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Occupational Therapist Practices Regarding Cognitive Deficits in Mild Acquired Brain Injury

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Committee Chairperson: Tatiana Kaminsky, PhD., OTR/L

Reader: Lucretia Berg, MSOT, OTR/L

Director, Occupational Therapy Program: George S. Tomlin, PhD., OTR/L

Dean of the Graduate Studies: Sarah Moore, PhD.

Abstract

This study examined occupational therapists' current knowledge and practices in cognitive rehabilitation for adults with mild acquired brain injury (mABI). A survey was sent to 250 occupational therapists with questions that addressed assessment, treatment, and discharge planning for this population. Fifty-seven therapists (22.8%) returned the survey and met inclusion criteria. The Mini-Mental State Examination was the most well-known and used assessment overall and the Assessment of Motor and Process Skills and Executive Function Performance Test were the most well-known and used occupationally based assessments. Therapists cited availability of an assessment as the main reason for use and lack of knowledge about the assessment as the main reason for nonuse. The most common treatment was compensatory strategy training with quadraphonic and multicontext approaches used least. The modal reason for using certain strategies was their ability to lead to functional gains. The modal reason for not using certain strategies was a lack of knowledge. Over 75% of therapists responded that they discharge clients for further cognitive evaluation at least 50% of the time, mostly to outpatient therapy. There was only a slight difference in treatment between outpatient and inpatient therapists. This is problematic, particularly because outpatient therapists may have more time to treat using the multicontext approach, which increases transferability of skills between tasks. Occupational therapists need better occupationally based assessments to identify mild cognitive deficits with improved training on both new and existing assessments. Additionally, discharge planning practice patterns are adequate for this population.

Occupational Therapist Practices Regarding Cognitive Deficits in Mild Acquired Brain Injury

Since the mid-1990s, occupational therapy (OT) researchers have called for more effective cognitive evaluation tools that reflect the complexities of occupational functioning and also identify the need for more established and effective interventions for those with cognitive deficits (Radomski, 1994; Wheatley, 1994). In 1994, Radomski characterized OT's role in cognitive rehabilitation as at a turning point:

In the year 2000, we may look back at this, the adolescence of cognitive rehabilitation, as a defining moment for occupational therapy – the period in which occupational therapy's role in this transdisciplinary field changed to either equal professional partner or technical assistant. (p. 271)

Yet beyond the year 2000 articles are still being published calling for comprehensive evaluation and efficacious treatment methods for those with cognitive deficits (Erez, Rothschild, Katz, Tuchner, & Hartman-Maeir, 2009; Wolf, 2010; Wolf, Baum & Connor, 2009). The authors of these articles identified the profession's failure to develop assessments with an OT perspective. They reported short-comings in treatment and rehabilitation to promote an effective return to complex life tasks beyond self-care, such as work, initiation of social participation, and community participation (Erez et al., 2009; Wolf, 2010; Wolf et al., 2009). This indicates that in the past 17 years since Radomski (1994) posited the defining moment for the involvement of OT in cognitive rehabilitation, adequate progress in the science of treatment for those with cognitive deficits has not been made.

Intervention protocol for clients regarding cognitive rehabilitation is important because the current number of people with an acquired brain injury (ABI), defined in this paper as stroke or cerebrovascular accident (CVA) and traumatic brain injury (TBI), is high. Yearly in the United States (U.S.), 795,000 people have a stroke, resulting in CVA being considered the largest cause

