adverse effect monitoring, and integration of digital tools, including artificial intelligence and pharmacogenomics. Drawing on recent evidence and international models, the article illustrates how pharmacist-led interventions improve therapeutic outcomes, reduce hospitalizations, and enhance safety in both hospital and community settings. The discussion emphasizes the importance of embedding pharmacists more fully into neurology teams to meet the increasing demand for patient-centered, coordinated care. In addition, it calls for strategic investments in pharmacist training, supportive policies, and future research to realize the full potential of pharmacists in neurology. By recognizing pharmacists as integral partners in neurological care, healthcare systems can advance quality, equity, and efficiency in managing these complex disorders. This perspective aims to spark dialog and innovation around an emerging frontier in collaborative neuropharmaceutical practice.

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(irma_wati@um.edu.my)**Citation:** Ngadimon IW, Rusli RA, Tajurudin FW. Advancing neurological care: The emerging role of pharmacists in patient-centered management. *Adv Neurol.* 2026;5(3):025060009. doi: 10.36922/AN025060009**Received:** February 6, 2025**Revised:** May 27, 2025**Accepted:** May 30, 2025**Published online:** June 18, 2025**Copyright:** © 2025 Author(s). This is an Open-Access article distributed under the terms of the Creative Commons Attribution License, permitting distribution, and reproduction in any medium, provided the original work is properly cited.**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

1. Introduction

In an evolving healthcare landscape that increasingly prioritizes patient-centered services, the role of pharmacists is becoming more crucial in the management of neurological disorders. These professionals bring a wealth of expertise to the healthcare team, facilitating tailored therapeutic strategies that significantly enhance treatment outcomes for patients with complex neurological needs. While pharmacists are well-integrated across various medical disciplines, their potential in neurology remains underutilized. Despite their established roles in disciplines such as cardiology and

oncology, the application of their expertise in neurology is often overlooked.^{1,2} Pharmacists can play innovative roles in the management of neurological disorders, an area ripe for advanced pharmacological interventions and personalized care strategies.

The role of pharmacists in neurological care encompasses multiple dimensions, including clinical management, patient education, technological integration, and research and development. These components collectively contribute to improving patient outcomes in this specialty. Figure 1 provides an overview of the multifaceted roles pharmacists play in neurological care, serving as a framework for the subsequent discussion in the next section.

2. The proactive role of pharmacists in antiseizure medication (ASM) therapy

Considering pharmacists' integral role across various neurological conditions, we highlight specific clinical areas where pharmacists have substantially impacted patient outcomes, starting with ASMs. ASMs are emphasized due to the complexities of medication management in epilepsy, including narrow therapeutic windows, significant drug interactions, and the frequent need for therapeutic adjustments. Pharmacists' specialized expertise is pivotal in optimizing these treatments, reducing adverse effects, and enhancing medication adherence. As the overarching mission of healthcare increasingly emphasizes patient-centered services, the provision of individualized ASM therapy becomes paramount for improving patient outcomes. This objective can be effectively achieved through a collaborative approach involving professionals from diverse disciplines. Within the healthcare team, pharmacists play a vital role in optimizing treatment strategies tailored to patients' needs. Consequently, it is imperative to explore opportunities for pharmacists to

provide valuable insights by identifying patients' risks for adverse outcomes. In this context, pharmacists should actively engage in preventing potential deficiencies in therapeutic interventions. The significance of pharmacists' involvement is evidenced by a notable enhancement in the quality of life scores among epilepsy patients, which increased from 7.9 at baseline to 17.0 at 6-month post-intervention in a neurology clinic, as demonstrated in a recent randomized controlled trial.³

Adverse drug reactions (ADRs) related to ASMs are a major concern. In Malaysia, ASMs ranked among the top 10 drug classes reported for inducing ADRs, with 65.7% of these cases reported by pharmacists.⁴ However, spontaneous reporting systems often undercapture true incidence. For instance, a study in Italy revealed that structured screening tools detected 96% of ADRs versus only 37% through unstructured interviews.⁵ Pharmacists can close this gap by incorporating validated tools into clinical practice. Various instruments are available to evaluate ASM-related side effects, varying by domain (e.g., cognitive or behavioral effects), patient population, and ease of administration. Choosing the right tool ensures timely detection without disrupting clinic flow, allowing for responsive and patient-centered care.

