

REVIEW ARTICLE

The feasibility and preliminary effects of compassion-based interventions for individuals with acquired brain injury: A scoping review

Trang Thi Thu Nguyen^{1,2}  and Fei-Hsiu Hsiao^{1,3*} ¹School of Nursing, College of Medicine, National Taiwan University, Taipei, Taiwan²Bach Mai Medical College, Bach Mai Hospital, Hanoi, Vietnam³Department of Nursing, National Taiwan University Hospital, Taipei, Taiwan

Abstract

Compassion-based interventions (CBIs) have been adapted for individuals with acquired brain injury (ABI), particularly those with cognitive impairments. Nevertheless, evidence regarding their feasibility and effects remains limited. This scoping review aimed to synthesize quantitative and qualitative evidence on the feasibility, preliminary effects, and participants' experiences of CBIs among individuals with ABI. This scoping review followed Arksey and O'Malley's methodological framework and Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews guidelines. Seven databases were searched from inception to March 2025. Data were charted for intervention contents, delivery formats, feasibility, preliminary outcomes, and participants' subjective experiences. Five studies met the inclusion criteria. Most interventions were developed based on compassion-focused therapy, mindful self-compassion, and compassion-focused imagery. One qualitative study used compassion-informed peer support. Interventions were delivered either in multiple sessions or in a single session. Structured, multi-session CBIs adapted for ABI patients' cognitive difficulties showed potential to improve psychological distress, self-compassion, and positive life attitudes at post-intervention and follow-up. In contrast, brief, single-session CBIs showed limited evidence of benefit. The interventions adapted for ABI-related cognitive difficulties appeared feasible and acceptable. Qualitative findings reflected participants' experiences of CBIs in alleviating perceptions of life challenges, enhancing well-being and support, and developing self-compassionate attitudes and self-care behaviors. This scoping review indicates the preliminary feasibility and potential benefits of CBIs for individuals with ABI. However, the evidence is still in its early stages, and further large-scale randomized controlled trials and cross-cultural research are required to confirm their effectiveness and generalizability.

Keywords: Compassion; Brain injury; Psychological distress; Self-compassion

***Corresponding author:**
Fei-Hsiu Hsiao
(hsiaoifei@ntu.edu.tw)

Citation: Nguyen TTT, Hsiao F-H. The feasibility and preliminary effects of compassion-based interventions for individuals with acquired brain injury: A scoping review. *Health Psychol Res.* 2026;14(3):026090054. doi: 10.36922/HPR026090054

Received: February 28, 2026

Revised: June 12, 2026

Accepted: June 18, 2026

Published online: July 22, 2026

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1. Introduction

Acquired brain injury (ABI) includes traumatic brain injury (TBI), which results from external trauma, and non-TBI, which arises from internal causes such as stroke,

infection, or inflammation.¹ Globally, more than 50 million people sustain TBI each year, accounting for 30–40% of all injury-related deaths.² According to the 2022 Global Stroke Factsheet, the lifetime risk of stroke (non-TBI) has increased by 50% over the past 17 years.³

Acquired brain injury often leads to persistent cognitive impairment, functional dependence, and psychological distress.⁴ Depression and anxiety are the most common psychological burdens across ABI populations. The studies found that 56% of patients with TBI experienced depression at three months post-injury,⁵ and 43% reported long-term depression.⁶ Moreover, the prevalence of anxiety among individuals with TBI is estimated at 17.45%, approximately 1.9 times higher than in those without TBI.⁷ Early post-injury emotional distress has been linked to direct damage to brain regions involved in mood regulation,⁸ neuroendocrine dysfunction,⁹ and alterations in inflammatory markers and serum cytokines.^{10,11} At later stages, psychological distress can negatively affect psychosocial adjustment to persistent cognitive impairment, chronic headaches, and interpersonal and occupational challenges.¹²

Psychological distress may be related to how individuals perceive and evaluate themselves. Most ABI patients experience a discrepancy in their self-concept,¹³ which may increase feelings of shame and self-criticism.¹⁴ Shame can increase sensitivity to self-criticism and reduce one's ability to be self-compassionate.^{15,16} Self-criticism has been identified as an independent predictor of depression among patients with TBI.¹⁷

Self-compassion is defined as a non-judgmental awareness of, acceptance of one's suffering as a common human experience, and responding to suffering with love and kindness.¹⁸ It is conceptualized as an internal resource that enables individuals to accept and cope with life's challenges.¹⁹ By fostering feelings of safety and security, self-compassion enhances overall well-being.²⁰ Empirical evidence suggests that self-compassion is negatively associated with shame, self-criticism, and depression;²¹ therefore, it may serve as a protective factor in alleviating the negative impact of self-criticism on depressive symptoms and enhancing psychological well-being among individuals with ABI.^{22–24}

Compassion-based interventions, which aim to cultivate compassionate cognition, emotion, and motivation toward oneself and others, may enhance self-compassion and reduce psychological distress. CBIs enhance the positive emotional regulation processes and reduce negative affect by promoting self-kindness, encouraging self-care behaviors, and fostering feelings of warmth and safety.^{25–28} Recent evidence indicates that

interventions such as compassion-focused therapy (CFT) and mindful self-compassion (MSC) improve positive self-evaluative processes and reduce self-criticism among clinical populations.^{29,30}

Given the high levels of shame, self-criticism, and psychological distress among individuals with ABI, CBIs may be particularly beneficial for this population. However, to date, most recent reviews have primarily focused on mindfulness-based interventions for psychological distress in patients with ABI.^{31,32} Although mindfulness-based approaches emphasize present-moment awareness, compassion-based approaches involve an intentional, benevolent orientation toward oneself characterized by kindness, care, and emotional warmth,¹⁸ and help maintain emotional balance when facing life's struggles.³³ Additionally, cognitive impairments following brain injury, such as difficulties in communication, memory, attention, and executive functioning,³⁴ may act as barriers to attending and engaging in psychotherapy.

