Effectiveness of Interventions to Improve Occupational Performance for People With Psychosocial, Behavioral, and Emotional Impairments After Brain Injury: A Systematic Review

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OBJECTIVE. This systematic review evaluates the effectiveness of interventions to improve occupational performance for people with psychosocial, behavioral, or emotional impairments after traumatic brain injury (TBI).

METHOD. Medline, PsycINFO, CINAHL, OTseeker, and the Cochrane Database of Systematic Reviews were searched. Of the 1,512 articles initially identified, 35 met the inclusion criteria.

RESULTS. Six types of interventions were identified: (1) education, (2) peer mentoring, (3) goal-directed therapy, (4) physical activity, (5) skills training, and (6) cognitive–behavioral therapy (CBT). Strong evidence from well-conducted research supports the use of CBT in individual and group settings. Moderate evidence supports goal-directed interventions, aquatic exercise, and functional skills training. Limited evidence supports peer mentoring, aerobic exercise, educational interventions, and various skills training.

CONCLUSION. An increasing body of evidence supports specific interventions to improve occupational performance and participation for people with psychosocial, behavioral, or emotional impairments after TBI.

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raumatic brain injury (TBI) causes a complex array of changes in a person’s psychosocial, behavioral, and emotional states. These changes, in turn, have a significant impact on occupational performance, including employment, academic pursuits, leisure, and social participation (Draper, Ponsford, & Schönberger, 2007). Long-term outcome studies of people up to 20 yr after TBI indicate high levels of mood disorders, anxiety, psychomotor slowing, loneliness, and family dysfunction (Draper et al., 2007; Hoofien, Gilboa, Vakil, & Donovick, 2001). The increased prevalence of psychological problems in people with TBI, including depression, anxiety, suicidal ideation, substance abuse, sleep disorders, and posttraumatic stress disorder, highlights the need for appropriate and empirically based interventions.

Occupational therapy plays a key role in TBI rehabilitation throughout the continuum of recovery. Occupational therapy practitioners have training in assessing and treating both psychological and physical impairments to improve occupational performance, making their role in TBI rehabilitation vital. With the increasing number of people living with TBI and the psychosocial, behavioral, and emotional impairments associated with the condition, identifying evidence-based interventions within the scope of occupational therapy practice is imperative.

The purpose of this systematic review was to critically appraise and synthesize the applicable evidence to address the research question “What is the evidence for the effectiveness of interventions to address psychosocial,
behavioral, or emotional impairments and skills to improve occupational performance for people with TBI?”

Method
This systematic review is one of six reviews of the TBI literature relevant to occupational therapy conducted under the auspices of the American Occupational Therapy Association (AOTA) Evidence-Based Practice (EBP) Project. The six review questions were based on an earlier set of reviews that covered the literature from 1986 to 2008 and were updated to reflect present clinical practice. An advisory board consisting of experts in the field and the review authors provided feedback on the development of the questions. The reviews were carried out through academic partnerships, with the review team for this question consisting of three occupational therapy program faculty members, two occupational therapy students, and one clinic-based occupational therapist. The methods for the reviews were specified in advance and documented in a protocol for the authors.

Search Strategy
The inclusion criteria for all of the reviews were as follows: Studies were published in peer-reviewed scientific literature between 2008 and 2013, 50% of participants in the study sample were adults with TBI, articles were written in English, and interventions were within the scope of practice of occupational therapy. Additionally, this review includes 5 articles published before 2008 because they provide valuable information to answer the question and were not included in the previous review. Using the evidence hierarchy described by Sackett, Rosenberg, Muir Gray, Haynes, and Richardson (1996), Level IV (descriptive outcome studies such as single-subject and case series designs) and Level V evidence (case reports, narrative literature reviews, and consensus statements) were included only when Level I (systematic reviews, meta-analyses, and randomized controlled trials [RCTs]), Level II (two-group nonrandomized studies), or Level III (one-group, nonrandomized studies) evidence was not found. The review excluded qualitative studies and reports from presentations, conference proceedings, non–peer-reviewed research literature, dissertations, and theses. Articles that were used in the four systematic reviews included in this review were not included individually in this review.

The EBP methodology consultant to the AOTA EBP Project and AOTA staff identified the search terms in consultation with the review authors and the advisory group, with the terms selected in keeping with the specific thesaurus of each database used in the search. A medical research librarian with experience in completing systematic review searches further refined the search strategies and conducted all searches. The databases and sites that were searched included Medline, PsycINFO, CINAHL, OTseeker, and the Cochrane Database of Systematic Reviews. The review teams examined reference lists from articles that were identified for inclusion for additional potential articles, and selected journals were hand searched to ensure that all appropriate articles were included. See Supplemental Appendix 1 for one of the electronic search strategies for this question (available online at http://otjournal.net; navigate to this article and click on “Supplemental”).