3. Effective management of neuromuscular disorders

In multiple sclerosis management, pharmacists in outpatient clinics coordinate complex disease-modifying therapy regimens. They handle insurance prior authorizations, facilitate medication access, and counsel patients.⁶ Their involvement markedly accelerates treatment initiation: one study found that the proportion of multiple sclerosis patients starting prescribed therapy within 90 days rose from 72.5% to 87.1% when a pharmacist was involved.² Another report involving 64 multiple sclerosis patients documented 378

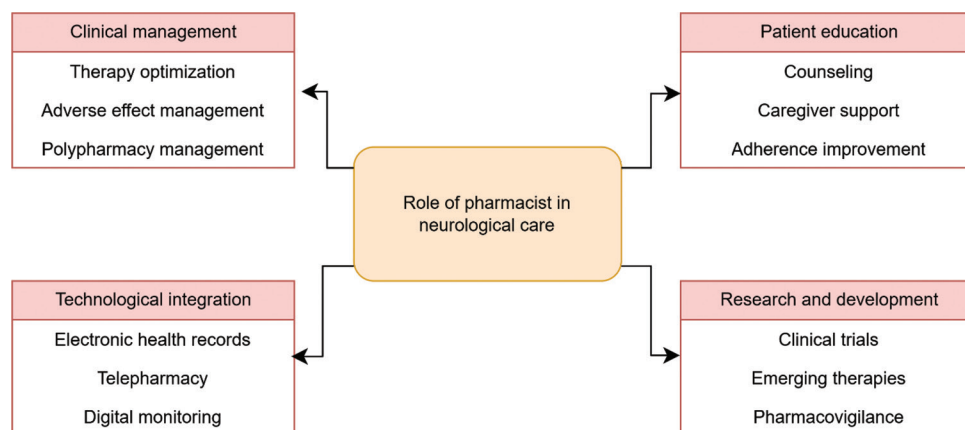


Figure 1. Key roles of pharmacists in neurological care. Image created by the authors.

pharmacist-driven interventions (mainly securing therapy access and providing education), which clinicians credited with reducing treatment delays.^{7,8} Pharmacists also arrange specialty pharmacy billing and patient assistance programs for high-cost disease-modifying therapies (e.g., rituximab)⁹ helping to prevent therapy interruptions. A notable study by Jermini *et al.*¹⁰ demonstrated that pharmacist-led medication reviews resulted in significant cost savings and optimized resource use. While limited studies specifically examine pharmacists' budgeting roles in neuromuscular diseases, broader literature supports their value in cost management across chronic neurological conditions.

Amyotrophic lateral sclerosis (ALS) care similarly benefits from embedded pharmacists. In multidisciplinary ALS clinics, pharmacists tailor symptomatic medications (e.g., for spasticity or sialorrhea), monitor drug interactions, and educate patients and caregivers. For example, one outpatient ALS clinic reported that pharmacists administered an average of two interventions per patient primarily to optimize symptom therapies.¹¹ Such pharmacist-driven interventions in specialty outpatient ALS teams improve overall patient management by ensuring timely symptom control and medication safety.