Over the past decade, CBIs have been adapted to accommodate cognitive impairments in individuals with ABI; however, their intervention components, delivery formats, feasibility, and effectiveness have not yet been systematically reviewed in this population. To address this gap, we conducted a scoping review to synthesize both quantitative and qualitative evidence on CBIs for individuals with ABI. Specifically, we summarize intervention content, delivery formats, feasibility indicators (e.g., treatment adherence and attrition), measured outcomes (e.g., depression, anxiety, and self-compassion), and participants' subjective experiences of CBIs. By mapping intervention characteristics, feasibility indicators, preliminary outcomes, and participants' experiences, this review provides insights into how CBIs can be implemented for individuals with ABI and adapted to accommodate cognitive limitations. These findings may inform the development and refinement of future CBIs for this population.

2. Methods

We conducted a scoping review to synthesize the existing literature. The review followed Arksey and O'Malley's³⁵ methodological framework and was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews checklist.³⁶ (Supplementary File Part C). A review protocol was developed, discussed, and approved by the research team prior to conducting the review. Although the protocol was not prospectively registered in a public database, the review was conducted in accordance with it. The review process included the following stages: identifying the research

question, developing the search strategy, selecting eligible studies, extracting and charting data, and synthesizing and reporting the findings.

2.1. Research question

The research questions were elaborated using the Joanna Briggs Institute (JBI)'s population, concept, and context format. The population was individuals with ABI aged 18 years and above; the concept was CBIs; and the context was a home or healthcare setting, acute care, or long-term care. The review answers the following research questions: What is known from the literature about the feasibility and effects of CBIs among the ABI population? What are ABI patients' experiences of CBIs?

2.2. Search strategy

Seven databases: CINAHL, PUBMED, APA PsycINFO, Web of Science, EMBASE, Scopus, and Cochrane Library were systematically searched from inception to March 2025 to identify relevant studies. The preliminary search identified that the intervention terminology was primarily associated with compassion-based approaches. Accordingly, the search strategy incorporated a broad range of compassion-related terms, including "self-compassion," "compassion," "compassionate," "loving-kindness meditation," "compassion meditation," "compassion-focused therapy," "mindful self-compassion," "cultivating compassion training," "cognitively based compassion training," and "compassion-based intervention." The search strategy further included terms representing ABI and neurorehabilitation populations, such as ABI, TBI, stroke, and cerebrovascular accident. To enhance search sensitivity and account for differences in database indexing practices, both keywords and controlled-vocabulary subject headings (e.g., MeSH terms, where applicable) were utilized.

Boolean operators and truncation were adapted for each database. The search strategy combined terms representing CBIs with terms related to ABI and the stroke population. In addition, backward citation tracking and manual searches of relevant reviews and reference lists were conducted to identify potentially eligible studies that may not have been captured through the electronic database searches. Full details of the database-specific search strategies are provided in Supplementary File Part A.

2.3. Study selection and data extraction

The operational definition of CBIs refers to interventions developed based on Neff's¹⁸ self-compassion framework or Gilbert's²⁵ concept of compassion, aiming to cultivate compassionate cognition, emotion, and motivation toward

oneself and others. Derived from Kirby *et al.*,³⁷ different types of CBIs have been identified, such as CFT, MSC, compassion cultivation training, cultivating emotional balance, loving-kindness meditation, and cognitively based compassion training. Accordingly, the inclusion criteria include: (i) Studies with the target population of adults with traumatic or non-traumatic ABI; (ii) Studies with the core components of CBIs related to cultivating a non-judgmental awareness and acceptance of one's suffering, and responding to suffering with love and kindness, enhancing compassion motivation or action to relieve oneself or others' suffering; (iii) Studies adopted randomized control trial (RCT) design or non-RCT design for quantitative studies, qualitative or mixed-methods studies exploring participants' experiences after intervention; (iv) Studies published in a peer-reviewed journal in English (the predominant language of peer-reviewed research). Studies were excluded if they were grey literature (conference papers or dissertations), case studies, or unavailable in full text.

For study selection and data extraction, all retrieved records were imported into reference management software (EndNote 21, Clarivate, United States), and duplicates were removed before screening. One reviewer extracted the data (the first author), and a second reviewer (the corresponding author) checked the extracted information for accuracy. Titles and abstracts were screened first, followed by full-text screening according to the inclusion and exclusion criteria. If a study was identified as potentially meeting the inclusion criteria by at least one reviewer, it entered the full-text screening process by two reviewers. Full-text articles were subsequently reviewed independently by the same reviewers to determine final inclusion. Any disagreements during the screening process were resolved through discussion in accordance with the study protocol, including the well-defined study objectives and a standardized data-charting form developed by the research team.

