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The Effectiveness of Intervention Facilitating Return to Work Through Improving Cognition for Those with Mild Traumatic Brain Injury

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Madison Ertelt, Abbey Marinucci & Jaden Pikarski, 2021

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Focused Question

What is the evidence for the effectiveness of different interventions occupational therapists use to improve cognition for those with mild traumatic brain injury (mTBI) for returning to the occupation of work?

Clinical Scenario

According to the Centers for Disease Control and Prevention (CDC) (2019), about 2.87 million traumatic brain injury (TBI)-related emergency department (ED) visits, hospitalizations, and deaths occurred in the United States in 2019. It is estimated that around 1.5 million Americans suffer a traumatic brain injury every year. Approximately 2.5 to 6.3 million people currently live with a TBI-related disability (Centers for Disease Control and Prevention, 2019; Faul & Coronado, 2015, as cited in Powell et al., 2016). Specific populations are at a higher risk for sustaining a TBI. High-risk age groups include children aged four years or younger, young adults 15–19 years of age, or elderly people older than 65 years. (Levin & Diaz-Arrastia., 2015). Additionally, TBI is reported to occur in around 8–22% of military personnel participating in combat operations (Levin & Diaz-Arrastia., 2015). Military personnel are at especially high risk of sustaining TBI due to combat-related injuries. With this, mTBI is estimated to account for 80 to 90 percent of TBI cases in both civilian and military populations. (Levin & Diaz-Arrastia., 2015).

An mTBI, as defined by the American Congress of Rehabilitation Medicine, as cited in Levin et al. (2015), is a physiological disruption of brain function resulting from the damage to the brain because of trauma to the head or brain movement causing the brain to hit the skull at a high velocity. An mTBI is categorized by any of the following characteristics after injury: “any period of loss of consciousness up to 30 min; post-traumatic amnesia not exceeding 24 h; any period of confusion or disorientation; transient neurological abnormalities” (Levin & Diaz-Arrastia., 2015, p. 506). Any brain injury that includes focal signs, seizures, and intracranial lesions not requiring surgery and a Glasgow Coma Scale (GCS) score of 13-15 would indicate an mTBI (Levin & Diaz-Arrastia., 2015). The GCS is a scale that measures the severity of a traumatic brain injury with a higher score signifying less impairment (Lefevre-Dognin et al., 2020; Teasdale & Jennett, 1974).

The high prevalence and severity of side effects that occur with an mTBI are significant. Although the large majority of those sustaining an mTBI recover rapidly and tend to return to work within two months (Wäljas et al., 2014), some individuals struggle with persistent symptoms that may prevent them from returning to work in a timely manner. Common occupational deficits following an mTBI include “underemployment, low income, and marital problems” (Vanderploeg et al., 2007, p. 585). Person factors relating to cognition including attention problems and working memory may contribute to these occupational deficits. This is because jobs often require a certain degree of cognitive workload, and, when this workload is either too high or too low, a person may jeopardize their safety in the workplace and thus be deemed unable to work (Mehta & Parasuraman, 2013). According to Vanderploeg et al. (2005), attention and working memory were found to be impaired in individuals with an mTBI around eight years post-injury. This is concerning as it demonstrates the long-term consequences of sustaining an mTBI may be prolonged for years following an injury. Thus, addressing the disability within this population is essential to mitigate the effects on these people’s meaningful occupations, specifically their return to the occupation of work.



Occupations, as defined by the American Occupational Therapy Association (2020), are “everyday activities that people do as individuals, in families, and with communities to occupy time and bring meaning and purpose to life” and may include things people “need to do, want to and are expected to do” (p. 7). mTBIs have shown to impact the occupations of work and sleep, especially, but can affect any occupation depending on the individual (Cogan et al., 2017). mTBIs can have a significant effect on a person's cognition. Cognition, according to AOTA (2013), refers to the “integrated information processing functions carried out by the brain that enable people to concentrate, think, remember, plan, problem-solve, self-monitor, and execute goal-directed behavior” (p. S9). Cognition is required for an individual to participate in a variety of occupations. Cognitive functions related to work include planning, problem-solving, self-monitoring, and participating in goal-directed behaviors (AOTA, 2013). The occupation of work brings meaning and purpose into the life of an individual, helps reintegrate veterans into the community, and promotes financial independence (Cogan et al., 2019; Dillahunt-Aspillaga & Powell, 2018). Community reintegration into the workforce is complicated by the inability to drive and lapses in memory and concentration (Beaulieu, 2019). Veterans are a particular population of interest regarding community and work reintegration because they may have been away from home for a period of time.