of long-term disability (Centers for Disease Control and Prevention [CDC], 2010, January 28). Wolf et al. (2009) collected data post-stroke on 7,740 patients at the neurology wing in a St. Louis hospital. They found that nearly half of the patients were under the age of 65, a little over a quarter of the patients were under 55 and moreover, that almost half of the patients had a mild stroke. In this study, a mild stroke was defined as a National Institutes of Health Stroke Scale (NIHSS) score of <6, leaving the person with the ability to complete activities of daily living (ADL) successfully, which often means he or she is discharged with minimal rehabilitation (Wolf et al., 2009). ADL typically involve taking care of one's own body whereas instrumental activities of daily living (IADL) are comprised of tasks in home life and community which necessitate "more complex interactions" than ADL (American Occupational Therapy Association [AOTA], 2008). Additionally, 1.7 million people in the U.S. have an occurrence of TBI per year (CDC, 2010, March 17). Since 2001, it is estimated that 15-22% of military personnel who returned from combat in Iraq and Afghanistan have sustained a mild TBI (mTBI) (Helmick, 2010). For those with mTBI, which is the most common type of TBI, most patients seem to fully recover without any persistent symptoms but 5-20% need further rehabilitation (Erez et al., 2009; Helmick, 2010). Some skills that are damaged in mTBI are working memory, emotional regulation, information processing speed, executive functioning, decision making, and planning (Erez et al., 2009; Helmick, 2010; Miotto et al., 2010). These skills may be involved with the more complex IADL. With age of onset and severity of stroke decreasing as well as the rise in number of incidences of TBIs, there is an increased need for OT practitioners to address complex occupations beyond the ability to complete ADL when planning discharge.

Background

Cognitive deficits with ABI. Areas of cognitive impairment change in relation to where the damage to the brain occurs. The middle cerebral artery (MCA) is most commonly involved in CVA. Strokes that are the result of MCA involvement can lead to damage located throughout the lateral aspects of the frontal, parietal, temporal, and occipital lobes (Gillen, 2009). This damage may, in turn, lead to lack of judgment, impaired behavioral organization, apraxia, aphasia, perseveration, and frustration (Gillen, 2009). Damage to the posterior cerebral artery (PCA) can lead to memory impairment and visual agnosia (Gillen, 2009). In relation to the lobes of the brain, damage to the frontal lobe may impair speech, planning, executive functions, problem solving, and attention; damage to the temporal lobe may impair memory, receptive language, and emotion; damage to the occipital lobe may impair reception of visual information; and damage to the parietal lobe may impair visual-spatial functioning and tactile information processing (Gillen, 2009).

These impairments may result in functional limitations. A task as seemingly simple as putting on a shirt may become difficult with possible behavioral problems such as perseveration on one part of the task like putting on the sleeve, trouble comprehending verbal instructions, inability to put on a shirt in proper sequence, or difficulties in attending to the task (Gillen, 2009).

Depending on the type of memory impairment, a person may have difficulties in a variety of activities such as remembering names, what happened earlier in the day, historical events, new instructions for use of adaptive equipment, remembering to take medications, remembering to pick up children from school, and keeping track of numbers while balancing a checkbook (Gillen, 2009).

Executive function is a skill that is commonly impaired with ABI (Erez et al., 2009; Helmick, 2010; Jaillard, Naegele, Trabucco-Miguel, LeBas, & Hommel, 2009; Miotto et al., 2010; Ownsworth & Shum, 2008). Executive function is housed in the prefrontal cortex and relates to initiating goals, choosing a strategy or developing a plan to execute goals, executing those plans, and then adjusting and monitoring as the plan progresses (Lundy-Ekman, 2007). Gillen (2009) provides an example of executive function in the IADL task of preparing a salad. One needs to be able to initiate making a salad at the appropriate time, be able obtain the appropriate ingredients in an organized fashion and organize the workspace, sequence the steps of making a salad appropriately, and be able to problem solve issues that may come up such as not having a sharp enough knife (Gillen, 2009). Some other reported symptoms of dysexecutive function include impulsivity, problems with planning, distractibility, aggression, and poor decision making (Gillen, 2009). As a result, issues such as dysexecutive function may negatively impact IADL functioning, especially considering that IADL tasks require more complex skills (AOTA, 2008). In addition to IADL, these deficits may lead to challenges in other areas of occupation, such as socializing, community integration/participation, leisure, and employment (Erez et al., 2009; Ownsworth & Shum, 2008; Schwartz, 1995; Wolf et al., 2009).

Cognitive impairments and functional deficits in mTBI. Erez et al. (2009) conducted a study of 13 people with postacute mTBI who were referred to occupational therapy after persistent cognitive complaints. The sample had a mean time since injury of 4.7 months and was comprised of six men and seven women with a mean age of 43.4 years (Erez et al., 2009). Their cognitive baseline was taken and the group showed normal mean scores for cognitive functions such as orientation, comprehension, calculations, naming, and judgment. The group, however, was mildly impaired in memory and attention. Erez et al. (2009) found that these people with

mTBI were aware of their cognitive deficits (such as decision making and emotional regulation), had reduced participation in socialization, leisure, and work, and that some of these participation limitations were correlated with executive function deficits. In particular, the researchers found correlations between executive function deficits and problems in money management and employment.