Extracted data included study characteristics (author, year of publication, country, research design, population characteristics, sample size in each group), intervention characteristics (name of intervention, duration, intensity, delivery format, outcome measure, and key findings), intervention adaptation and feasibility indicators (adaptation, therapist, home practice support, attrition, adherence to protocol, treatment adherence, acceptability). The information on the qualitative study included the author, purpose, study design, sample, participant characteristics, intervention, and emergent themes (the main effects and mechanisms of intervention). The qualitative themes were extracted from original studies.

2.4. Quality appraisal

Risk of bias and methodological quality were assessed using design-specific tools. Randomized trials were assessed using version 2 of the revised Cochrane Risk of Bias tool (RoB 2).³⁸ The non-randomized intervention was assessed using the Risk of Bias in Non-randomized Studies of Interventions tool (ROBINS-I).³⁹ The qualitative study was assessed using the JBI Critical Appraisal Checklist for Qualitative Research.⁴⁰ Two researchers independently assessed the methodological quality of each study. Disagreements were resolved through discussion and consensus.

3. Results

The literature search and study selection process, including the number of records excluded and the reasons for exclusion, is illustrated in [Figure 1](#). The systematic search identified 581 records across seven databases.

After removing 243 duplicate records, 338 records remained for title and abstract screening. Of these, 304 records were excluded, leaving 34 articles for full-text eligibility assessment. During full-text review, 29 articles were excluded for failing to meet the eligibility criteria. Ultimately, five studies were included in the review: three quantitative, one qualitative, and one mixed-methods.

3.1. Characteristics of studies and population.

[Table 1](#) presents the characteristics of the included quantitative studies, and [Table 2](#) shows the characteristics of the qualitative studies. Five studies were published between 2012 and 2024. Three studies used two-armed randomized controlled trials.⁴¹⁻⁴³ One study used a mixed-methods design with a quasi-experimental one-arm design and qualitative interviews,⁴⁴ and one study employed a qualitative research method.⁴⁵ The studies were conducted in three countries: three in the United Kingdom (UK), one in Switzerland, and one in Canada. Sample sizes ranged

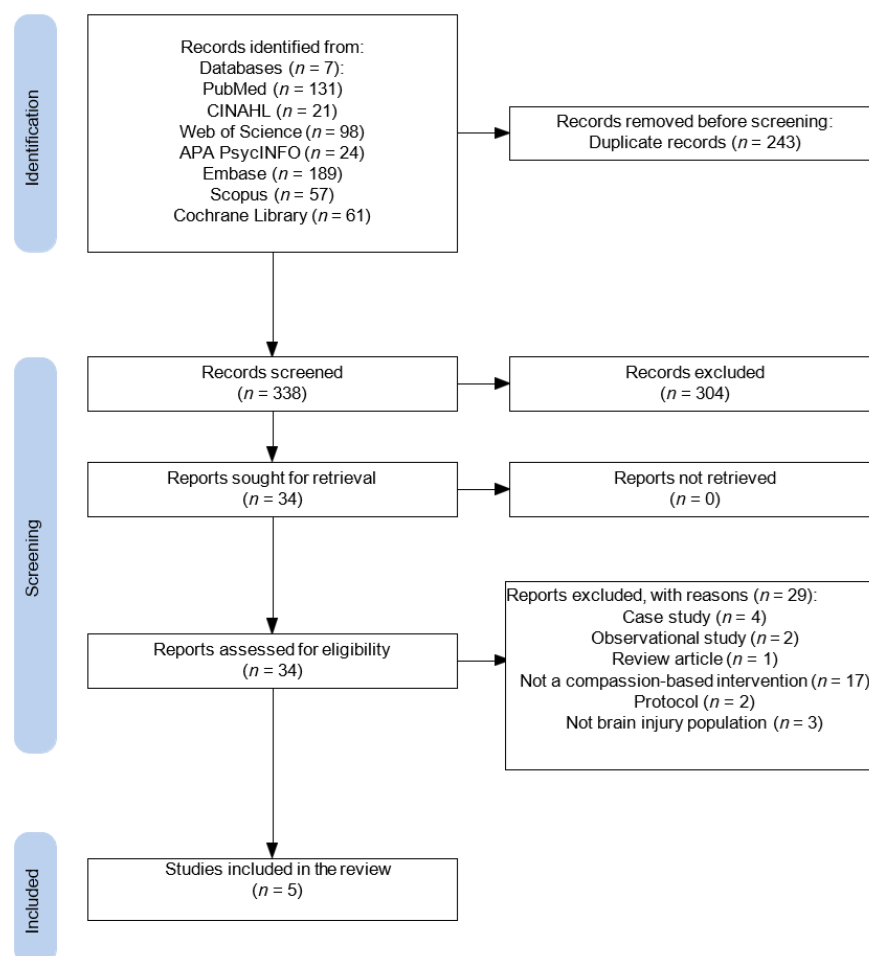


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram

from 12 to 31 participants, totaling 115 across all studies. Most participants were individuals with a head injury^{41,43} or brain injury.^{42,44} One study focused on stroke patients.⁴⁵

3.2. Intervention characteristics and contents

The compassion-related interventions were grouped into three categories according to their structure, intensity, and

the contents of the intervention. Structured CBIs were delivered over 6–18 weeks ($n = 2$), brief CBIs with a single session ($n = 2$), and compassion-informed peer support ($n = 1$). Structured CBIs and brief CBIs provided therapeutic or practice-based activities to cultivate self-compassion among individuals with ABI. Compassion-informed peer support applied compassion-based concepts to enhance