Myasthenia gravis management likewise involves significant pharmacist coordination. In outpatient myasthenia gravis specialty clinics or infusion centers, pharmacists often initiate complex immunotherapies (e.g., arranging intravenous immunoglobulin infusions or starting biologic agents) by securing insurance authorizations and scheduling infusions.¹² They counsel patients on what to expect (such as the delayed onset of treatment effects) to enhance adherence and monitor for side effects or comorbidities. Although formal studies in myasthenia gravis are sparse, expert reports emphasize that pharmacist-led services, including authorization management, patient education, and therapy monitoring, are routinely implemented to streamline myasthenia gravis care and improve treatment adherence.¹³

4. Pharmacist-led processes in Parkinson's disease (PD), stroke, and dementia

In PD, pharmacists implement comprehensive medication management processes to address the complex therapeutic needs of this condition. These services are typically delivered in outpatient settings, such as specialist PD clinics or community pharmacies, and often involve pharmacist-led medication reviews in collaboration with neurologists.¹⁴ Key interventions include fine-tuning dopaminergic regimens, managing polypharmacy in an aging PD population, mitigating medication side

effects, and providing detailed education for patients and caregivers.¹⁵ One study demonstrated that a pharmacist-physician program significantly reduced drug-related problems (by approximately 7/patient) and improved both motor function and quality of life over 24 weeks.¹⁶ Notably, pharmacist interventions are tailored to the specific needs of PD, such as adjusting levodopa dosing schedules to minimize "wearing-off" motor fluctuations, typically made with physician agreement.^{17,18}

In stroke management, pharmacists' involvement is also integrated in stroke management throughout the care continuum, from acute response to long-term secondary prevention. In hospitals, they contribute to emergency stroke teams, conduct medication reconciliation, and assess thrombolytic eligibility.¹⁹ Post-discharge, pharmacists lead follow-up clinics focused on managing vascular risk factors and improving medication adherence. A pharmacist-managed stroke program halved 1-year recurrence rates and significantly improved quality of life.²⁰ Likewise, a systematic review found that pharmacist involvement in stroke care across emergency, inpatient, and outpatient settings was associated with greater adherence to guideline-directed therapies, improved achievement of risk factor targets, and overall improvements in post-stroke outcomes.²¹

In dementia management, pharmacists typically work in outpatient and community settings, such as memory clinics, primary care, and long-term care facilities, as part of multidisciplinary teams focused on optimizing pharmacotherapy for cognitive symptoms and behavioral issues. Key processes include conducting regular medication reviews to deprescribe or adjust potentially inappropriate medications, particularly antipsychotics and anticholinergics. Pharmacists also ensure the safe and effective use of cognitive enhancers, such as donepezil, and provide extensive education to caregivers.²² In a UK primary care study, pharmacist-led reviews resulted in a reduction of antipsychotic use by over 60%.²² Similarly, a pharmacist counseling program in Japan nearly doubled 1-year treatment persistence with donepezil, improving understanding among patients and caregivers despite the presence of side effects.²³ Together, these condition-specific, pharmacist-led models highlight the effectiveness of tailored medication management in neurology. Whether enhancing motor symptom control in PD, preventing recurrent strokes, or improving safety in dementia pharmacotherapy, pharmacists contribute to greater therapeutic precision and continuity of care, working either independently or in collaboration with physicians, depending on the care setting.

5. Pharmacists' role alongside primary care physicians in neurological care

Pharmacists offer distinct advantages in neurological care that complement but do not replace, the role of primary care physicians. While primary care physicians offer broad diagnostic and management oversight, pharmacists specialize in pharmacotherapy and are ideally positioned to optimize complex medication regimens, particularly for chronic neurological conditions such as PD, epilepsy, and dementia. Their accessibility in outpatient and community settings allows for frequent medication reviews, early detection of ADRs, and ongoing support for adherence. This proximity to patients enables timely intervention, which is crucial in conditions where therapeutic windows are narrow or side effects are prevalent.

Evidence supports the effectiveness of pharmacist-led care models. For instance, a systematic review indicated that pharmacist-conducted medication reviews in dementia care significantly reduced the inappropriate use of psychotropic medications.²⁴ Similarly, a scoping review by Weber *et al.*²⁵ highlighted pharmacist interventions at hospital discharge – such as medication reconciliation and patient education – as effective in lowering readmission rates. These findings emphasize that pharmacists and primary care physicians function best as collaborative partners. By offering expertise in medication management and greater accessibility, pharmacists serve as a vital resource in chronic neurological care, improving safety, continuity, and patient outcomes.