Miotto et al. (2010) examined 12 people with mild-to-moderate traumatic brain injury one year post-injury. The participants had injuries in various areas of the brain including parietal, temporal, frontal lobes, and combinations thereof (e.g., fronto-temporal, temporo-parietal). Eight of the participants had a left hemisphere injury and four had a right hemisphere injury. Miotto et al. (2010) found that the most commonly observed deficits were information processing speed, verbal episodic memory recognition, and verbal recall.

In a case study by Schwartz (1995), a woman in her 30's had a brain injury as a result of a seizure linked to a rare blood disease. In her five month stay at the hospital, she only received OT in the final month. At 11 months post injury, she was independent in self-care but had impairments in completing household chores such as grocery shopping and meal planning. She also had difficulties in tasks related to caring for her children, remembering to attend appointments, and keeping cognitive supports (e.g., an appointment book) with her when she left the house (Schwartz, 1995).

Erez et al. (2009) suggested that people with mTBI may not have symptoms that are as mild as the name would suggest, since they have participation limitations in activities such as employment. Participation limitations were also supported by the studies done by Miotto et al. (2010) and Schwartz (1995), who found deficits in cognition and functional limitations in people

after mTBI. Erez et al. (2009) suggested that there is great importance in providing OT services to those with mTBI because of these persisting limitations (Erez et al., 2009).

Cognitive impairments and functional deficits in mild stroke. Jaillard et al. (2009) studied 177 patients post-first stroke with a mean age of 50.6 years ($SD = 16.1$). These participants were scored on the NIHSS and the Mini-Mental State Examination (MMSE), which were administered on day one and then again at day 15. These tests were used to obtain a neuropsychological profile of patients (Jaillard et al., 2009). Over 15 days, both the NIHSS and MMSE scores improved. Most notably, when compared with a control and matched group of 81 healthy individuals, the MMSE score for the participants with first-stroke was nearly the same: 29.15 for control, 28.4 for participants with stroke (Jaillard et al., 2009). Though the MMSE is often used to assess cognitive dysfunction, it is not a comprehensive test of executive function, and when tests were added that specifically assessed memory and executive function, the amount of cognitive dysfunction reported was increased in this group of participants (Jaillard et al., 2009). Though the MMSE scores indicated no cognitive deficits at day 15 for those post-stroke, 91.5% of patients failed at least one area on additional tests of cognitive functioning. In the working memory domain, 87.6% of participants failed and 64.4% failed in executive functions and episodic memory domains (Jaillard et al., 2009). For these participants, it was important that the MMSE was not the only tool for assessing cognitive dysfunction. Instead, assessments that were specifically designed to examine executive function and memory were appropriate. Another important point is that areas of occupation, such as return-to-work, may be impacted by those areas of cognitive dysfunction identified by the use of additional tests of cognitive function (Ownsworth & Shum, 2008).

Ownsworth and Shum (2008) studied 27 people who were an average of 2.1 years post stroke with a mean age of 47.3 years in order to note whether stroke had affected their ability to work and to determine which tests of executive function predicted employment performance. Ten of the 27 had returned to work where 17 had not. Two had returned to the same position with similar duties, another had modified duties, and the remainder changed employers and had different duties (Ownsworth & Shum, 2008). Most participants demonstrated impairment on varied assessments of executive functions. The researchers found that executive function influences purposeful behaviors. Purposeful behaviors include developing a goal, planning, and modifying behaviors as the goal is executed. These purposeful behaviors were related to employment productivity. Particularly, those with greater ability to self-monitor and produce ideas had better post-stroke employment productivity (Ownsworth & Shum, 2008). The authors suggested that use of more comprehensive cognitive evaluations for young people with stroke, rather than a screen that may only evaluate a few elements of cognitive function, may help therapists to better understand how to rehabilitate a patient back to work and other productive activities (Ownsworth & Shum, 2008). This is particularly important as the mean age of onset of stroke is decreasing (Wolf et al., 2009) and people aged 45-65+ years make up 42.3% of the labor force in the U.S. as of 2009 (U.S. Census Bureau, 2011, January 20).