Table 1. Characteristics of quantitative studies

Author	Year	Country	Study design	Population	Age (mean $\pm$ SD/range), female (%)	Intervention group (n)	Comparison group (n)
Campbell <i>et al.</i> ⁴¹	2019	United Kingdom	RCT, two-arm, pre-post	Severe head injury	47 $\pm$ 8.9 (17%)	Compassion focus imagery with a brief preparatory video ($n = 12$)	Relaxation imagery ($n = 12$)
Künzi <i>et al.</i> ⁴²	2022	Switzerland	RCT, two-arm, pre-post	ABI with mental health difficulties	Intervention group: mean age 42.36 (36%); Comparison group: mean age 45.47 (30%)	Animal-assisted mindfulness self-compassion ($n = 14$)	Standard mindfulness self-compassion ($n = 17$)
O'Neill and McMillan ⁴³	2012	Scotland	RCT, two-arm, pre-post	Severe head injury and low empathy	Intervention group: 45.33 $\pm$ 15.6 (83%); Comparison group: 39.08 $\pm$ 11.08 (92%)	Compassion focus imagery ($n = 12$)	Relaxation ($n = 12$)
Ashworth <i>et al.</i> ⁴⁴	2015	United Kingdom	Mix method, quasi-experimental	ABI and mental health difficulties	Age range 21–55 years (42%)	Compassion-focused therapy ($n = 12$)	NA

Abbreviations: ABI: Acquired brain injury; NA: Not available; RCT: Randomized controlled trial; SD: Standard deviation.

Table 2. Characteristics of qualitative studies

Authors (country)	Purpose	Study design/sample size	Participant characteristic	Intervention	Main effects of the intervention	Helpful elements
Singh <i>et al.</i> ⁴⁵ (Canada)	Describe compassionate support in virtual peer support stroke programs	A qualitative descriptive study, $n = 24$	Adults with stroke	Virtual peer support stroke programs, compassion toward others and connectedness with peers	Alleviating challenges, enhancing well-being, and enhancing support	A sense of connectedness and understanding about shared lived experiences, actively listening for facilitators, positive virtues and emotions, and virtual communication for stroke-related needs
Ashworth <i>et al.</i> ⁴⁴ (United Kingdom)	To explore patients' experience of psychological difficulties, psychological change, and the expertise of CFT	Mixed method: quasi-experimental and interpretative phenomenological analysis, $n = 6$	ABI and mental health difficulties	CFT	Developing the new self-compassion tool, establishing a non-blaming understanding, developing a personal sense of control, taking self-care action, and a better understanding of others' behaviors and of how to alter their responses.	Neuropsychological sense-making: "trickier brain" and "not my fault", develop a relationship and feel understood, finding safety and connection in the group, and careful monitoring during intervention.

Abbreviations: ABI: Acquired brain injury; CFT: Compassion-focused therapy.

participants' compassion toward others.

The structured CBIs were grounded in compassion-based therapeutic frameworks, including CFT⁴⁴ and MSC,⁴² and delivered over multiple sessions. The CFT intervention combined a Compassionate Mind Mood Group with individual CFT sessions. The mood group included socialization to the CFT model, compassion mind training, and practice planning, while the individual sessions focused on developing compassionate practice to manage ABI-related challenges and address barriers to compassion.⁴⁴ The MSC-based intervention emphasized mindfulness- and self-compassion-based group exercises and attachment-focused activities, with animal-assisted therapy to support emotional and relational engagement.⁴² Brief CBIs used single-session compassion-focused imagery activities involving breathing, relaxation techniques, and imagery practice to cultivate a self-compassion experience.^{41,43} Compassion-informed peer support provided virtual peer support to foster compassion toward others and peer connectedness through shared lived experience, compassionate communication, active listening, and understanding of disease-related needs.⁴⁵

In most included studies, interventions were delivered through face-to-face sessions; only compassion-informed peer support used an online delivery format.⁴⁵ Both brief CBIs were delivered individually,^{41,43} whereas structured CBIs were implemented either in group settings⁴² or a combination of group and individual formats.⁴⁴ Both structured CBIs included follow-up assessments to evaluate maintenance effects at three months, while brief CBIs did not include follow-up assessments (Table 3).

3.3. Tailoring of compassion-based interventions for individuals with acquired brain injury

Structured CBIs delivered over multiple sessions incorporated specific adaptations for individuals with ABI. In the adapted CFT intervention, core CFT psychoeducation was modified for the brain injury context by reframing the “tricky brain” concept as a “trickier brain,” emphasizing how ABI may further disrupt emotional regulation systems.⁴⁴ In the MSC intervention, animal-assisted therapy was incorporated to provide a non-judgmental source of social support, which may enhance engagement and be accessible for individuals with ABI.⁴²

Across included studies, intervention adaptations were designed to accommodate cognitive impairments commonly experienced by individuals with ABI, including difficulties with memory, attention, and executive functioning. Three categories of adaptations were identified: reducing cognitive load, learning and

memory supports, and engagement/practice supports (Table 4). Structured CBIs incorporated all three types of adaptations,^{42,44} whereas brief CBIs primarily employed strategies to reduce cognitive load and provide learning and memory supports.^{41,43} Strategies to reduce cognitive load included shorter sessions, slower pacing, simplified content, repetition, and scheduled breaks. Learning and memory supports comprised visual and video-based materials, written or verbal summaries, text-message reminders, supportive mobile phone images, memory cards, and session recordings. Engagement and practice supports included home practice integrated into daily routines, guided reflection exercises, preparatory video materials, and animal-assisted support.

