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# An Umbrella Review of Self-Management Interventions for Health Conditions With Symptom Overlap With Traumatic Brain Injury

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**Objective:** To synthesize evidence for the effectiveness of self-management interventions for chronic health conditions that have symptom overlap with traumatic brain injury (TBI) in order to extract recommendations for self-management intervention in persons with TBI. **Design:** An umbrella review of existing systematic reviews and/or meta-analyses of randomized controlled trials or nonrandomized studies targeting self-management of chronic conditions and specific outcomes relevant to persons with TBI. **Method:** A comprehensive literature search of 5 databases was conducted using PRISMA guidelines. Two independent reviewers conducted screening and data extraction using the Covidence web-based review platform. Quality assessment was conducted using criteria adapted from the Assessing the Methodological Quality of Systematic Reviews-2 (AMSTAR-2). **Results:** A total of 26 reviews met the inclusion criteria, covering a range of chronic conditions and a range of outcomes. Seven reviews were of moderate or high quality and focused on self-management in persons with stroke, chronic pain, and psychiatric disorders with psychotic features. Self-management interventions were found to have positive effects on quality of



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life, self-efficacy, hope, reduction of disability, pain, relapse and rehospitalization rates, psychiatric symptoms, and occupational and social functioning. **Conclusions:** Findings are encouraging with regard to the effectiveness of self-management interventions in patients with symptoms similar to those of TBI. However, reviews did not address adaptation of self-management interventions for those with cognitive deficits or for populations with greater vulnerabilities, such as low education and older adults. Adaptations for TBI and its intersection with these special groups may be needed. **Key words:** *management, self, self-management, traumatic brain injury*



MODERATE TO SEVERE traumatic brain injury (TBI) can result in impaired physical,[1] sensory,[2] cognitive,[3] emotional,[4] and behavioral functioning[5] that is often chronic and associated with decreased functioning in daily life and decreased participation in life roles, including employment and social relationships.[6] Functional decline can occur following a period of stability, as evidenced by a third of persons with good recovery at 1 year after injury classified as disabled at 10 to 14 years.[6,7] Because of these dynamic lifelong challenges that require ongoing monitoring and attention, TBI has been acknowledged as a chronic health condition,[8,9] necessitating self-management across the life span.

The medical model for chronic disease management has historically focused on treatment of a specific condition,[10] but many people with TBI have multiple chronic conditions or life circumstances to self-manage. One study based on a large multicenter TBI database showed that a substantial number of individuals with TBI had other chronic conditions at 10 years postinjury, including back pain, hypertension, depression, anxiety, orthopedic fractures, high cholesterol, sleep disorders, panic attacks, osteoarthritis, and diabetes.[11] Providing education to people about their specific conditions, including TBI, may not be adequate to reduce chronic disease burden.[12] While education is an important component, management of chronic disease requires the use of disease management skills, demonstration of actual management behaviors, and a strong patient-provider partnership.[10] Broadly, self-management is considered an individual's ability to manage symptoms, treatment, physical and psychosocial consequences, and lifestyle changes related to living with a chronic condition.[13] Self-management training has been widely utilized as an approach to disease management for many chronic conditions, such as pain, hypertension, obesity, and arthritis.[14,15] Self-management requires an individual's active participation in disease management[13] and use of specific skills, including problem-solving, decision-making, resource utilization, forming of a healthcare partnership, and taking action.[13]

Unfortunately, the skills necessary to actively engage in self-management can be particularly challenging after acquiring a disability such as TBI.[16] For many people with moderate to severe TBI, the ability to set and achieve goals is compromised by impaired cognitive and behavioral functions, including planning, self-monitoring, translating intention into action, and behavioral control.[3,17] Poor self-awareness is often observed in individuals who have sustained moderate to severe TBI and is a poor prognosticator of productive goal-setting.[18] Impaired working memory can disrupt the ability to keep information available for use in planning activities and modifying plans based on new information.[19] Hence, the neurobehavioral deficits common after TBI pose particular challenges to be addressed in self-management programs targeting this population.[20]

