

Critical Review:

Does mindfulness intervention improve quality of life and depression symptoms in individuals with traumatic brain injury?

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This critical review examines the evidence of mindfulness-based intervention for individuals with traumatic brain injury and its effects on depression and quality of life. A literature search resulted in five relevant articles, including a randomized clinical trial, single group pre-post designs, and a mixed-methods study. The articles were evaluated on study design, methods, validity and importance for clinical practice. Overall, results suggest that mindfulness intervention may improve the quality of life and/or depression symptoms of individuals with traumatic brain injury, however the strength of the research is limited at this time. Recommendations for future research are discussed.

Introduction

Traumatic brain injury (TBI) is a serious medical condition that results from an external blow to the head, causing an alteration in brain function (Menon, Schwab, Wright, & Maas, 2010). The effects of a TBI can be devastating, and result in physical, cognitive and psychological impairments (Azulay, Smart, Mott, & Cicerone 2013). It has been reported that 22-50% of individuals experience depression following a TBI (Gualtieri & Cox, 1991; McCleary et al., 1998). The effects of depression can be difficult to treat and are associated with reduced quality of life (QOL) (Hart et al., 2011).

Mindfulness-based interventions have become more common in Western culture over the last two decades to cope with chronic illness, mental health challenges, and daily life stresses (Grossman, Niemann, Schmidt, & Walach, 2004). Mindfulness is the moment-to-moment awareness of thoughts, feelings and bodily sensations, taught through meditation and awareness exercises (Azulay et al. 2013). Theoretically, as individuals improve their awareness of their experiences, they can improve their ability to monitor and cope with stress. (Azulay et al. 2013). Mindfulness interventions have been shown to improve depression symptoms and QOL in individuals with chronic illnesses (Bohlmeijer et al., 2010; Fjorback et al., 2011).

Preliminary studies of mindfulness programs on TBI patients have shown improvements in attention, working memory and mental fatigue (Azulay et al., 2013; Johansson., Bjuhr, & Rönnbäck, 2012). The effects of mindfulness on depression and QOL in

individuals with TBI is a new area of research and warrants examination to determine its efficacy.

Objectives

The primary objective of this paper is to critically review evidence of whether mindfulness-based interventions improve the QOL and symptoms of depression for individuals with TBI.

Methods

Search Strategy

Articles were found using online databases PubMed, PSYCHINFO and Scholar's Portal with the following key words: (mindfulness) AND (traumatic brain injury) OR (acquired brain injury) AND (quality of life) OR (depression) OR (mental health). Reference lists of related and included articles were reviewed for additional resources.

Selection Criteria

Studies selected for this review included individuals with reported or diagnosed TBI, which reported on the outcomes of mindfulness intervention related to QOL and depression.

Data Collection

This literature search generated five articles in line with the aforementioned selection criteria: single group pre-post studies (3), a randomized clinical trial (1), and a mixed methods study (1).

Results

Single Group Pre-Post Study

A single group pre-post study examines a group on a certain outcome, comparing baseline measures to post-intervention measures. A limitation of this design is that no control group is used, so it cannot be concluded whether the results would have occurred without the intervention. Single group pre-post studies are often used in emerging fields and may provide cause for conducting more rigorous future research on the topic.

Bedard et al. (2003) examined whether a mindfulness-based stress reduction (MBSR) intervention improved the QOL, reduced depression symptoms and increased the sense of control for individuals with TBI. This review will focus on QOL and reduced depression symptoms. Participants included ten individuals with mild-moderate TBI, at least 1-year post injury. A 12-week group intervention was completed by all subjects and included insight meditation, breathing exercises, guided visualization and group discussion. The duration of each session and time spent on each component was not specified. Gold standard measures of QOL and depression were administered pre and post intervention. Results indicated statistically significant improvements in QOL. Significant improvements were not shown in depression symptoms.

Statistical analyses were completed despite the small sample size and using three drop out participants for comparison. Difficulties recruiting male participants limited the study's ability to compare results to the general TBI population.

Overall, this study demonstrates equivocal evidence that MBSR may improve QOL in individuals with mild-moderate TBI.

Bedard et al. (2012) conducted a single group pre-post study to explore whether mindfulness-based cognitive therapy (MBCT) reduced depression symptoms in individuals with TBI. MBCT is an intervention that combines MBSR and cognitive behavioral therapy (CBT). The 8-week intervention included weekly 90-minute sessions and home practice. It involved meditation and breathing techniques, gentle yoga, and the themes of awareness of thoughts and feelings, staying in the present, and acceptance. The program was modified to suit the needs of the TBI population, by shortening meditation sessions, including numerous memory aids and repeating concepts. Participants included 20 individuals with TBI sustained greater than 1 year prior, with a diagnosis of clinical depression.