3.4. Active control comparison group.

In MSC-based interventions, the active control group received the same intervention but without the animal-assisted component, enabling a direct comparison between the standard MSC condition and the animal-assisted MSC condition.⁴² Both brief CBI studies used an active-control design of a relaxation imagery comparison group, allowing the specific effects of compassion-focused imagery to be distinguished from those of general relaxation techniques.^{41,43}

3.5. Quantitative study findings

3.5.1. Feasibility and acceptability

Brief CBIs showed high adherence and low attrition, with no participant dropouts and 100% completion of the single-session intervention in both studies.^{41,43} The brief CBI study reported positive informal post-intervention feedback from participants.⁴¹ However, these studies did not include home-practice support or follow-up assessment. Structured CBIs provided the preliminary evidence of feasibility across multiple sessions. In the adapted CFT intervention, all participants completed pre- and post-intervention assessments; 75% completed the three-month follow-up; and participants attended a mean of 16 out of 18 planned individual sessions.⁴⁴ This adapted CFT was described as well accepted, based on semi-structured qualitative interviews exploring participants' experiences. In the adapted MSC intervention, attrition was lower in the animal-assisted MSC group than in the standard MSC group (7.1% vs. 23.5%), treatment adherence was higher in the animal-assisted MSC group (89.9% vs. 72.9%), and protocol adherence was 100%.⁴² The animal-assisted MSC appeared to have greater acceptability and patient commitment than the standard MSC⁴² (Table 4). Negative or challenging experiences were not reported in all included studies.

Table 3. Characteristics of the interventions and outcomes of quantitative studies

Authors	Intervention	Study duration/intensity	Delivery format	Time points	Compassion measure	Other outcome/measure	Key findings
O'Neill and McMillan ⁴³	CFI	Single session, 30 minutes	Face-to-face, individual	Pre-, post-intervention; no follow-up	Self-compassion scale	Relaxation scale, empathy quotient	No significant effects on self-compassion, empathy, and relaxation.
Campbell <i>et al.</i> ⁴¹	CFI	Single session, 50 minutes	Face to face, individual	Pre-, post-intervention; no follow-up	Self-compassion scale	State-trait anxiety inventory, relaxation scale, heart rate variability, empathy quotient, motivation for scale	No significant between-group effects were found for empathy, self-compassion, relaxation, anxiety, or HRV change. Motivation increased from pre- to post-preparatory video.
Ashworth <i>et al.</i> ⁴⁴	CFT	24 sessions, 50 minutes per session, 6 weeks of group sessions and 18 weeks of individual sessions, three-month follow-up	Face to face, group and individual	Pre-, post-intervention; 3-month follow-up	Self-criticism/self-attacking, self-reassuring scale	Hospital depression and anxiety scale	Pre-post changes were significant for depression, anxiety, hated self, and inadequate self. These changes remained significant from pre-intervention to three-month follow-up for depression, anxiety, hated self, and inadequate self. Reassured self also increased significantly from pre- to post-intervention and from pre-intervention to three-month follow-up.
Künzi <i>et al.</i> ⁴²	MSC	12 sessions, 75 minutes per session, six weeks, three-month follow-up	Face-to-face, group	Pre-, post-intervention; 3-month follow-up	No	Brief symptom inventory, visual analog scale in moods, adherence to treatment	There were significant reductions in psychological distress in both the intervention and control groups. Compared to the standard MSC group, the animal-assisted MSC group showed significantly greater within-session increases in feeling secure, comforted, accepted, motivated, grateful, and at ease, but not in hopefulness. Treatment adherence was higher in the intervention group than in the control group.

Abbreviations: ABI: Acquired brain injury; CFI: Compassion focus imagery; CFT: Compassion-focused therapy; MSC: Mindfulness self-compassion.

3.5.2. Self-compassion-related outcome

Both brief CBIs showed there were no statistically significant pre-post changes in self-compassion scores, as reported by O'Neill and McMillan⁴³ (Wilcoxon $T = 78.00$, $p = 0.07$, $r = -0.26$) and Campbell *et al.*⁴¹ ($t(23) = -0.189$, $p = 0.852$). In contrast, the multi-session CFT intervention demonstrated significant improvements in self-criticism and self-reassurance subscales of the Self-Criticism/Self-Reassurance Scale (FSCRS). Specifically, significant

reductions were observed in the FSCRS subscales of inadequate self ($z = -2.81$, $p < 0.005$; $r = 0.67$, $d = 1.81$) and hated self ($z = -2.91$, $p < 0.005$; $r = 0.60$, $d = 1.50$), alongside a significant increase in reassured self ($z = -2.67$, $p < 0.05$; $r = -0.56$, $d = -1.38$). These improvements were maintained at the three-month follow-up, with significant pre-follow-up differences in inadequate self ($z = -2.67$, $p < 0.05$), hated self ($z = -2.44$, $p < 0.05$), and reassured self ($z = -2.39$, $p < 0.05$).⁴⁴