Study Selection, Data Extraction, and Risk of Bias Assessment
The EBP Project methodology consultant first eliminated references for each question on the basis of citations and abstracts. The review team (the authors) eliminated additional references on the basis of citations and review of the abstracts. We retrieved the full-text versions of the articles for the remaining references and reviewed them for relevance to the question, study quality, and level of evidence. Each included article was abstracted using an evidence table that included the level of evidence, a summary of the study methods, and findings relevant to the review question. AOTA staff and the EBP Project consultant reviewed the evidence tables to ensure quality control before we undertook a more in-depth review and summarization.

We assessed the risk of bias of individual studies using the methods described by Higgins, Altman, and Sterne (2011). The risk of bias of systematic reviews was assessed using the measurement tool developed by Shea et al. (2007). One author of this review conducted the initial risk of bias assessment for all articles. The entire team of authors then reviewed random articles to check accuracy of the assessment, with 100% agreement achieved. The risk of bias assessment was included in determining the strength of evidence for the intervention approaches.

Data Synthesis
Given the heterogeneity of the included studies, we used a qualitative approach to data synthesis. We examined the studies selected for review for similarities across participants, settings, interventions, and outcomes and grouped related studies into themes. The strength of the evidence for each theme was adapted from the system proposed by the Agency for Healthcare Research and Quality, U.S. Preventive Task Force (2012). The designation of strong evidence indicates consistent results from well-conducted studies, usually at least two RCTs. A designation of moderate
Evidence was made on the basis of one RCT or two or more studies with lower levels of evidence. In addition, inconsistency of findings across individual well-conducted studies could preclude a classification of strong evidence and result instead in a designation of moderate evidence. The designation of limited evidence was made when there were only a few lower level studies, flaws in the available studies, or minor inconsistency in the findings across individual studies. A designation of mixed evidence indicates that the major findings were inconsistent across studies in a given category. Finally, a designation of insufficient evidence was used when the number and quality of studies were too limited to make any clear classification.

Results

Abstracts of 1,512 articles were reviewed, of which 35 were included in this review; see Figure 1 for further detail. Supplemental Table 1 summarizes selected articles on interventions that address psychosocial, behavioral, and emotional interventions to improve occupational performance (available online at http://otjournal.net; navigate to this article, and click on “Supplemental”). Articles were also included if quality-of-life or community participation outcome measures were used because of the limited number of studies using specific occupational performance measures. Summaries of the key findings related to these interventions are provided in the sections that follow.

Risk of Bias

The researchers in many of the studies included in this review appropriately used patient self-report tools to measure psychological and emotional status. Because the researchers used self-report tools, and because in many studies participants were not blinded to their role in the study (e.g., intervention recipient, control group, wait-list control), a risk of detection bias was present. Blinding of participants and personnel was unable to be maintained in a majority of studies in this review, increasing the risk for performance bias. A majority of studies included in this review, however, demonstrated low risk for attrition bias over both the short term (2–6 wk) and the long term (>6 wk; see Supplemental Tables 2 and 3, available online).

Education Interventions

Education interventions included counseling or educating clients regarding psychosocial, behavioral, or emotional symptoms after brain injury and ways to address these symptoms. The education interventions were further divided into two subgroups: group based and individual based.

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram of published literature search.

Figure format adapted from “Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement,” by D. Moher, A. Liberati, J. Tetzlaff, & D. G. Altman; PRISMA Group, 2009, British Medical Journal, 339, b2535. Used under the terms of the Creative Commons Attribution License.
Group-Based Education. Two Level I studies, 1 Level II study, and 1 Level III study implemented an education intervention to address psychosocial, behavioral, or emotional skills and impairments for participants within a group setting. The education interventions included strategies to improve participants' knowledge and understanding of an issue related to brain injury to improve occupational performance. In a Level I systematic review on the efficacy of community-based rehabilitation programs, the researchers found moderate evidence to support the psychosocial benefits of participating in a group-based intervention (Evans & Brewis, 2008). In addition, a group intervention based on the International Classification of Functioning, Disability and Health (World Health Organization, 2001) Environment dimension significantly improved community integration and decreased depression (Fleming, Kuipers, Foster, Smith, & Doig, 2009, Level II), and a multifamily group treatment was associated with decreased anger expression and increased social support and occupational activity in a group of veterans (Perlick et al., 2013, Level III).