## IMPORTANCE OF A CHRONIC CARE MODEL INCLUDING SELF-MANAGEMENT

Despite obstacles, it is important to empower individuals with TBI to be as independent as possible in managing their long-term health and to determine the types of supports that they require to do so. TBI rehabilitation programs typically focus on traditional cognitive, physical, and mental health concerns. Nonetheless, in a survey of participants with TBI 1 to 5 years postinjury, Dreer and colleagues[21] found that everyday wellness goals, including physical activity, nutrition, and stress management, were highly endorsed by participants as concepts they would like to see addressed in an intervention program. Health-related goals such as these are consistent with the Chronic Care Model (CCM) that identifies self-management as one of the essential elements of a healthcare system that encourages high-quality chronic disease management.[22] Given that TBI has been identified as a chronic condition,[8,9] individuals with TBI may benefit from a CCM, including self-management, for management of health conditions and optimization of overall health and wellness.

## BACKGROUND TO CURRENT REVIEW

The current review was conducted as one of the activities on a grant funded by the National Institute on Disability, Independent Living, and Rehabilitation Research to develop a CCM for individuals with TBI. Because of its crucial role in CCMs, self-management will be an important component of the model for individuals with TBI. The investigators planned to conduct a systematic review of studies investigating the

effectiveness of self-management interventions for persons with TBI. We were interested in delivering training in self-management to individuals with TBI and their caregivers in a manner that enables them to apply it to different health needs and conditions across their life span, similar to the comprehensive self-management programs that have been described for other chronic conditions.[13–15] Our initial task was to adopt a working definition of self-management intervention. We adapted the definition proposed by Jonkman and colleagues,[23] which specifies that comprehensive self-management interventions "aim to equip patients with the skills to actively participate and take responsibility in the management of their chronic condition" and includes education or knowledge transfer and at least 2 of the following: training in independent sign/symptom monitoring (eg, monitoring of mood); medication management; enhancing decision-making or problem-solving skills for medical treatment management (included training in resource utilization); and changing physical activity, diet, or smoking/substance use behavior or other health behaviors.

Initial informal literature searches revealed that there were few studies that tested such a program for individuals with TBI. While the term "self-management" was often used in an article's title or abstract, further review of the article revealed that the "self-management" intervention was often focused on education and/or one component of self-management, rather than meeting our working definition. The investigator team concluded that there were not enough investigations to warrant a systematic review or to yield conclusions that could guide informed decision-making about developing self-management training for individuals with TBI. Given the numerous systematic reviews on effectiveness of self-management in other chronic health conditions, many of which have symptom overlap with TBI, the authors decided to conduct an umbrella review to synthesize the evidence of self-management in these other conditions in order to guide informed clinical decision-making about implementation of self-management training in persons with TBI.

## METHOD

This umbrella review was conducted according to guidelines developed by the Joanna Briggs Institute, as described in an article by Aromataris et al.[24] As recommended in this article, the methods for the review were conducted to be consistent with the Preferred Reporting System for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

### Review inclusion criteria

#### *Type of review*

We included only systematic reviews and meta-analyses of randomized controlled trials (RCTs) and/or nonrandomized studies of interventions (NRSIs). We excluded scoping reviews, narrative reviews, review protocols, and reviews of nonintervention or qualitative studies. We included reviews that combined reviews of RCTs and/or NRSIs with qualitative studies if they presented the results in a manner that allowed us to draw conclusions based on the RCTs and/or NRSIs alone.

#### *Populations*

Reviews were included if they focused on studies with an adult population (at least 18 years of age) and chronic conditions that were common in persons with TBI or had symptoms overlapping with those of TBI. Reviews were included if they reported on studies targeting patients, caregivers, or the patient-caregiver duo. Decisions about which chronic health conditions to include were made a priori by 4 of the authors, starting with a review of the Centers for Medicare & Medicaid Services (CMS) list of chronic conditions. Each of the conditions was discussed, and a group consensus was achieved regarding whether to include it in the review. Decisions were based on the condition's potential symptom overlap with TBI so that conclusions might be extrapolated to TBI. The following conditions were selected for inclusion due to likely symptom overlap: Alzheimer disease and related dementias; autism; depression; drug abuse/substance abuse; HIV/AIDS; schizophrenia and other psychotic disorders; and stroke. In addition to the conditions selected from the CMS list, the following chronic conditions were selected for inclusion due to symptom overlap with TBI: chronic pain; anxiety; and posttraumatic stress disorder. TBI itself was also included as a chronic condition for the purpose of the search. If a specific review not only included one of our targeted conditions but also included others, we retained it if the results for our targeted conditions were described separately so that they could be interpreted apart from the conditions not on our inclusion list.