Occupational therapy and cognitive rehabilitation. *Evaluations for mABI.* Several studies reported that there is a lack of comprehensive cognitive assessments for OT practitioners to use with people with mABI (Erez et al., 2009; Miotto et al., 2010; Ownsworth & Shum, 2008; Wolf, 2010). Currently, assessment of deficits post stroke in acute care tends to focus on ADL, mobility, and presence of aphasia or neglect (Wolf et al., 2009). Discharge planning is often based on neurological measures of impairment such as stroke scales (Wolf et al., 2009). Patients

with mild stroke are often discharged without recommendation for further rehabilitation because stroke scales do not cover all areas of cognitive deficit and do not take into account factors of complex life tasks. Patients with mild stroke are often able to care for themselves in ADL and therefore typically score as highly functioning on stroke scales (Wolf et al., 2009).

In their study, Ownsworth and Shum (2008) studied five different tests that assessed different areas of cognition including verbal fluency, basic reasoning, problem solving, error monitoring, self-regulation, planning, initiation, and fine-tuning of complex tasks. These tests were the Health and Safety sub-test of the Independent Living Scales, the Five-Point Test, the FAS Test, The Key Search Test, and the Tinkertoy Test. Ownsworth and Shum (2008) suggested that the use of tests that assess purposive behavior and self-regulation, such as the Tinkertoy Test, were best for functional employment prediction. This was because functioning on purposeful behavior and self-regulation best distinguished between those who were and were not employed on follow-up (Ownsworth & Shum, 2008). The Tinkertoy Test appeared to be able to provide accurate results despite language, motor, or perceptual impairment that the test-taker may have had due to the ABI (Ownsworth & Shum, 2008).

Erez et al. (2009) discussed various testing tools available and whether they were sensitive enough to use with clients who have milder symptoms. They briefly discussed the Executive Function Performance Test (EFPT) (Baum et al., 2008) as an example of a test that measures occupational performance. The EFPT is purported to be easy to administer and score and assesses cognitive deficits and the level of support needed to be successful in completing tasks (Baum et al., 2008). The test involves patients performing tasks such as cooking oatmeal, managing medications, making a phone call, and paying a bill, which offers a top-down approach that is in line with the needs of occupational therapists in setting goals (Baum et al.,

2008). The EFPT has been shown to be reliable and valid for testing executive function in real-world situations for people with stroke (Baum et al., 2008). Of the four subtests, two discriminated between mild and healthy groups and three of the four discriminated between mild and moderate groups. The EFPT had solid correlations with both the Functional Independence Measure (FIM) and the Functional Assessment Measure (FAM), with the FAM being more highly correlated (Baum et al., 2008). With reliable and valid evaluation tools like the EFPT and the Tinkertoy Test that assess some aspects of ability to be employed, it is unclear why there are continued articles that suggest the need for more evaluation tools and perhaps suggests a disconnect between assessment availability and their use in practice.

Cognitive treatment for mABI. Some of the same studies that pointed out the need for improved evaluations also suggested the need for better rehabilitation in advanced skills for those with mABI (Erez et al., 2009; Ownsworth & Shum, 2008; Wolf et al., 2009). There was little research found regarding cognitive treatment on complex tasks such as IADL and work with those who have mABI, and all research that was found focused solely on mTBI. Thus, research related to mTBI treatment will be discussed further, followed by treatment related to people with ABI who may have more serious injury beyond the “mild” designation.

In April 2009, a consensus conference was held with 50 “subject matter experts” from the fields of neurology, neuropsychology, nursing, psychiatry, family practice, speech-language pathology, and occupational therapy in order to provide guidelines for rehabilitation services for those with mTBI. Included in these guidelines were recommendations about assessment, interventions, and outcome measurements (Helmick, 2010). Treatment recommendations included teaching memory strategies such as using acronyms, repetition, or imagery; external cues such as use of cell phones, to-do lists, and diaries; social skills learning (usually in a group

setting); self-awareness training; and other treatments to address attention, communication, and emotional regulation (Helmick, 2010).