In a Level I RCT, the primary outcome measures indicated that the group intervention was effective in decreasing hopelessness, whereas the secondary measures did not yield significant findings; in addition, the evidence was insufficient to support the effectiveness of a group education intervention in altering secondary outcome measures including suicidal ideation, depression, social problem solving, and self-esteem (Simpson, Tate, Whiting, & Cotter, 2011).

These results provide limited support for group-based education to improve psychosocial, behavioral, or emotional skills and impairments as well as community integration. Too few studies included in this section had sufficiently similar methodologies and findings to allow a higher designation of the strength of the evidence.

Individual-Based Education. One Level I systematic review, 2 Level I RCTs, and 1 Level II study included individual-based education as an intervention to address psychosocial, behavioral, or emotional skills and impairments. Scheduled telephone calls as an education intervention were found to significantly lower depressive symptom severity (Bombardier et al., 2009, Level I RCT) and improve quality of life, psychological function, and independence in activities of daily living (Evans & Brewis, 2008, Level I systematic review). Individual-based education interventions at a multidisciplinary TBI clinic were found to be effective in lowering depressive symptoms for people with a psychiatric history 6 mo postinjury (Ghaifur, McCullagh, Ouchterlony, & Feinstein, 2006, Level I RCT). An individual skills-based substance abuse prevention counseling program in a community setting for adults with TBI was found to significantly decrease alcohol and drug use and increase coping skillfulness and the likelihood of maintaining employment (Vungkhanching, Heinemann, Langley, Ridgely, & Kramer, 2007, Level II).

These articles provide limited evidence for individual-based education interventions to treat depression, psychosocial function, coping, community participation, and alcohol and drug abuse. Too few studies included in this subsection had sufficiently similar methodologies and findings (e.g., telephone, multidisciplinary clinic, counseling program) to allow a higher designation of the strength of the evidence.

Peer Mentoring Interventions

Two Level I studies implemented peer mentoring interventions for people with TBI. Limited evidence supports peer mentoring interventions to decrease avoidance coping, chaos in the home, alcohol abuse, and somatic symptoms of emotional distress and to improve health-related quality of life (Hanks, Rapport, Wertheimer, & Kovia, 2012). Struchen et al. (2011) reported that peer mentoring was effective in decreasing feelings of loneliness while increasing perceived social support. These authors noted an unexpected increase in self-reported depressive symptoms, suggesting that this finding may be attributable to increased awareness among participants of their own TBI-related problems resulting from involvement in the peer mentoring program.

The evidence was insufficient to support peer mentoring interventions to improve perception of community integration, levels of anxiety and depression (Hanks et al., 2012), satisfaction with social integration, or social activity levels since injury of people with TBI (Struchen et al., 2001).

Goal-Directed Interventions

Two Level I studies implemented goal-directed interventions for adults with TBI during the outpatient phase of rehabilitation. The findings from these RCTs provide strong evidence to support the use of goal-directed interventions in outpatient settings to improve participant self-ratings of performance and satisfaction (Doig, Fleming, Kuipers, Cornwell, & Khan, 2011; Ownsworth, Fleming, Shum, Kuipers, & Strong, 2008). Moderate evidence supports the use of goal-directed outpatient rehabilitation after TBI to improve goal attainment, occupational performance, psychosocial reintegration, and adjustment levels (Doig et al., 2011) and to increase life satisfaction when combined with group therapy (Ownsworth et al., 2008).

Physical Activity Interventions

Two Level I RCTs and 2 Level III studies evaluated the effects of physical activity after TBI. Moderate evidence...
from a Level I study supports use of aquatic exercise to improve tension, depression, anger, vigor, fatigue, and confusion with people 6 mo to 5 yr post-TBI (Driver & Ede, 2009). Limited evidence supports use of aerobic exercise to improve self-esteem (Schwandt et al., 2012, Level III), depression, quality of life, and community activity when the participants continued to engage in ≥90 min of exercise per week (Hoffman et al., 2010, Level I; Wise, Hoffman, Powell, Bombardier, & Bell, 2012, Level III).

Skills Training Interventions

Skills training includes interventions that focus on the development of specific skills to address psychological symptoms such as anger or assertiveness or to promote living skills. The skills training interventions in this review were divided into three subgroups: behavioral, social, and functional.