According to Belanger et. al., (2012), of the 48,175 veterans screened that were involved in the operation enduring freedom/operation Iraqi Freedom, 87% (or 41,684) showed a positive screen for TBI. With this, comorbid mental health diagnoses including post-traumatic stress disorder (PTSD) and depression are also common among veterans with TBIs (Cogan et al., 2017; Cogan et al., 2019; DeGraba et al., 2021; Jones et al., 2019; Seal et al., 2016). Psychological factors may prolong the effects of an mTBI and therefore the veteran population has unique needs as compared to other populations affected by mTBI (Taylor & Seebeck, 2019). For example, veterans report a loss of identity, and the inclusion of family members is especially helpful for them in therapy (Cogan et al., 2018; Cogan et al., 2019). Although family members are helpful, taking on the role of a caregiver can be a burden and place high amounts of stress on these individuals. According to Hyatt (2014), family members of the injured relative identify that there are greater levels of anger and changes in temperament seen in the person with an mTBI. Alongside other person factors mentioned previously, specific person factors may need to be considered regarding veterans. Noise and light sensitivity are important sensory functions that should be addressed, as many veterans report these symptoms post-mTBI (Shepherd et al., 2020). Visual and visuospatial impairment, as discussed in Berger et al. (2016), is present in about 90 percent of TBIs as a result of physical trauma. Along with this, other areas of concern may include cognitive and motor limitations (Berger et al., 2016). All of these areas intertwine. Motor functions are fundamental to a majority of performance skills necessary for a return to work, along with cognitive and sensory functions (AOTA, 2020; Chang et al., 2016). This information suggests that occupational therapy interventions implemented need to target body functions in particular to make a return to the occupation of work smoother post mTBI. The Person-Environment-Occupation (PEO) model is the theoretical foundation chosen to analyze individuals with an mTBI throughout this critically appraised topic paper. Within the model, person factors are broken down into physical (i.e. diagnosis), cognitive (i.e. attention or memory), affective (i.e. stress), spiritual (i.e. beliefs and values) and sensory (i.e. light and noise sensitivity) (Baptiste, 2017). Environmental factors are broken down into physical, social, cultural, institutional, and virtual (Baptiste, 2017). Occupation factors are broken down into self-care, productivity (i.e. working, driving, etc.), and leisure (Law et al., 1996). Reflected



throughout the paper are connections between the importance of the best fit between all aspects of this model.

Purpose Statement

In the occupational therapy profession, further research is needed to determine the most efficient intervention strategies to implement when looking to improve cognition in individuals with an mTBI. Potential intervention strategies expressed in the literature (Classen et al., 2014a; Classen et al., 2014b; Cox et al., 2010; Dornonville de la Cour et al., 2019; Lee et al., 2016; MacPherson et al., 2017; Soeker, 2017; Varjadic et al., 2018 as cited in Holowaychuk et al.) include pencil/paper tasks, cognitive workbooks, and occupation-based interventions. The purpose of this critically appraised topic paper is to evaluate the evidence supporting these intervention strategies that occupational therapists may use to improve cognition in individuals who have suffered an mTBI in order to return to work.

Methods

Search Strategy

Evidence was located for the efficacy of pencil-and-paper, cognitive workbooks, and occupation-based intervention for individuals with an mTBI and return to work. For each intervention, a variety of search terms were used. Search terms were searched in the databases CINAHL, PubMed, PsychInfo, Google Scholar, and through the University of North Dakota School of Medicine and Health Sciences Library database.