6. Global variation in pharmacist involvement in neurological care

The extent of pharmacist involvement in neurology varies widely across healthcare systems. High-income countries have made considerable strides in incorporating pharmacists into neurological care teams. In the United States, the United Kingdom, and Australia, clinical pharmacists are routinely integrated into both hospital neurology services and outpatient clinics.²⁶ Over the decades, these countries have gathered evidence demonstrating the positive clinical and economic outcomes of pharmacist interventions in chronic disease management. Specialist pharmacists in neurology or general practice now undertake roles such as medication titration, side-effect monitoring, and counseling, often working under collaborative practice agreements. For example, in the U.S., pharmacist specialists manage multiple sclerosis clinics and epilepsy or movement disorder clinics in coordination with neurologists. The Veterans Affairs model cited previously exemplifies a pharmacist-run neurology pharmacotherapy clinic that has enhanced care efficiency and access.²⁷ Likewise,

the UK's National Health Service increasingly employs primary care clinical pharmacists to review medications for patients with dementia, stroke, or PD as part of integrated care teams. These high-income models illustrate that when pharmacists are empowered as core members of the neurology care team, they can take on significant responsibilities for medication adjustments, monitoring of therapeutic responses, and patient education, thereby augmenting the physicians' capacity and improving chronic care outcomes.

In contrast, pharmacist integration in Southeast Asia is still in the early stages of development. In this region, particularly in Malaysia, pharmacist-led Medication Therapy Adherence Clinics (MTACs) have been established in tertiary centers to support conditions such as epilepsy, PD, and stroke.²⁸ While these services hold promise, they remain limited primarily to urban centers and face challenges such as inadequate clinical training in neurology, regulatory constraints, and a lack of reimbursement for cognitive services.²⁹ Nevertheless, regional pilot programs and the increasing recognition of pharmacists' value indicate a gradual shift toward broader integration. Adapting successful models from high-income countries while aligning with local policies and infrastructures is crucial for advancing the role of pharmacists in neurological care, especially in underserved and resource-limited settings. Enhancing training programs, securing funding, and incorporating MTAC services into broader healthcare frameworks can facilitate this expansion, ensuring that patients in all regions have access to pharmacist-led care.

7. Pharmacists' role in research and development

In addition to their clinical and educational responsibilities, pharmacists play a crucial role in the research and development of new therapeutic approaches for neurological conditions. Their involvement in clinical trials and the development of clinical protocols ensures that therapeutic innovations are not only effective but also safe and tailored to meet the specific needs of neurological patients. Pharmacists contribute to the formulation and testing of new drugs, collaborating closely with other healthcare professionals to assess the pharmacodynamics and pharmacokinetics of new treatments. This dual role bridges the gap between clinical practice and research, as evidenced by their participation in trials for antiepileptic drugs and multiple sclerosis therapies.^{2,5} Their unique insights into drug interactions, side effects, and patient compliance inform the design and implementation of trials, making them invaluable members of research teams focusing on neurological therapies.

In a recent study conducted at a major neurology center, pharmacists were integral to a clinical trial exploring the efficacy of a new, extended-release formulation of a popular antiepileptic drug. Their insights into patient adherence challenges and drug delivery mechanisms helped shape the study's design, ultimately leading to the development of a more effective dosing regimen that improved patient outcomes. By actively engaging in such research efforts, pharmacists not only contribute to the scientific community but also enhance their ability to provide advanced patient care. Their involvement in these research activities supports the development of evidence-based practices that underpin therapeutic decisions in neurology.