#### *Intervention*

We adapted the definition proposed by Jonkman and colleagues,[23] as described in the introduction section. We included stress management and social engagement under the category of "other health behaviors" so that interventions focused on changing these behaviors were included.

#### *Comparators*

We included reviews of RCTs that utilized a control group or wait-list control. We also included nonrandomized comparisons of different self-management

treatment groups or of self-management with another comparison intervention (eg, education alone).

### *Outcomes*

Reviews were included if they focused on studies involving 1 or more of the following outcomes: health knowledge; health service utilization; mortality; global health outcomes; physical or mental health outcomes; quality of life or life satisfaction; activities and participation outcomes; self-efficacy for healthcare management; self-management behaviors; and/or caregiver burden (or any of the aforementioned outcomes for caregivers).

### *Setting*

Reviews were included that focused on self-management nterventions delivered in an outpatient or community setting. We excluded reviews that focused only on inpatient or residential settings. We retained reviews that included a mix of studies focusing on outpatient/community and inpatient/residential settings if they presented the results in a way that allowed us to make separate conclusions for the outpatient/community settings.

## Review selection

A health sciences librarian conducted systematic searches in Ovid MEDLINE, EMBASE, Cochrane Reviews, CINAHL, and PsycINFO from January 1, 2010, through May 3, 2021. The start date for the search was chosen to cover systematic reviews conducted over the past 10 years, which would have covered literature published over approximately the last 20 years. The librarian used terms associated with self-management and a combination of original and preestablished filters to limit results to the 11 targeted chronic conditions, as well as systematic reviews, meta-analyses, umbrella reviews, humans, adults, and English language. The full search strategy can be found in Supplemental Digital Content Appendix 1 (available at: http://links.lww.com/JHTR/A811). Abstracts and full-text articles resulting from the search were uploaded into Covidence for review, with duplicates removed. Abstracts were screened by 2 independent reviewers, with disagreements resolved through discussion. Full-text review was conducted by 2 independent reviewers who achieved consensus.

## Data extraction

Each included article was extracted by one team member working independently and then verified by a different team member, with discrepancies resolved through discussion. Data extraction templates were developed by 4 investigators and entered into Covidence. Extracted data included title, authors, date of publication, country of origin, databases searched, dates covered by search, age range covered by studies, settings covered by studies, self-management components included, delivery mode of intervention, targets of intervention, and outcomes assessed. Reviewers were asked to describe any adaptations to the self-management intervention that were used to compensate for cognitive impairments, as well as any results regarding effectiveness for special populations such as underrepresented racial and ethnic groups and low literacy. Finally, reviewers were asked to describe the potential relevance of the findings to developing self-management interventions for persons with TBI.

## Quality ratings

Quality ratings were conducted by 2 independent reviewers, using quality criteria adapted from the rating system Assessing the Methodological Quality of Systematic Reviews-2 (AMSTAR-2).[25] Rating criteria are shown in Supplemental Digital Content Appendix 2 (available at: http://links.lww.com/JHTR/A811http://links.lww.com/JHTR/A812). Two reviewers independently rated each criterion, with discrepancies resolved through discussion. The first and second authors then used these ratings to classify the overall quality of each article, using criteria recommended by Shea et al,[25] into one of the following categories: high (no critical weakness and either no or 1 noncritical weakness); moderate (no critical weaknesses, but more than 1 noncritical weakness); low (1 critical weakness with or without noncritical weaknesses); or critically low (more than 1 critical weakness, with or without noncritical weaknesses). Critical weaknesses included protocol not registered prior to the start of the review, inadequate literature search, no justification for study exclusion, no assessment of risk of bias, inappropriate meta-analytic techniques, lack of consideration of risk of bias when interpreting results, and assessment of the presence of likely impact of publication bias. Each of the first 2 authors assigned these ratings independently, with discrepancies resolved through discussion after additional reading of the reviews on which discrepancies occurred.