The evidence within the researched literature was mainly separated in terms of pencil-and-paper, cognitive workbook, and occupation-based interventions. Thus, within the ‘summary of key findings’ section of this paper, this section was separated by headers in terms of each intervention strategy by itself and then a synthesis of all three was done to bring everything together cohesively. Within all intervention areas, however, common search terms were used between all three interventions (see inclusion criteria). Evidence was scarce in terms of pencil-and-paper and cognitive workbook tasks but abundant in terms of occupation-based interventions. Below, the inclusion criteria, exclusion criteria, and studies reviewed for this critically appraised topic are further discussed.

Inclusion Criteria

To determine if an intervention was “occupation-based” in an examined article, the following question was asked:

Do the interventions present include using occupation as a means of accomplishing a change in occupational performance?

If yes, the article was included for review in the ‘occupation-based interventions’ section of this critically appraised topic paper. The specific term “occupation-based interventions” was not required to include an article in this section. For cognitive workbook and pencil-and-paper interventions, studies were included that used cognitive workbook or pencil-and-paper tasks as an aspect of intervention for any population and not only including independent cognitive workbook approaches due to the scarcity of articles on mTBIs and cognitive interventions.

Exclusion Criteria

Exclusion criteria was minimized due to the lack of evidence regarding the topics of pencil-and-paper tasks and cognitive workbooks. For occupation-based interventions, articles



were excluded if they did not answer the following question directly or indirectly within the article:

Do the interventions present include using occupation as a means of accomplishing a change in occupational performance?

Studies Included

A total of twenty-three studies were included for review. In terms of methodology, there were eleven level I, two level II, three level III, one level IV and three N/A studies present in this review.

Table 1

A Summary of Relevant Evidence Reviewed

Study Design	Level of Evidence	Number of Articles	Articles Included
Randomized Control Trial (RCT)	I	5	(Cox et al., 2010), (Classen et al., 2011), (Classen et al., 2016), (Carpenter et al., 2012), and (Lee et al., 2016)
Systematic Review	I	5	(Galletto & Sacko, 2017), (Koehler et al., 2011), (Kumar et al., 2017), (Powell et al., 2016), and (Roy & Molnar, 2013)
Literature Review	I	1	(Barman et al., 2016)



Pretest-Posttest Design	II	2	(Classen et al, 2014b), (Soeker, 2017) and (Wallace & Jefferson, 2015)
Exploratory Study	III	1	(McCarron et al., 2019)
Retrospective Cohort Study	III	2	(Holowaychuk et. al., 2020) and (Dornonville de la Cour et al., 2019)
Single Subject Design	IV	1	(Classen et al., 2014a)
Website	N/A	3	(AOTA, 2020), (Military Health System, n.d.) and (Villines, 2021)
Grounded Theory	N/A	1	(Winter et al., 2018)
One Shot Case Study	N/A	1	(De Guise et al., 2016)

Summary of Key Findings

Pencil-and-Paper Interventions

Pencil-and-paper tasks can be used to assess many areas of interest for occupational therapists regarding mTBIs. Some tasks may address vision, attention, personality, motor speed,



or job-related knowledge (Berger et al., 2016; Hyatt, 2014). According to Jennings (2019), cells in the brain are activated when presented with an object; however, when presented with an object or task that holds meaning, a new area in the brain is activated. When tasks are performed that are not meaningful to the individual, information from these tasks may not be transferable to the client's meaningful occupations. Repetitive practice of cognitive skills, whether using paper and pencil or computer programs, appears to improve only the direct skills that are targeted and not to result in enhanced functional task performance, which is the focus of occupational therapy interventions (AOTA, 2018 as cited in AOTA, 2020). Even when the assessment broke down cognition into specific tasks such as those targeting attention, memory, and problem-solving, evidence was largely lacking when observing improvement of occupational performance (Galetto & Sacco, 2017; Kumar et al., 2017, thus, indicating a lack of transferability).