Behavioral Skills Training. One Level I systematic review and 2 Level III studies examined the effectiveness of behavioral skills training interventions. In the systematic review, Ylvisaker et al. (2007) found that behavioral skills training interventions improved behavioral functioning after TBI. A Level III study of anger self-management training found significant improvement in self-reported anger scores on three outcome measures (Hart, Vaccaro, Hays, & Maiuro, 2012). Hensold, Guercio, Grubbs, Upton, and Faw (2006, Level III) found that a personal intervention substance abuse treatment approach significantly improved participants’ residential status, level of supervision required, awareness, and productive involvement. Together, these results provide limited support for behavioral skills training to treat behavioral functioning, anger, and community involvement.

Social Skills Training. One Level I and 1 Level III study implemented social skills training for people with TBI to address psychosocial, behavioral, or emotional impairments. In a Level I RCT, McDonald et al. (2008) found that social skills training for people with severe TBI resulted in significant improvements in direct measures of social behavior but had no effect on social participation, emotional well-being, and quality of life (Geurtsen et al., 2011, Level II) that remained stable at 1-yr and 3-yr follow-up (Geurtsen et al., 2012, Level II). Gains made during community-based rehabilitation continued 6 mo posttreatment for participants in a transitional living program and home-based-program (Hopman, Tate, & McCluskey, 2012, Level II). Including intensive life skills training in a community-based rehabilitation program was shown to significantly improve community reintegration but not life satisfaction (Wheeler, Lane, & McMahon, 2007, Level II). These results provide moderate support for functional skills training in a residential, community, or home-based program as being effective in treating impairments associated with social participation, community reintegration, independent living, emotional well-being, and quality of life after TBI.

Cognitive–Behavioral Therapy Interventions

CBT is guided by theoretical frameworks and can be incorporated into the occupational therapy intervention process along with a focus on occupational performance outcomes (Harrison & Hill, 2003). CBT interventions were divided into four subgroups: (1) group-based CBT, (2) individual-based CBT, (3) CBT administered in a virtual context, and (4) mindfulness-based CBT.

Group-Based CBT. Two Level I systematic reviews, 2 Level II studies, and 2 Level III studies included group-based CBT interventions to address anxiety or depression and psychosocial distress or function. Group-based CBT techniques were found to be effective in treating acute stress disorder, anxiety, depression, and psychosocial or psychological distress (Arundine et al., 2012, Level II; Bradbury et al., 2008, Level III; Soo & Tate, 2012, Level I) and anger expression (Walker et al., 2010, Level III). However, in a Level II study, Anson and Ponsford (2006) found that a CBT group intervention did not show significant changes in anxiety, depression, or psychosocial function. Al Sayegh, Sandford, & Carson (2010, Level I) found group-based CBT techniques to be effective in improving anxiety and depression at 1-mo follow-up for postconcussion syndrome. These studies provide strong support for the use of group-based CBT interventions to treat anxiety, depression, and psychosocial distress or function after TBI.
Two Level II and 1 Level III studies found conflicting evidence that group-based CBT interventions improved adaptive coping (Anson & Ponsford, 2006, Level II; Arundine et al., 2012, Level II; Bradbury et al., 2008, Level III). On the basis of these 3 studies, the evidence supporting group-based CBT interventions to improve adaptive coping and community integration is mixed and is not sufficient to support or deny its use in the treatment of coping skills and community integration post-TBI.

Individual-Based CBT. A Level I RCT implemented individual-based CBT interventions with three groups of people with TBI: motivational interviewing (MI) + CBT, nondirective counseling (NDC) + CBT, and treatment as usual (Hsieh et al., 2012). Participants who received MI + CBT had significantly better responses, including decreased anxiety, stress, and nonproductive coping, than those who received NDC + CBT. However, no difference between the CBT groups was obtained in reducing depression. Both groups resulted in significantly reduced stress, and the MI + CBT group had significantly reduced nonproductive coping compared with the treatment-as-usual group. However, the three groups did not differ significantly in regard to adaptive coping and psychosocial functioning. These results provide limited support for using MI in combination with CBT to improve anxiety, stress, and nonproductive coping to promote occupational performance after TBI.

CBT Administered in the Virtual Context. One Level II and 1 Level III study examined the use of telephone-administered CBT interventions for people with TBI and found significant reductions in psychosocial distress (Arundine et al., 2012, Level II) and in depression and anxiety (Bradbury et al., 2008, Level III). A Level III study examined a program of weekly online CBT with telephone support for people with TBI and depression and found significantly decreased depression at completion and 12-mo follow-up (Topolovec-Vranic et al., 2010). Overall, the evidence is limited to support the use of CBT administered in the virtual context to address psychological and emotional distress, anxiety, and depression, and the evidence is insufficient to support use of this intervention to address community integration or adaptive coping.