# RESULTS

The PRISMA flowchart for the study, including reasons for exclusion, is shown in Figure 1. The initial database search resulted in 6210 records. After removal of duplicate records and excluded abstracts, the initial screening led to 257 full-text articles that were assessed for eligibility criteria. Of these, 231 were excluded on 1 or more criteria, and the reasons for exclusion of each are shown in the Supplemental Digital Content Table (available at: http://links.lww.com/JHTR/A664). The

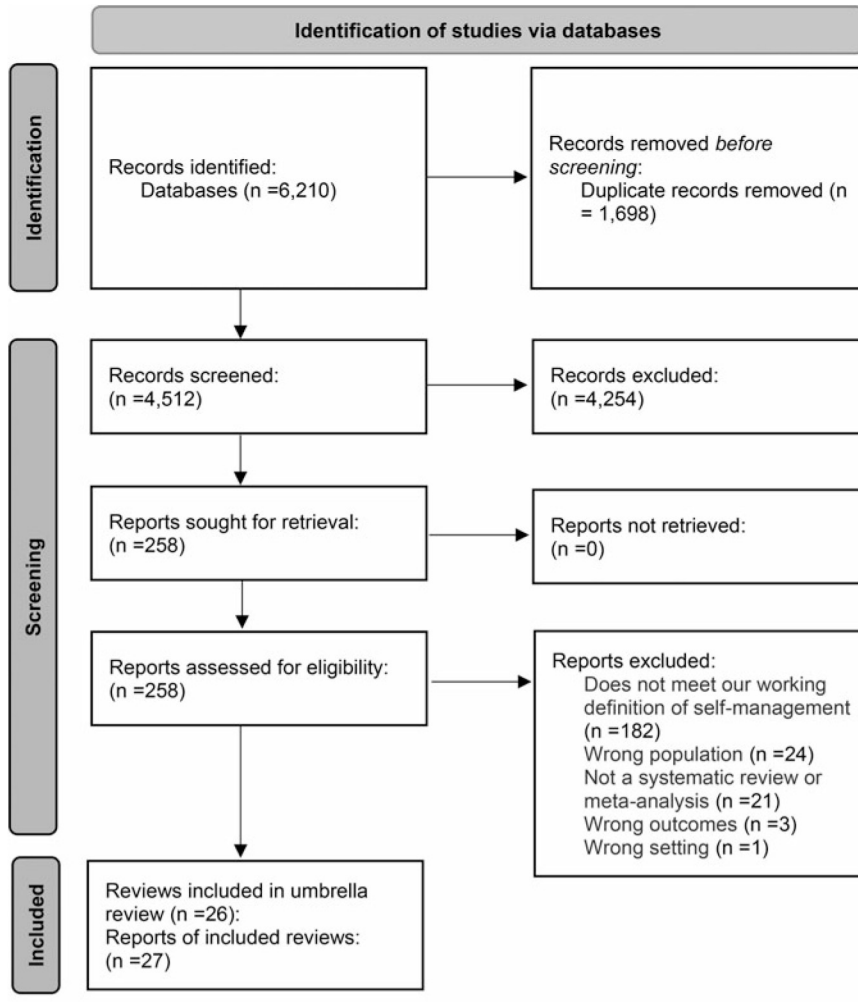


**Figure 1.** PRISMA flowchart. From Page et al.[58] For more information, visit: http://www.prisma-statement.org/.

primary reason for exclusion was that the interventions included in the review did not meet our working definition of self-management. Of the reviews that were excluded at the abstract screening stage, 144 were focused on TBI as a population. Five reviews focused on TBI were excluded during full-text review due to not meeting our working definition of self-management intervention. Twenty-six systematic reviews were included in the umbrella review. There was great variability defining self-management, with many reviews including education-only interventions or including 1 or 2 components of self-management only.

## Quality of studies

Figure 2 shows the AMSTAR-2 quality ratings for each of the reviews included, as well as the overall quality rating category for each. Most reviews were judged to be of low or critically low quality because they had 1 or more critical weaknesses. The 2 most common critical weaknesses included the lack of consideration for publication bias or risk of bias when interpreting the results. Five of the reviews were rated as high quality, and 2 were rated as moderate quality.