Connection to Occupation

Despite the evidence against transferability of tasks, the trail-making test assesses different areas of cognition and is shown to be an indicator of driving performance. According to MacPherson et al. (2017); Varjadic et al. as cited in Holowaychuk et al. (2020); & Lee et al. (2016), it is shown that the Trail Making Test Part-B (TMT-B) is a close reflection of an individual's ability to drive. It was found that the test analyses similar cognitive functions of driving such as visual search demands, ability to switch between demands, how fast the task can be completed, and executive functions. As discussed in Roy & Molnar (2013), if an individual has three or more errors or cannot complete the task in three minutes or less, there is a correlation that indicates a failing score when it comes to the actual driving evaluation. There was significant evidence for the TMT-B in individuals who have had a CVA. Exclusively, a study by Lee et al. (2016) discussed how many studies had been done to rule that the TMT-B can predict an individual's fitness to drive. They also found associations that had a significant correlation to individuals' performance on the TMT-B and drivers' involvement in traffic accidents (Lee et al., 2016). It is important to note that evidence pertaining to this test and individuals with an mTBI is scarce. An article by de Guise et al. (2016) discusses the trail-making test with individuals who had an mTBI; however, there was no discussion about the TMT's correlation to driving. Instead, there was discussion about its significance regarding anxiety, "In fact, the TMT has been identified as a significant predictor of anxiety disorder following TBI...Processing speed assessed with the TMT was found to be the strongest variable associated with anxiety disorder" (Guise et al. 2016, p. 219). The occupation of driving and community mobility impacts an individual's ability to return to work after an mTBI in many ways. Addressing driving and community mobility is important because, depending on the individual's living situation, public transportation may be limited. Cognitively, correctly navigating the transportation system, especially in larger cities, may be compromised due to the effects of mTBIs.

According to the cited research (Barman et al., 2016; McCarron et al., 2019; Military Health System, n.d.; Varjadic et al., 2018 as cited in Holowaychuk et al.; & Lee et al., 2016), the respective definitions of pencil-and-paper tasks and cognitive workbooks are not found. However, from gathering existing research, it was determined that a pencil-and-paper task is a further broken-down aspect of a cognitive workbook according to the current research. Both intervention methods work to improve cognitive skills such as memory, problem-solving, social communication, and process skills (Military Health System, n.d.). The distinguishing factor between these two intervention approaches is the focus of the intervention. A pencil-and-paper



task may attempt to improve one or two cognitive skills whereas a cognitive workbook will include multiple pencil-and-paper tasks to address a variety of cognitive skills.

Cognitive Workbook Interventions

Cognitive workbooks are often introduced through the intervention of cognitive rehabilitation in patients with an mTBI (Military Health System, n.d.). The goal of cognitive rehabilitation is to develop cognitive skills such as memory, attention processing, social communications, problem-solving, and the regulation of emotion (Military Health System, n.d.). Cognitive workbooks are commonly a cumulative collection of writing tasks and interactive computer-assisted programs (Military Health System, n.d.). Ultimately, cognitive workbook intervention should not be used as an independent intervention as it has shown the most benefits when used with a multidisciplinary team/interdisciplinary approach (Barman et al., 2016). The cognitive workbook works to create or reconnect neural pathways that were damaged in the trauma to the head or brain in injury by completing “repeated exercise of standardized cognitive tests of increasing difficulty, targeting specific cognitive domains” (Barman et al., 2016, p.174).

Current research (Cogan et al., 2018; Cogan et al., 2019; Levin & Diaz-Arrastia., 2015; McCarron et al., 2019) focuses on the veteran population who are diagnosed with an mTBI. These individuals diagnosed with a TBI are often also diagnosed with co-occurring conditions, most notably posttraumatic stress disorder (PTSD) and chronic pain (McCarron et al., 2019). TBI in veterans is commonly caused by falls, assaults, blast exposures, and motor vehicle accidents (McCarron et al., 2019). Veterans diagnosed with an mTBI can have difficulties with returning to work, maintaining intimate relationships, and building social networks (McCarron et al., 2019). As a result, veterans may experience additional difficulties when being [re]integrated into society causing occupational balance and deprivation in particular areas of occupation including work. There is a need for further research within patients diagnosed with an mTBI and treatment with cognitive workbooks.