Table 4. Adaptations and feasibility indicators of quantitative studies

Authors	Adaptation				Therapist/ supervision	Attrition	Adherence to protocol	Acceptability	Adherence to treatment
	Cognitive- load reduction	Learning and memory support	Engagement/ practice support	Home practice support					
O'Neill and Mc Millan ⁴³	NR	NR	NR	NR	Final-year clinical psychology trainee	Exp: 0%; control: 0%	100%	NR	Exp: 100% completed; control: 100% completed
Campbell <i>et al.</i> ⁴¹	Reduce contents, slower pace, guided reflection	Used a preparatory video, repeat imagery	NR	NR	Therapist in neurorehabilitation with CFT experience	Exp: 0%; control: 0%	Compliance with interventions was described as very good.	Post-intervention feedback was positive	Exp: 100% completed; control: 100% completed
Ashworth <i>et al.</i> ⁴⁴	ABI-tailored psychoed ucation, shorter session	Compassi onate text reminder, images on a mobile phone	Planning practice in a weekly schedule	Supported to practice compass ionate skills	Clinical psychologists with CFT training	Pre-post completed: 100%, three- month follow-up completed: 75%	NR	Well accepted	Mean uptake 16/18 sessions
Künzi <i>et al.</i> ⁴²	Shorter session, simplified language, repetitive	Provide memory cards, provide a recording	Animal- assisted therapy, integrating content into daily life	Integrate home practice into weekly schedules	Psychotherapists certified in animal- assisted therapy and trained in MSC techniques	Exp: 7.1%, control: 23.5%	100%	High acceptability and patients' commitment	Exp: 89.9% completed, control: 72.9% completed

Abbreviations: ABI: Acquired brain injury; CFT: Compassion-focused therapy; MSC: Mindfulness self-compassion; NR: Not reported.

3.5.3. Psychological distress (depression and anxiety) outcomes

Psychological distress (depression and anxiety) was assessed in three included studies.^{41,42,44} Two studies evaluated depression or anxiety among ABI patients using the Hospital Anxiety and Depression Scale⁴⁴ and the State-Trait Anxiety Inventory.⁴¹ Another study measured psychological distress using the Brief Symptom Inventory and emotional states using the Visual Analog Scale.⁴²

The CFT-based intervention study significantly decreased depression and anxiety at the time of post-intervention and at 3-month follow-up. Anxiety and depression both decreased significantly from pre- to post-intervention and from pre-intervention to three-month follow-up (anxiety: $z = -2.81$, $p < 0.005$; $z = -2.14$, $p < 0.05$; depression: $z = -2.68$, $p < 0.05$; $z = -2.39$, $p < 0.05$).⁴⁴

The MSC-based intervention significantly reduced general psychological distress across both groups from pre-intervention to follow-up (difference = -0.29 , 95%

confidence interval: -0.54 to -0.03 , $p = 0.028$). There was no significant difference between the animal-assisted MSC and standard MSC groups in reducing psychological distress (group effect: $p = 0.289$; group $\times$ t1–t3: $p = 0.772$). However, the animal-assisted MSC group showed greater benefits in positive emotional states than the standard MSC group. Significant between-group differences favored the animal-assisted MSC group for feeling secure ($p = 0.001$), comforted ($p = 0.003$), accepted ($p = 0.007$), motivated ($p = 0.023$), grateful ($p = 0.035$), and at ease ($p < 0.001$).⁴²

In the brief CBI study, there was no significant between-group difference in state anxiety between the intervention and control groups ($U = 67.50$, $p = 0.346$), suggesting that brief CBIs were unlikely to improve anxiety.⁴¹

3.5.4. Other outcomes

No significant effects of brief CBI studies were observed in related secondary outcomes of relaxation,^{41,43} empathy using the Empathy Quotient scale,⁴³ and physical

functioning (heart rate variability [HRV]).⁴¹ O'Neill and McMillan⁴³ reported no significant pre-post changes in Empathy Quotient scores ($t(23) = 0.78, p = 0.45$) or Relaxation Scale scores (Wilcoxon $T = 71.00, p = 0.20$). Campbell *et al.*⁴¹ found no significant between-group differences in self-reported relaxation or HRV change. Nevertheless, they found that motivation to engage in psychotherapy increased after the preparatory video ($z = 3.44, p = 0.001$).⁴¹

3.6. Qualitative study's findings

Table 2 presents the characteristics of the two qualitative studies examining participants' experiences in CBIs. Singh *et al.*⁴⁵ examined experiences of compassion within a compassion-informed peer support among stroke patients, with a particular focus on cultivating compassion toward others and strengthening peer connectedness. Participants described how the program's emphasis on compassion facilitated the sharing of experiences and mutual advice, which helped alleviate perceived challenges. Feelings of social connectedness and positive emotions further contributed to enhanced well-being. The creation of a safe and compassionate environment encouraged deeper interactions and fostered strong peer support.

Another mixed-methods study explored ABI patients' experiences of participating in a structured CFT-based intervention.⁴⁴ The emerging theme "Developing the New Tool" reflected how participants developed a new self-compassion skill to cope with the challenges. Four subthemes were identified (Table 2). Firstly, participants adopted a non-blaming perspective, which helped reduce feelings of guilt, shame, and distress. Secondly, they developed a greater sense of personal control, enabling them to manage difficulties more effectively. Third, they engaged in self-care behaviors, including cultivating empathy. Lastly, the intervention helped participants develop a better understanding of others' behaviors and adjust their responses accordingly.