## Summary of the reviews

The 26 reviews that were included covered 8 main chronic disease groups, including stroke ($n = 9$),[26–34] chronic pain ($n = 8$),[35–42] mental health (psychotic disorders [$n = 4$],[43–46] general mental health [$n = 1$],[47] depression [$n = 1$],[48] posttraumatic stress disorder [$n = 1$][49]), HIV ($n = 1$),[50] and dementia ($n = 1$).[51] Outcomes covered in the reviews included mental health, functional activities/disability, self-management of specific symptoms (eg, pain), self-efficacy for healthcare management, physical health, specific self-management behaviors (eg, medication adherence), quality of life, health knowledge, participation (occupational, social), health service utilization, global health, mortality, and caregiver outcomes.

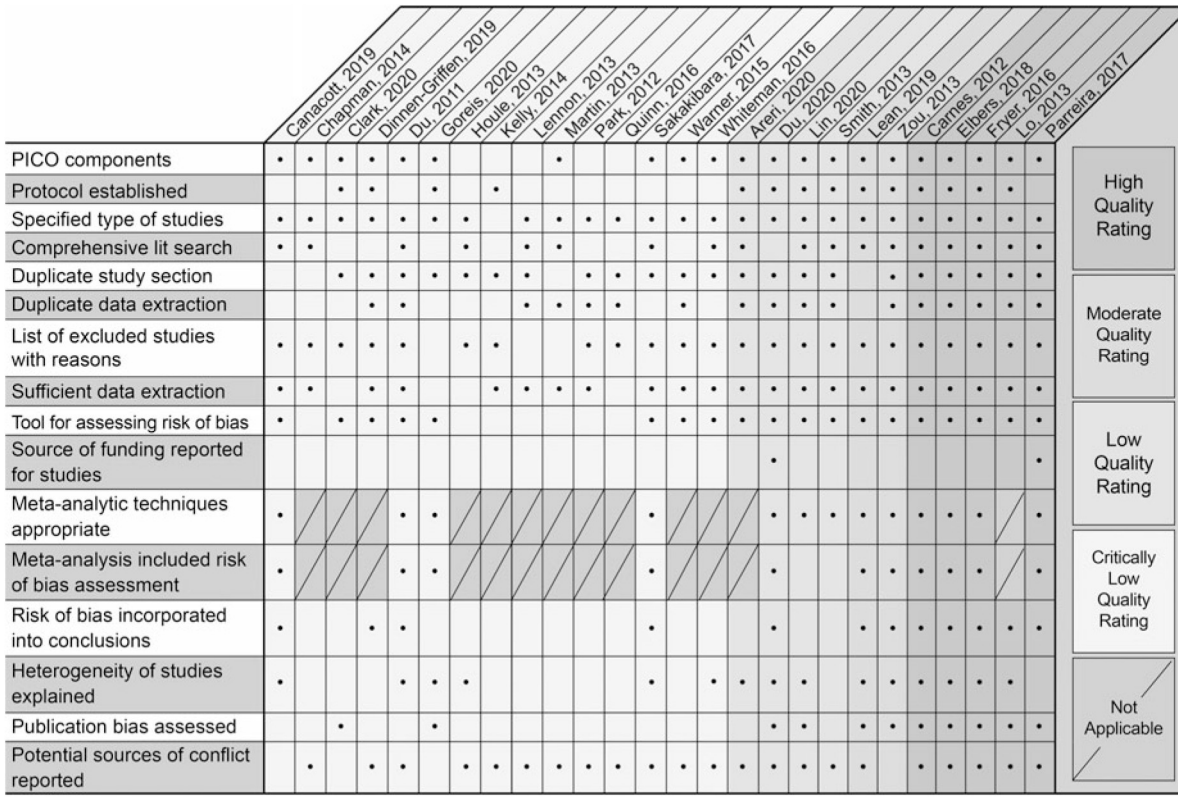


**Figure 2.** Quality ratings of included studies.



Table 1 shows the characteristics of the self-management interventions covered by the reviews with moderate- or high-quality ratings, including the components of self-management, delivery method of intervention, and target group. Most reviews included interventions that addressed all 4 components of self-management, in addition to education. The majority of interventions included in reviews were conducted in person, but many included interventions conducted by telephone. Web-based and video delivery of self-management