Multimethod Approach to Cognitive Treatment

Cognitive workbooks as an intervention need to be tailored to an individual’s needs and based on the symptoms experienced; therefore, varying intervention procedures using cognitive workbooks within the intervention process (Barman et al., 2016; McCarron et al., 2019). Cognitive workbooks combine the approach of cognitive rehabilitation and psychotherapy (McCarron et al., 2019). Critical thinking skills that are involved within cognition have been shown to improve with practice such as exercises that require mental processing that increases efficacy in problem-solving (Wallace & Jefferson, 2015). More commonly, workbooks are used as a part of cognitive intervention rather than the cognitive workbook as an independent intervention approach.

Societal Reintegration

Cognitive workbooks focus on building skills that can transfer throughout occupations and focus on the area of societal integration (Military Health System, n.d.; McCarron et al., 2019). Societal integration includes the ability to return to work, maintain intimate relationships, and create social networks (McCarron et al., 2019). Social skills are critical for a return to work and success within the work environment. A cognitive workbook put together by McCarron et al. (2019), using scientific literature, clinical experience, and feedback from participants while following the model of social competence along with weekly group meetings for 12 months,



created a significant improvement in social competence, social cognition, and social function outcomes in veterans with TBI. In other research, workbooks have shown efficient in improvement in person factors such as psychological distress, stress management, cognitive avoidance in cancer populations when the workbook is individualized to fit the context and needs of the population and in development in critical thinking skills in college students (Carpenter et al., 2012; Wallace & Jefferson, 2015). With efficacy being studied in other populations and diagnoses, more research is needed on cognitive workbooks as an independent approach to improving cognition. Further research also needs to be done to address cognitive workbooks in efficacy to improve cognition in veterans to return to work. According to current research, however, cognitive workbooks, when used independently, can improve cognitive skills in individuals; therefore, improvement in cognition may allow for improved social integration, including a return to work (Carpenter et al., 2012; McCarron et al., 2019; Wallace & Jefferson, 2015). Note that further research is needed to confirm correlation between cognitive workbook intervention and readiness/ability to return to work.

Occupation-Based Interventions

Occupation-based interventions are interventions that use occupation as a means to engage a client in occupational performance as the end goal of the intervention. Returning to work requires an integration of the ability to perform multiple occupations that aid in a person's success. Occupations present within the PEO model include self-care, leisure, and productivity (Baptiste, 2017). Despite the type of occupation being addressed, including a social environment consisting of multidisciplinary and interdisciplinary treatment approaches was found to improve occupational performance outcomes post-mTBI (Powell et al., 2016). Several occupation-based interventions were located that may help facilitate a person's return to work (Classen et al., 2014a; Classen et al., 2014b; Classen et al., 2016; Cox et al., 2010; Dillahunt-Aspillage & Powell, 2018; Dornonville de la Cour et al., 2019; Soeker, 2017; Winter et al., 2018), including those in the area of productivity. Productivity would be analogous to instrumental activities of daily living (IADL) and work occupations in the United States (AOTA, 2020). Thus, to stay consistent with current practice in the United States, occupation-based interventions are explored within this section in the areas of IADL and work rather than productivity. The most commonly cited population within the literature on occupation-based interventions are veterans (Classen et al., 2014a; Classen et al., 2014b; Classen et al., 2016; Cox et al., 2010; Dillahunt-Aspillage & Powell, 2018; Soeker, 2017; Winter et al., 2018). Therefore, the occupation-based interventions presented in aforementioned sections of this critically appraised topic paper will be connected to the veteran population and return to work through the use of IADL and work occupation-based interventions.