Three appropriate measures of depression were administered pre and post intervention and appropriate statistical methods were used to analyze the data. Results indicated significantly reduced depression symptoms on all three measures, with medium to large effect sizes. There was also a significant reduction in the number of participants with a diagnosis of clinical depression.

Results of this study should be interpreted with caution. There were several limitations including there was no control group and the sample size was small. A strength of the study is that participants were not receiving concurrent therapy during the intervention.

Overall, this article provides highly suggestive evidence that an adapted MBCT intervention may be effective in reducing symptoms of depression in people with TBI.

Azulay et al. (2013) investigated whether MBSR improves post-concussive symptoms, psychological functioning and neuropsychological functioning in individuals with minor TBI. This paper will focus on the results of participants' self-reported ratings of psychological functioning, particularly QOL. Individuals (n=22) with mild TBI participated in weekly 2-hour MBSR sessions for 10 weeks. The intervention was modified to accommodate the cognitive challenges of this population such as reduced recall, poor topic maintenance, and attention difficulties.

The program was modelled after the MBSR program designed by Kabat-Zinn, although the authors did not state the specific activities included. Participants were provided with home practice and asked to complete a homework log. A gold standard measure of QOL was administered pre- and post-intervention. Results indicated clinically significant changes in perceived QOL.

Although the results of this study seem promising, readers should be cautious when making conclusions, as all participants received concurrent rehab during the intervention. Therefore, it is extremely difficult to determine if the mindfulness intervention created this positive change.

Overall, this article provides equivocal evidence that that an adapted MBSR program may be effective in improving QOL in individuals with TBI.

Randomized Clinical Trial

Randomized clinical trials (RCTs) are considered one of the most rigorous study designs in clinical research.

They provide strong evidence of whether a possible cause-effect relationship exists between two comparison groups. Randomization helps to control for confounding variables that may influence the results. As with any research, the study design and results must be critically reviewed in order to make an appropriate interpretation and conclusive statement.

Bedard et al. (2013) investigated whether MBCT reduced symptoms of depression in individuals with TBI. Participants included individuals with TBI and symptoms of depression. They were randomly assigned to either MBCT group (n=38) or the wait-list control group (n= 38). The MBCT group completed a 10-week intervention of 1.5-hour weekly sessions and recommended home practice. The topics included meditation, breathing exercises, awareness of thoughts and feelings, acceptance and staying in the present. The program was adapted for the TBI population, addressing issues such as attention and memory. Valid tools were used to measure participant's self-reported ratings of depression symptoms. Appropriate statistical analysis was completed. Results indicated significant reduction in depression symptoms on one out of three measures.

This study demonstrated appropriate randomization, and although it was not possible for participants to be blind to their condition, the researchers collecting the data were blind to group allocation. It is difficult to apply these findings to the general TBI population, as participants self-selected into this study, and there was a high drop-out rate. Future research should assess the sensitivity of the instruments, as significant results were only demonstrated for one out of three measures.

Overall, this study demonstrates suggestive evidence that MBCT may be effective in reducing symptoms of depression in this population.

Mixed Methods Study

A mixed methods study includes both quantitative and qualitative information. An advantage of this study design is that the research question is addressed from different perspectives, allowing for a holistic view of the results. This may provide more information than a single independent design.

Kristofferson (2012) investigated the effects of an adapted MBSR intervention on the QOL, depression, anxiety and impulsivity of individuals with TBI and substance use disorder (SUD). This paper will focus on the evidence obtained on QOL and depression. Individuals (n=12) with TBI and substance use disorder living full time in a residential facility completed an 8-week MBSR program, which included 1-hour weekly

classes, and a 4-hour meditation retreat toward the end of the course. The intervention included meditation, body scanning, yoga, mindfulness in everyday activities, and homework exercises. Quantitative data was collected through valid self-report measures on QOL and depression taken pre and post intervention, and at an 8-week follow-up. A 1-hour qualitative interview was also conducted at the 8-week follow-up. Quantitative results indicated no significant changes on depression or QOL scores, apart from a negative, unexpected change on the "general health perceptions" subscale between post intervention and the 8-week follow-up. Qualitative interviews revealed reported improvements in QOL, mood and depression.