**TABLE 1** *Characteristics of interventions for reviewed studies*

| | | Carnes et al (2012)[40] | Elbers et al (2018)[41] | Fryer et al (2016)[33] | Lean et al (2019)[45] | Lo et al (2013)[34] | Parreira et al (2017)[42] | Zou et al (2013)[46] |
|---|---|---|---|---|---|---|---|---|
| Self-management components | Changing health behaviors | • | • | • | | • | • | • |
| | Enhancing decision-making or skills for medical treatment management (includes resource facilitation) | | • | • | • | • | • | • |
| | Training in independent sign/symptom monitoring | | | • | • | • | | • |
| | Training in medication management | | | • | • | • | | • |
| Delivery Method | In person | • | • | • | • | • | • | • |
| | Telephone | | | • | | • | | |
| | Video | • | | | | | | |
| | Web-based | | | | • | | | |
| Target of Intervention | Person with disease | • | • | • | • | • | • | • |
| | Group | | • | • | • | • | • | • |
| | Caregiver/care partner | | | • | | • | | |
| | Person-caregiver duo | | | | | • | | |

**TABLE 2** *Summary of conclusions of systematic reviews rated as moderate or high quality*

| | Disease groups | | |
|---|---|---|---|
| **Outcomes** | **Psychiatric disorders (schizophrenia, schizoaffective, bipolar)** | **Chronic pain** | **Stroke** |
| Health service utilization | ↓ avg. hospital length of stay posttreatment and follow-up (Lean et al, 2019[45])<br>No effect on readmission posttreatment and follow-up (Lean et al, 2019[45])<br>↓ mean number of readmissions (Lean et al, 2019[45])<br>↓ rehospitalizations (Zou et al, 2013[46]) | | |
| Global health | | ↑ global health at short-term follow-up when delivered in the group setting and by a healthcare professional (Carnes et al, 2012[40]); no effect at >8-mo follow-up (Carnes et al, 2012[40]) | |
| Physical health | | ↑ physical function when delivered in the group setting and by a healthcare professional (Carnes et al, 2012[40])<br>No effect on physical function posttreatment and follow-up (Elbers et al, 2018[41]) | |
| Mental health | No effect on hope and empowerment posttreatment (Lean et al, 2019[45])<br>↑ hope and empowerment at follow-up (Lean et al, 2019[45])<br>↓relapse (Zou et al, 2013[46])<br>↓symptom severity, including positive, negative, and general symptoms (Zou et al, 2013[46]) | No effect on depression posttreatment (Carnes et al, 2012[40]) | No effect on depression or anxiety levels (Fryer et al, 2016[33])<br>No effect on depressive symptoms (Fryer et al, 2016[33]) |
| Self-management of specific symptoms | ↓ total psychiatric symptoms posttreatment and follow-up (Lean et al, 2019[45])<br>No effect on positive symptoms posttreatment (Lean et al, 2019[45])<br>↓ positive symptoms at follow-up (Lean et al, 2019[45])<br>↓negative symptoms posttreatment and follow-up (Lean et al, 2019[45]);<br>↓ depression and/or anxiety symptoms at posttreatment and follow-up (Lean et al, 2019[45]) | ↓ pain intensity at follow-up; at <4 mo, effect only seen when delivered in the group setting and by a healthcare professional (Carnes et al, 2012[40])<br>No effect for reducing back pain intensity (Elbers et al, 2018[41])<br>↓ reducing lower back pain at follow-up (Parreira et al, 2017[42]) | |

*(continues)*

**TABLE 2** *Summary of conclusions of systematic reviews rated as moderate or high quality* (Continued)

| | Disease groups | | |
|---|---|---|---|
| **Outcomes** | **Psychiatric disorders (schizophrenia, schizoaffective, bipolar)** | **Chronic pain** | **Stroke** |
| QOL/Life satisfaction | ↑ quality of life posttreatment and follow-up (Lean et al, 2019[45]) | | ↑ stroke-specific quality of life (Fryer et al, 2016[33]) |
| Activities | ↓ functional disability posttreatment and follow-up (Lean et al, 2019[45]) | ↑ physical activity posttreatment, but not a clinically important change (Elbers et al, 2018[41])<br>↓ pain disability, but not a clinically important change (Elbers et al, 2018[41])<br>No effect on physical activity at follow-up (Elbers et al, 2018[41]) | No effect on activity limitation (Fryer et al, 2016[33]) |
| Participation | ↑ social functioning posttreatment and follow-up (Lean et al, 2019[45])<br>↑ occupational function (Zou et al, 2013[46])<br>↑ social contacts (Zou et al, 2013[46]) | | |
| Self-efficacy for healthcare management | ↑ self-efficacy posttreatment and follow-up (Lean et al, 2019[45]) | ↑ self-efficacy at follow-up, when delivered in the group setting and by a healthcare professional (Carnes et al, 2012[40])<br>↑ self-efficacy at follow-up, but not a clinically important change (Elbers et al, 2018[41]) | ↑self-efficacy (Fryer et al, 2016[33])<br>No effect on locus of control (Fryer et al, 2016[33])<br>↑ self-efficacy in communicating with physicians at follow-up (Lo et al, 2013[34]) |
| Specific self-management behaviors | ↑ medication adherence (Zou et al, 2013[46]) | | No effect on cognitive self-management practices at follow-up (Lo et al, 2013[34])<br>No effect on participation in aerobic exercise at follow-up (Lo et al, 2013[34]) |