Instrumental Activities of Daily Living

Driving rehabilitations are a common occupation-based intervention within the veteran population and are important in facilitating return to work. Several cognitive functions have been found to be important for driving. An mTBI can lead to safety issues while driving due to errors in cognition (Classen et al., 2011; Van Voorhees et al., 2018; Winter et al., 2018). This may prohibit a person from being able to independently transport themselves via driving a car to their job within the community.

Therefore, the transaction between a person with cognitive impairments following an mTBI and interacting with and operating a motorized vehicle is a poor fit in aiding a person's



return to their occupation of work. Driving and community mobility is an occupation defined by the Occupational Therapy Practice Framework (OTPF) as “planning and moving around in the community using public or private transportation, such as driving, walking, bicycling, or accessing and riding in buses, taxi cabs, rideshares, or other transportation systems” (AOTA, 2020, p. 31). Cognitive factors attributed to mTBI may consequently lead to a decrease in one's overall occupational performance in the occupation of driving and community mobility.

Several driving rehabilitation interventions were described within the literature (Classen et al., 2014a; Classen et al., 2014b; Classen et al., 2016; Cox et al., 2010). The population most researched in terms of driving rehabilitation were veterans. Veterans constitute a unique population to be addressed, as they are working on community integration after discharge from service (Dillahunt-Aspillage & Powell, 2018). Part of this community integration includes being able to drive to allow for a return to civilian work. According to the U.S. Department of Veteran Affairs (2015), veterans make for some of the best workers as they “bring diverse experiences, a variety of skills, and their military training to the civilian workplace” (p.1). Virtual driving rehabilitation interventions overall have shown efficacy in improving the cognition of those with an mTBI in terms of decreasing driving errors (Classen et al., 2014a; Classen et al., 2014b; Classen et al., 2016; Cox et al., 2010). Although some evidence was found on the topic of driving rehabilitation, it is recommended that more research be done specifically on driving rehabilitation and return to work for veterans to ensure safety within this IADL occupation.

Work

Interventions revolving around work are another occupation-based intervention for mTBIs. Work, as defined by the OTPF, is defined as “labor or exertion related to the development, production, delivery, or management of objects or services; benefits may be financial or nonfinancial” (AOTA, 2020, p. 33). Two occupation-based interventions having to do with return to work were located in the literature (Dornonville de la Cour et al., 2019; Soeker, 2017). Soeker (2017) implemented a program called the Model of Occupational Self Efficacy (MOOSE), which was found to use occupation-based principles such as “role playing, life skills training, work endurance training, and activities that promote the enhancement of an individual's memory” (p. 67). The second study used a multidisciplinary vocational rehabilitation approach that consisted of clients setting goals for themselves and working through modules that support a client's return to work (Dornonville de la Cour et al., 2019). Commonly seen throughout both interventions are activities that work on the client's endurance and energy conservation while participating in work-based tasks (Dornonville de la Cour et al., 2019; Soeker, 2017). These studies found that using occupation-based interventions while engaging in work related tasks facilitated positive outcomes such as improvements in cognition (Soeker, 2017) and a faster return to work (Dornonville de la Cour et al., 2019). One limitation in occupation-based interventions related to work is the lack of relevant research targeting this area in those with an mTBI.

Synthesis of Key Findings

The term “occupation-based” is defined by the as “characteristic of the best practice method used in occupational therapy, in which the practitioner uses an evaluation process and types of interventions that actively engage the client in occupation (Fisher & Marterella, as cited by AOTA, 2020). Therefore, if utilizing pencil-and-paper tasks and cognitive workbooks, they must be individualized for an individual's needs and be able to create a fit between person, environment, and occupation (Law et al., 1996). Current research is limited on the efficacy of



cognitive workbooks and pencil-and-paper tasks to improve cognitive skills in individuals with an mTBI. However, cognitive workbooks have been shown to improve cognition in other populations with other diagnoses (Carpenter et al., 2012; Wallace & Jefferson, 2015), and there are findings that suggest pencil-and-paper tasks correlate to occupational performance. With improvement in cognition, success in a work environment can be hypothesized.