Mindfulness-Based Cognitive Therapy. One Level III study implemented mindfulness-based cognitive therapy (MBCT) in a group of people with chronic TBI and depression (Bédard et al., 2012). This study provided limited evidence to support use of MBCT to reduce depressive symptoms after TBI and insufficient evidence to support its use to improve anxiety symptoms, pain frequency, and levels of functioning.

Discussion and Implications for Practice, Education, and Research

This systematic review examined the evidence for the effectiveness of interventions to address psychosocial, behavioral, or emotional impairments and skills to improve occupational performance for people with TBI. The literature published between 2008 and 2014 was wide ranging and supported the role of occupational therapy in work with adults after TBI to help improve client factors, participation, and occupational performance. In the majority of the studies, a multidisciplinary team that may or may not have included occupational therapy provided the interventions.

Implications for Occupational Therapy Practice

It is imperative that occupational therapy practitioners identify evidence-based interventions within the scope of occupational therapy practice that address psychosocial, behavioral, and emotional impairments to maximize the potential for recovery and full participation of clients with TBI. The largest number of studies in this systematic review analyzed the treatment effects of CBT interventions to improve anxiety, depression, psychosocial distress or function, and anger (Arundine et al., 2012; Bradbury et al., 2008; Soo & Tate, 2012; Walker et al., 2010). Occupational therapy practitioners can incorporate CBT with other interventions that address occupational performance. CBT was found to be effective for people with mild and moderate TBI and in both individual and group settings. CBT can also be modified to include motivational interviewing (Hsieh et al., 2012) and MBCT (Bédard et al., 2012).

Reviewed studies provided moderate support for use of goal-directed intervention, aquatic physical activity, and functional skills training to address psychosocial functioning and improve occupational performance. Considering the inconsistency of some of the results and study designs and the risk for bias, other studies provided limited support for the effectiveness of peer mentoring, education or counseling, aerobic exercise, and a variety of skills training interventions in improving depression, anxiety, and anger. Because of the limited nature of the evidence for these other interventions, clinicians should decide on a case-by-case basis whether to use them, taking into account their own clinical expertise and clients’ preference and response.

Implications for Occupational Therapy Education

Education programs can use the results of this review to help students gain an understanding of and ability to provide evaluation and treatment for adults with TBI experiencing impairments in psychosocial, behavioral, and
emotional functioning. The 2011 Accreditation Council for Occupational Therapy Education® (ACOTE®; 2012) standards include standards on addressing the physical and psychosocial well-being of the recipients of occupational therapy services. In our opinion, it is also recommended that educational programs emphasize future occupational therapy practitioners the importance of advocating for people with TBI because of the complexity and long-lasting impairments associated with this type of injury.

Implications for Occupational Therapy Research

The findings of this review indicate that the body of literature to support the use of psychosocial, behavioral, and emotional interventions for people with TBI is growing. However, many areas remain that would benefit from additional research relevant to addressing psychosocial, behavioral, and emotional impairments and improve occupational performance. More studies that provide high-level evidence with larger sample sizes over longer durations to determine the longevity of effects from interventions within the scope of occupational therapy practice will advance the current literature and promote best practice.

In this systematic review, many of the interventions were provided by multidisciplinary teams that may or may not have included occupational therapy. Studies addressing interventions provided specifically by occupational therapy practitioners are needed to capture the unique skill set that occupational therapy practitioners provide and would promote and support the profession and the clients who receive occupational therapy services. In addition, development of outcome measures that focus on occupational performance and participation would further advance the available literature and allow for greater comparison of interventions among studies over time.

Limitations of the Review

The major limitations of the studies in this review relate to small sample sizes, restricted geographic locations, limited age ranges, varying outcome measures, and high dropout rates. Although the findings have limitations, the evidence provides reliable preliminary information about psychosocial, behavioral, and emotional interventions addressing occupational performance that warrants further investigation.

Conclusion

This systematic review highlights the increasing body of evidence supporting the role of occupational therapy in providing psychosocial, behavioral, and emotional interventions for people with TBI. The elevated prevalence of depression, anxiety, and anger in people with TBI highlights the importance of addressing psychosocial as well as physical impairments during the evaluation and intervention process. Occupational therapy practitioners’ unique skill set enables them to provide holistic services integrating current best evidence, clinical expertise, and client-centered practice for people with TBI. ▲

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References


*Indicates studies included in this review.