3.7. Critical appraisal of studies

Quality appraisal was conducted using design-specific tools. The three randomized controlled trials were assessed using RoB 2.⁴¹⁻⁴³ For all three studies, participants were not fully blinded to their assigned conditions, which may have influenced responses through expectancy effects or social desirability bias. In Campbell *et al.*'s⁴¹ study, the information about the statistical analysis plan and the selection of reported outcomes was not clearly provided. In O'Neill and McMillan's⁴³ study, allocation concealment in the randomization process was not reported. The non-randomized intervention study was assessed using ROBINS-I and was judged to have a high overall risk of

bias, primarily due to confounding.⁴⁴ The qualitative study was appraised using the JBI Critical Appraisal Checklist for Qualitative Research and was rated as good quality, meeting 8 of the 10 appraisal criteria. Its main limitations were the lack of explicit reporting of the researcher's positionality and reflexivity (Supplementary File Part B).⁴⁵

4. Discussion

To our knowledge, this is the first scoping review to synthesize and map the evidence from studies evaluating the feasibility and preliminary effects of CBIs among individuals with ABI. It addressed the characteristics of interventions, their main contents, delivery methods, and outcomes. Five intervention studies met the inclusion criteria for in-depth synthesis. Overall, adapted structured and brief CBIs were found to be feasible and acceptable for individuals with ABI. Structured CBIs delivered across multiple sessions were adapted to address the learning needs of individuals with ABI, who may experience cognitive impairments and require additional time to learn and practice the intervention. Preliminary findings indicated reductions in depression and anxiety, along with improvements in self-compassion and positive attitudes toward life at both post-intervention and follow-up assessments. In contrast, brief CBIs consisting of a single session focused on one compassion-based technique did not produce significant improvements in self-compassion, empathy, or anxiety following the intervention. These findings provide promising preliminary evidence for the feasibility and potential benefits of structured CBIs in this population. However, they should be interpreted with caution, as most of the included studies were small pilot or feasibility trials and exhibited methodological limitations, including concerns regarding risk of bias.

Structured CBIs are typically delivered over extended periods and provide comprehensive compassion training with an emphasis on sustained practice. Through repeated engagement, patients learn to accept their suffering without judgment, cultivate self-compassion, and develop greater awareness of others, which may help alleviate feelings of loneliness.⁴⁶ In contrast, a brief, low-intensity intervention consisting of a single 30–50-minute session without opportunities for ongoing practice may be insufficient to effectively engage the emotional awareness and regulatory processes necessary for meaningful change.⁴⁷

In this review, the structured CBIs were delivered with group formats, whereas the brief CBI was delivered individually. The potential outcomes favoring the structured CBIs over the brief CBI might not only be related to intervention duration and intensity, but also to delivery format. In the qualitative findings, the

emerging themes of feeling understood and connected with other members suggested that group interactions might enable participants to develop empathic and affiliative relationships with themselves and others. Group connection also encouraged mutual inspiration and support. These shared experiences may have strengthened empathetic understanding and supported more positive and compassionate responses toward themselves and others.⁴⁴ Group-based interventions may foster safety and engagement among participants through shared experiences. Having a similar illness experience made it easy for participants to build connections and create a compassionate and safe environment.⁴⁵

Our results suggest promising preliminary effects of structured CFT interventions on improving ABI patients' self-compassion as well as decreasing depression and anxiety. These findings were consistent with the conclusions of a previous systematic review on CFT among the clinical population.²⁹ CFT aims to enhance awareness of emotional responses, particularly self-criticism, and to cultivate empathy and compassion toward oneself and others in a non-judgmental manner, thereby reducing depressive symptoms.²⁵ Given that shame and self-criticism are common among individuals with ABI and are associated with depression,¹⁷ the qualitative findings may help explain the potential mechanisms underlying the benefits of CFT. Participants reported that CFT promoted self-empathy and reduced self-blame regarding the consequences of their condition. They also described self-compassion as an important internal resource for coping with illness-related challenges and fostering self-acceptance. In addition, participants reported greater acceptance of their condition through improved management of its consequences.⁴⁴

The MSC-based intervention showed preliminary positive effects in both the standard MSC and animal-assisted MSC groups, including reductions in psychological distress and improvements in positive attitudes toward life. These findings are consistent with previous studies of CBIs in populations with cancer,⁴⁸ psychiatric disorders,⁴⁹ long-term physical conditions,⁵⁰ and perioperative settings.⁵¹ The beneficial effects of MSC on psychological distress may be attributable to the synergistic roles of mindfulness and self-compassion. Mindfulness fosters non-judgmental awareness of present-moment experiences, while self-compassion promotes kindness, understanding, and acceptance toward oneself during times of suffering.³⁰ By encouraging a more compassionate self-response, MSC may reduce rumination and self-criticism, thereby mitigating negative emotions.⁵² These mechanisms may enhance emotion regulation and reduce psychological distress.

Notably, incorporating animal-assisted support into the MSC intervention was associated with lower attrition rates and greater treatment adherence. Attrition in the standard MSC group was approximately three times higher than in the animal-assisted MSC group.⁴² This finding is consistent with meta-analytic evidence indicating significantly lower dropout rates in animal-assisted psychotherapy compared with conventional psychotherapy.⁵³ The presence of animals has been associated with increased positive affect⁵⁴ enhanced therapeutic alliance, and social interaction between patients and therapists,⁵³ and reduced stress and anxiety through direct human–animal interaction.⁵⁵ Animal-assisted interventions have also been linked to improved motivation and overall well-being,⁵⁶ greater perceived safety,⁵⁷ and stronger motivation to attend therapy sessions.⁵⁸ Collectively, these factors may enhance participant engagement and contribute to improved treatment adherence.⁵⁹

The majority of CBIs were delivered face-to-face; only one compassion-informed peer-support intervention was delivered virtually.⁴⁵ In the virtual setting, the foundation of compassion was maintained through a sustained sense of connectedness, enabling participants to feel valued, acknowledged, and prioritized. These findings suggest that the elements of compassion, such as recognizing and responding to suffering, may not rely solely on in-person interaction. Virtual environments can support compassion by expressing compassion toward individuals, enhancing self-compassion, or facilitating compassion between people.⁶⁰ Although evidence remains limited, virtual compassion-informed approaches may represent a promising way for delivering compassionate care.