8. Technological integration in pharmaceutical care

Pharmacists are at the forefront of integrating digital technologies and artificial intelligence (AI) to optimize neurological care. From ensuring medication safety to individualizing dosing, these innovations empower pharmacists to deliver data-driven, proactive interventions that enhance patient outcomes, particularly in complex and chronic neurological conditions. Electronic health records, telepharmacy, and AI-powered decision support systems have transformed pharmacists' ability to provide timely and precise care. These tools are especially impactful in remote and underserved areas, where access to specialists may be limited. For instance, predictive analytics and machine learning models can flag potential drug interactions or adverse effects before they occur, enabling pharmacists to adjust regimens early.^{30,31}

At Desert Oasis Healthcare, pharmacists deployed Arine's Virtual Pharmacist, a machine learning platform that identifies medication-related problems and generates therapy recommendations. This approach resulted in a 40% reduction in hospitalizations through proactive medication optimization.³² In the field of neuropharmacogenomics, pharmacists at the Mayo Clinic operationalized an AI-based clinical alert system that employs natural language processing and machine learning to provide personalized pharmacogenomic dosing. Pharmacists interpreted these alerts, guided prescribers, and adjusted treatments based on genotype-specific recommendations.³³ In addition, pharmacists have played a pivotal role in stroke care innovations. At UK HealthCare, they collaborated with neurologists to implement Viz.ai, an AI-powered triage tool that rapidly detects large vessel occlusions from CT scans. Pharmacists used this information to prioritize antiplatelet or thrombolytic preparation, ensuring rapid access to critical therapies.³⁴

Beyond interpreting AI outputs, pharmacists lead the integration of digital tools into workflows, train clinical staff, and ensure ethical, patient-centered implementation. Their clinical insight is vital in translating algorithmic outputs into safe, actionable decisions, reinforcing their leadership in health technology integration. While AI in neurology is still emerging, pharmacists' contributions to digital care models are already reshaping how neurological conditions are managed, advancing safety, accessibility, and precision in therapeutic interventions.

9. Future directions and research needs

Research into new roles for pharmacists in emerging therapies for neurological disorders and the long-term impacts of pharmacist-managed care on chronic neurological conditions would further define and enhance their contributions. In addition, addressing educational needs and overcoming barriers such as scope of practice limitations and reimbursement issues are crucial for fully realizing the potential of pharmacists in this field.

Future research should focus on quantifying the impact of pharmacists in reducing hospital readmissions and improving long-term outcomes for neurological patients. Studies could explore the integration of pharmacists into telemedicine platforms specializing in neurology, evaluating how virtual patient management can expand care capacities and accessibility.

10. Educational aspects for pharmacists in neurology

Specialized training in neuropharmacology and patient counseling is essential for pharmacists to effectively support neurology patients. Ongoing education and certifications in neurology pharmacy are beneficial for maintaining up-to-date knowledge and skills.

Current educational programs for pharmacists often lack specialized training in neurology, limiting their effectiveness in this field. Developing targeted curricula that include advanced neuropharmacology and case management can equip pharmacists with the necessary skills to significantly contribute to neurology teams.

11. Challenges and barriers in neurological care

Pharmacists face challenges such as limitations in the scope of practice and reimbursement issues.³⁵ Overcoming these barriers requires greater interdisciplinary collaboration and policy changes to better integrate pharmacists into healthcare teams. These include recognizing pharmacists as primary care providers in neurology settings, which

would enable reimbursement for clinical services such as medication therapy management and direct patient consultations, thus fostering a more collaborative practice environment.

12. Conclusion

The role of pharmacists in neurological care is poised for significant expansion. As demonstrated by the case studies and data reviewed, pharmacists not only enhance treatment efficacy but also ensure safer patient outcomes through personalized medication management. However, realizing the full potential of pharmacists in this specialty requires not only educational and policy shifts but also a cultural change within healthcare systems to embrace pharmacists as integral members of the neurological care team. By fostering these developments, we can better meet the complex needs of neurological patients and pave the way for innovative care models.

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Conflict of interest

The authors declare that they have no competing interests.

Author contributions

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Ethics approval and consent to participate

Not applicable.

Consent for publication

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