The findings of this study demonstrate the usefulness of a mixed methods approach. Although the quantitative data did not indicate significant improvements in participants' QOL or depression, the qualitative interviews provided more detailed information, indicating numerous perceived benefits. The small sample size and lack of control group are limiting factors; it is possible that simply belonging to a group influenced participant outcomes. In addition, participant anonymity was preserved for confidentiality reasons, although this means that we do not know if the majority of positive feedback was from a select few individuals. Therefore, the quotes included may not represent the viewpoints of all participants.

Overall, this study demonstrates suggestive evidence that an adapted MBSR program may be a beneficial intervention for TBI patients with SUD living in a residential facility. Future research is needed to explore if quantitative changes can be seen.

Discussion

The use of mindfulness as an intervention method to improve the QOL of individuals with TBI is an emerging area of research. Five articles were included in this review and yielded mixed results. Three studies were considered to demonstrate suggestive evidence for improving QOL and/or depression in this population (Bedard et al., 2012; Bedard et al., 2013; Kristofferson, 2012), while two studies revealed equivocal evidence.

Conducting research with the TBI population presents a number of challenges. One issue is that individuals with TBI are a heterogeneous population. They range in age, education level, severity of injury, and time post-injury. These variables all impact how an individual may respond to treatment, and it can be very difficult to separate these factors in a study.

Most of the studies included in this review were limited by the study design, with four using a single group pre-post study (Bedard et al., 2003; Bedard et al., 2012; Azulay et al., 2013; Kristofferson, 2012). The lack of control groups in these designs is problematic and limits the extent to which changes can be attributed to the intervention itself. In one study, participants were also receiving other concurrent therapy (Azulay et al., 2013), and another study included individuals with substance use disorders (Kristofferson, 2012), further complicating the ability to draw conclusions from the results.

All studies also relied on questionnaires, which are limited in the information they capture. It is possible that the effects of mindfulness intervention were more nuanced than what could be expressed through a questionnaire. Kristofferson (2012) found no difference between pre and post treatment scores on quantitative measures, however qualitative interviews demonstrated many perceived benefits of the intervention. Perhaps the outcomes of mindfulness intervention are better captured with a qualitative approach, however the potential for bias must be addressed.

The inconsistency among outcomes might have resulted from the differences in the intensity and adaptations of the programs. The amount of intervention ranged from eight weekly 90-minute sessions (Bedard et al., 2012) to 12 weekly sessions (length of time not reported) (Bedard, 2003). Three studies were based on John Kabatt-Zinn's MBSR program (Azulay et al., 2013; Bedard et al., 2003; Kristofferson 2012), and two studies were a combination of MBSR and Segal's MBCT (Bedard et al., 2012; Bedard et al., 2013). While each paper highlighted the main components of the program, Kristofferson (2012) was the only author to specify the amount of time spent on each component. All papers except Bedard et al. (2003) adapted the program for the cognitive challenges of the population, but only provided a general description of the modifications. In practice, there may have been great differences between the programs that is not described in the articles, making it difficult to compare different studies on mindfulness programs.

As this is a relatively new area of research, three out of five studies were from the same authors (Bedard et al., 2003; Bedard et al., 2012; Bedard et al., 2013). As the field grows, it is important to compare studies from other researchers, to provide different perspectives on the topic. Future research should also include more rigorous study designs such as randomized clinical trials and larger sample sizes. In addition, QOL is a broad term, and including concepts that may contribute to QOL such as self-efficacy and impulsivity may provide

a more comprehensive understanding of participant outcomes.

Kristofferson's (2012) qualitative interviews suggested that some individuals felt that they benefitted from the program, but had difficulty continuing with the techniques they learned after the program had ended. It would be useful to evaluate whether longer programs with continued support demonstrate greater adherence and improvements. Including follow-up data would help determine if gains are maintained long term. In addition, ensuring home practice is well documented is important when determining participants' adherence to the program (Bedard et al., 2013).

While the papers included in this review provided mixed evidence, there are many avenues for future research on this topic. Continued exploration is warranted, considering some suggestive findings, and the potential need for complementary treatments for depression and improvements in QOL for this population.

Clinical Implications

Due to the limitations of the research and lack of strong evidence presented in this review, it is recommended that Speech-Language Pathologists are cautious in recommending mindfulness-based intervention for their clients with TBI. Nonetheless, it is a low-risk intervention that may provide some benefit for symptoms of depression and QOL.

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