Clinical Bottom Line

The following research question guided our research: What is the evidence for the effectiveness of different interventions occupational therapists use to improve cognition for those with mild traumatic brain injury (mTBI) for returning to the occupation of work?

To answer this question and determine the best fit for intervention for clients with an mTBI experiencing cognitive difficulties, PEO was used to analyze person factors, environment, and the occupation of returning to work. The personal factors that were considered to determine fit of intervention were: cognitive ability, attitudes, and personality. Through research, veterans became a population that a large amount of research was based on (Carpenter et al., 2012, p. 464, McCarron et al., 2019 and Wallace & Jefferson, 2015, p. 106). However, based on personal factors that exist within the population, it was determined that the person factors focused on can be translated to other populations with mTBIs as well because of co-occurring diagnoses such as PTSD and other mental health conditions (McCarron et al., 2019).

It is important to note that veterans were not our intended population. This population seemed to naturally present itself throughout the literature search. Through collective discussions, we decided to leave this population out of our research question as this population was not our intended audience. We discussed how this information was intended to better all individuals who have experienced an mTBI.

The environment of the occupation of returning to work includes social support of coworkers and family members, physical dynamic requirements of the job, the culture of the workplace and its effect on the necessary productivity. Environment also includes the relational distance from home to work and the transportation environment that requires driving ability or ability to use other forms of transportation, which is considered in the research (Classen et al., 2014a; Classen et al., 2014b; Classen et al., 2016; Cox et al., 2010). The environment of the interventions of pencil-and-paper tasks, cognitive workbooks, and occupation-based differ. Occupation-based intervention is done in a way that simulates the work environment to the best it can. The social, cultural, and physical environment will differ significantly depending on the work that the individual engages in.

In addition, physical, social, and cultural variables were found to be specific to the veteran population regardless of which type of intervention is being implemented. Considerations for the physical, social, and cultural differ in particular. The physical environment, according to a qualitative study done by Cogan et al. (2019), that would be considered ideal, would have “soundproof rooms for one-on-one sessions so that service members who are diagnosed with posttraumatic stress disorder and are hypervigilant would be less easily disrupted during treatment sessions” (p. 234). The social environment may consist of family members which, as stated by participants in a study by Cogan et al. (2019), would be beneficial. Additionally, the cultural environment of the military was found to be a reason for delayed treatment post injury following an mTBI (Cogan et al., 2017).

The occupation of returning to work is one that was broken down into aspects: driving to work and the work demands, also known as occupational load in the PEO model, of a variety of



professions (Baptiste, 2017). By using occupation-based intervention, the intervention imitates the work demands. Whereas cognitive workbook and pencil-and-paper tasks focus on building skills that can transfer throughout occupations and focusing on the area of societal integration (Military Health System, n.d. and McCarron et al., 2019). The cognitive skills are used to transfer to work demands and within the transportation to work and back. Occupation-based intervention will develop cognitive and social skills that are specifically required for the occupation demands of the specific job of the client.

By using the PEO model, the transferability of the personal factors can lead to greater use of the findings to other populations other than veterans with an mTBI. The findings may be applied to any population experiencing cognitive difficulties, particular due to traumatic brain injuries. Through the research process, occupation-based intervention had greatest support of efficacy in this population and therefore would be best practice of occupational therapy to use with clients with cognitive impairments.

Ultimately, occupational therapy is client-centered, evidence-based, and occupation-based (AOTA, 2020). Considering these values of occupational therapy, best practice when addressing individuals with an mTBI and return to work intervention is an occupation-based intervention. Although scarce, the evidence on cognitive workbook and pencil-and-paper task interventions have shown some efficacy and would be a good complement to occupation-based interventions. Best practice for interventions involving an mTBI for return to work should be multi- and interdisciplinary (Powell et al., 2016) in terms of social context and should use occupation-based interventions as the primary intervention strategy. It would be beneficial to further research interventions that cohesively use occupation-based interventions along with cognitive workbook and pencil-and-paper tasks.



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