Abbreviation: QOL, quality of life.
[a]↑ = improved/increased; ↓ = reduced/decreased.

interventions was relatively rare. Interventions were most often targeted toward the individual or groups of individuals, with few studies targeting caregivers or the patient-caregiver duo.



### Synthesis of findings from high- and moderate-quality studies

Table 2 shows the conclusions of the 7 reviews that were rated as high or moderate in quality. Three focused on effectiveness of self-management interventions for chronic pain, 2 addressed stroke, and 2 focused on mental health disorders. The 2 that focused on stroke showed positive outcomes on quality of life, general self-efficacy,[33] and self-efficacy for communicating with physicians.[34] No effect of self-management interventions was found for reducing depression or anxiety or physical disability.[33] Self-management was not effective for increasing use of self-management strategies of cognitive or mental relaxation or for increasing aerobic exercise.[34]

Self-management was found to impact a variety of outcomes in 3 reviews focused on patients with chronic pain. For patients with chronic musculoskeletal pain, self-management interventions were found to be effective for improving self-efficacy,[40,41] reducing pain disability,[40] and reducing perceived pain intensity.[40,41] One review[40] concluded that self-management interventions were effective for improving physical function, while a second review concluded a lack of benefits for physical function.[41] Carnes and colleagues[40] concluded positive effects on pain intensity, global health, physical health, and self-efficacy, when the intervention was delivered by a healthcare professional in a group setting. In patients with chronic back pain, Parreira and colleagues[42] concluded that there is low-quality evidence that Back Schools, which include self-management interventions, are effective for reducing pain and pain-related disability.

The reviews of self-management intervention for patients with mental health disorders with psychotic features (including schizophrenia, schizoaffective disorder, and bipolar disorder) concluded that self-management interventions led to a reduction in overall psychiatric symptoms, including positive, negative, and general symptoms.[45,46] Self-management intervention was also associated with a decreased number of readmissions/rehospitalizations, as well as reduced relapse rates. Intervention was associated with increased hope and feelings of empowerment, increased quality of life, increased self-efficacy for managing health, reduced functional disability, improved occupational and social functioning, and improved medication adherence.

Our umbrella review did not identify any systematic reviews regarding self-management interventions for persons with TBI.

## DISCUSSION

Our umbrella review did not yield evidence for the effectiveness of self-management interventions for persons with TBI, based on our working definition. The literature in this area is early in its development, and evaluation of comprehensive self-management programs to improve outcomes following TBI is needed. While we did not find systematic reviews of self-management studies for persons with TBI, a single study showed effectiveness of anger self-management training (psychoeducation, training in self-monitoring of anger and problem-solving) for reducing self-reported trait anger in persons with TBI.[52]

Our umbrella review did yield encouraging findings regarding the effectiveness of self-management interventions in chronic conditions whose symptoms overlap with TBI. Chronic pain is common in the TBI population[53] and therefore self-management of pain symptoms is a priority. The findings that self-management interventions are effective for reducing pain intensity and pain-related disability, and for improving physical function in people with chronic pain, suggest that these interventions may be effective for management of chronic pain in individuals with TBI. However, these interventions may have to be adapted to be effectively implemented by people with TBI who typically have cognitive impairment. The positive impact of self-management interventions for a variety of outcomes in patients with mental health disorders with psychotic features is relevant to persons with TBI, as individuals with psychotic disorder have been shown to have impairments in verbal memory, processing speed, working memory, and social cognition.[54,55]