Qualitative findings highlighted themes of connectedness and mutual support, suggesting that a compassionate environment may help reduce feelings of isolation and enable individuals to experience compassion from others. Compassion has been conceptualized as comprising three interrelated dimensions: self-compassion, compassion for others, and compassion received from others.²⁵ However, most studies included in this review assessed compassion primarily using the Self-Compassion Scale or FSCRS, both of which focus predominantly on self-compassion. As a result, compassion toward others and compassion received from others—dimensions that may play an important role in reducing isolation and fostering social connectedness—remain underexplored. Future research should therefore investigate whether CBIs not only enhance self-compassion but also strengthen individuals' capacity to extend compassion toward others and to receive compassion from others.

The HRV was rarely assessed in the included studies

and was evaluated only in the brief CBI. HRV was used as a physiological marker of affiliative and threat-related emotional states during the intervention.⁴¹ Although previous studies have reported improvements in HRV following CBIs,⁶¹ no significant changes were observed in the brief CBI study. This finding may suggest that a single-session intervention is insufficient to elicit measurable physiological changes. Future studies should examine whether structured, multi-session CBIs can improve HRV in individuals with ABI.

A significant geographical gap was identified in this review. All included studies were conducted in high-income Western countries, including the UK, Switzerland, and Canada. No studies were conducted in low- and middle-income countries. This limits the generalizability of current evidence to non-Western settings. Participants' ethnicity, social context, and cultural background were rarely examined. Cultural differences may affect how individuals understand and respond to CBIs. For example, Asian cultural contexts emphasize high achievement and self-improvement, which may be associated with greater self-criticism and lower self-compassion.⁶² Some individuals may fear that practicing compassion might be perceived as weak, thereby reducing its acceptability or creating resistance. Therefore, when CBIs developed in Western contexts are applied to other cultural settings, they should be made culturally sensitive by addressing the myth of compassion and emphasizing the benefits of practicing compassion for oneself and for maintaining harmonious relationships with others. Further research could examine the feasibility, acceptance, and psychosocial effects of cultural adaptation of CBIs among ABI patients.

Our scoping review was strengthened by a comprehensive synthesis of qualitative and quantitative findings. However, this scoping review has several limitations. Although seven electronic databases were searched, eligibility was restricted to English-language, peer-reviewed full-text articles, which may have introduced language, publication, and availability bias. The evidence base was also limited, comprising predominantly small pilot and feasibility studies, warranting cautious interpretation of the findings. In addition, included studies encompassed heterogeneous ABI populations (e.g., stroke, TBI, and other acquired brain injuries), which may differ in clinical presentation, cognitive impairment, and response to CBIs. Considerable variation in intervention content, intensity, and duration further limited comparability across studies. Finally, several studies lacked control groups or follow-up assessments, limiting conclusions about intervention-specific effects and long-term outcomes.

5. Conclusion

To our knowledge, this is the first scoping review to examine the feasibility and preliminary effects of adapted CBIs for individuals with ABI. Although research in this area remains in its early stages, this review maps the current characteristics of CBIs and highlights how these interventions have been adapted to address ABI-related cognitive impairments. It also provides preliminary evidence of their feasibility and potential benefits for this population. Interventions grounded in compassion-based therapeutic frameworks, delivered through repeated compassion practice, and adapted for ABI-related cognitive difficulties appeared feasible and acceptable and showed preliminary psychological benefit.

Future research should determine the optimal duration, intensity, and delivery format of CBIs, as well as the role of cognitive adaptations, to better understand how these characteristics may support sustained benefits. This review also identified a discrepancy between qualitative and quantitative findings, particularly regarding participants' experiences of receiving compassion from others, which was not adequately captured in quantitative measures. Future studies should therefore incorporate assessments of compassion toward others and compassion received from others to provide a more comprehensive understanding of intervention effects. In addition, larger-scale studies conducted across diverse cultural contexts are needed to strengthen the evidence base and enhance the generalizability of findings within the ABI population.

Acknowledgments

None.

Funding

None.

Conflict of interest

The authors declare no conflicts of interest.

Author contributions

Conceptualization: All authors

Formal analysis: All authors

Methodology: All authors

Writing—original draft: Trang Thi Thu Nguyen

Writing—review & editing: All authors

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data

The data used in this scoping review were extracted from published studies. All relevant extracted data are included in this article and its supplementary materials.

Further disclosure

The authors used ChatGPT-4 for English-language polishing, grammar refinement, and improving readability. Artificial intelligence (AI) use was limited to phrasing and grammatical suggestions under the author's supervision. AI was not involved in study design, literature searching, study selection, data extraction, data analysis and interpretation, or conclusion drawing. All AI-assisted content was manually reviewed and verified by the authors for accuracy, originality, and consistency with the study findings.

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