Evidence on the effectiveness of self-management intervention for people with stroke is relevant for people with TBI, as these populations overlap with regard to cognitive, emotional, and behavioral symptoms. Conclusions of reviews of self-management in patients with stroke are encouraging with regard to effects on quality of life and self-efficacy. Unfortunately, the reviews concluded that self-management interventions with community-dwelling persons following stroke have not led to improvement in symptoms of depression or anxiety, use of self-management strategies for relaxation, participation in aerobic exercise, reduction in physical disability, or reduction in medical risk factors for stroke. Any self-management intervention that is likely to be effective for people with TBI must include consideration of the impact of cognitive, emotional, and behavioral impairments on ability to understand and implement self-management strategies, and the intervention should include adaptations that can be made to tailor the intervention for people with such impairments. Unfortunately, the reviews of self-management in patients with stroke offer a minimal understanding of cognitive obstacles to learning and implementing

self-management. Level of cognitive impairment and its potential impact on benefit were not discussed in these reviews. Indeed, some of the studies that were reviewed specifically excluded individuals with cognitive impairments. Lo and colleagues[34] indicated that the studies that they reviewed were unclear as to how learning of skills, such as problem-solving and decision-making, was facilitated for individuals with stroke.

In conducting our review, we were interested in whether there was evidence of the effectiveness of self-management interventions for subgroups of individuals that are overrepresented among people with TBI, including older patients and underserved racial/ethnic groups. We found minimal investigation of the differential impact of self-management interventions for these subgroups. These different subgroups may require tailoring of self-management interventions in the context of their socioeconomic and cultural environments. Another challenge is determining what key characteristics of the intervention (eg, content, delivery method, frequency of contact, technology use) are drivers of successful outcomes. Only one review examined the effects of different delivery methods, interventionists, intervention duration, and intervention components. Carnes and colleagues[40] emphasized the difficulty with examining the effects of complex and multicomponent self-management interventions.

The role of caregivers in facilitating learning and implementation of self-management in people with stroke has not been addressed in the systematic reviews, and this would have relevance for people with TBIs. The review by Lo and colleagues[34] included studies that allowed caregivers to participate in sessions with patients with stroke, but no conclusions were drawn about the specific role of caregivers in assisting the person with stroke to learn and implement self-management. While independence of the person with stroke or TBI is the ultimate goal, some individuals will likely need the assistance of a caregiver, depending on the level of impairment. Thus, education of caregivers on how to assist the person with injury to learn and implement self-management is necessary.

Our review did not yield consistent evidence of the role of peer mentorship in self-management interventions. One review in the area of chronic pain indicated that self-management interventions were effective when led by healthcare professionals or lay persons, but the lay persons were not peers with the same disability as the target group.[40] Lo and colleagues[34] recognized that stroke survivors and their caregivers valued peer-led programs and perceived benefits through sharing of advice and social connectedness. Peer mentoring has long been perceived as valuable by individuals with TBI,[56] although there is insufficient evidence of its effectiveness for improving self-management outcomes.[57] Based on perceived value to people with TBI, consideration should be given to integrating peer mentors into professional-led self-management training.

## LIMITATIONS

The current umbrella review was conducted to extract lessons that could be applied to development of self-management interventions for individuals with TBI, and a decision was made to include reviews that focused on self-management for chronic health conditions in which symptoms overlapped with TBI. Conclusions were made on the basis of 7 reviews that covered only 3 chronic health conditions. Our quality ratings of the reviews related to the methodology of the systematic review itself, and a low rating did not necessarily correspond to low quality of studies included in the review. This is a limitation of umbrella reviews and may result in missing information from specific studies that may indicate high-quality evidence. Our working definition of self-management intervention may have resulted in exclusion of some reviews that could have yielded information that could be applied to individuals with TBI.

## CONCLUSION

Lessons learned from reviews of the effectiveness of self-management interventions for individuals with chronic health conditions for which symptoms overlap with TBI suggest that such interventions may be effective for improving many outcomes; however, the results for individuals with cognitive impairment and other special needs are uncertain. Development of self-management interventions for persons with TBI should focus on tailoring existing intervention programs to build in compensatory strategies and supports for facilitating learning of implementation of self-management skills. Studies evaluating such interventions for persons with TBI are needed.

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