Another treatment strategy is introducing the use of assistive technology. Hartmann (2010) conducted a case study with a 32 year old man who worked as a paralegal secretary and had frontal lobe mTBI. The man was having trouble with quality and efficiency of work. Before his injury, he worked nine hour days with no hours on the weekends, was able to read 75-100 pages per day with the ability to read for 80 minutes at a time, and was able to take notes and dictation accurately. After his injury, he worked ten hour days and 12 hours on the weekends in order to complete the same amount of work as his pre-injury level. His reading speed decreased to 60 pages per day at 25 minutes at a time. He also had difficulty with taking notes and in dictation he had omission and sequencing problems. The participant was provided with and trained on use of technology including text-to-speech software, voice recorder, and digital pen and paper. Using the technology, he was able to work ten hours during the day with zero to two hours on the weekends, read 80-100 pages per day with a sustained reading time of 60 minutes, and had intact note taking and dictation. The assistive technology treatment was successful in improving work efficacy for this man with mTBI and his work performance eventually went back to pre-injury levels without the assistive technology treatment (Hartmann, 2010).

For moderate to severe ABI, two common treatment philosophies are the Dynamic Interactional Model/multicontext approach and the quadraphonic approach (Gillen, 2009), which provide a lens for treating clients with cognitive impairment after ABI. No matter which philosophy is used, a variety of compensatory and remedial treatment strategies are used with these clients including, but not limited to, task planning and organization, use of calendars as reminders, “thinking through” problems, and self-awareness training (Gillen, 2009).

Toglia's (1991) multicontext approach focuses on generalizing learning and is based on the idea that learning is a dynamic process with multiple factors that interact to promote learning. Tasks are analyzed in regards to their physical and conceptual characteristics. The tasks are then linked together based first on physical similarity and later are more focused on conceptual similarities (Toglia, 1991). This act of linking tasks together based on similarities is the basis for the different ways skills are transferred over varied contexts: near, intermediate, far, and very far (Toglia, 1991). This approach helps people be able to generalize particular strategies to varied situations.

Toglia (2005) provided a case example of a woman who was having trouble in housework, unable to find items in drawers or armholes in shirts that had busy patterns, confusing details when there were more than 10 objects present, and confusing similarly shaped items. During treatment, she would choose target items out of 10-20 familiar objects using finger-pointing and stimuli-blocking strategies. The starting activity involved putting 20 spoons of varying types (tea spoon, measuring spoon, etc.) randomly on the counter and sorting them using the strategies previously mentioned. Transferring that strategy, the next activity would involve sorting different knives in a drawer. Next, she would sort a cabinet full of canned goods, then empty a dishwasher and separate different items appropriately, then find matching fabric pieces for a craft activity, and finally choosing all of the short sleeved shirts in a closet (Toglia, 2005). In each case, she used the same strategy but could learn to transfer it to various contexts by use of the multicontext approach (Toglia, 2005).

Abreu and Peloquin's (2005) quadraphonic approach takes into account "micro" and "macro" perspectives. The "micro" focus (remediation-based) pulls from teaching-learning theory, information-processing theory, biomechanical theory, and neurodevelopmental theory (Abreu &

Peloquin, 2005). The “macro” (functional skills/ “whole person”-based) perspective looks at four characteristics: lifestyle or personal characteristics in performing activities, life-stage status, health status including premorbid status, and degree of functional restrictions (Abreu & Peloquin, 2005). All together, the approach involves moving between the micro and macro when providing intervention and has a focus on providing holistic treatment. In a case example provided by Abreu and Peloquin (2005), a man had problems with memory as a result of brain injury. In order to do a task, he was given simple instructions on a card. He first read them aloud but then was asked why he read them aloud as a cue to start reading it silently. Later, he learned to read them silently and was able to complete tasks efficiently with use of the cue card. To address the more holistic side of the approach, he also kept a memory diary that had sections relating to memories of his own life with photos or stories, a schedule with dates, a section that showed who his support team was at the hospital, and a section to record his own thoughts. These particular diary sections were chosen to help the man “reconstruct” his life since he had memory problems post-brain injury (Abreu & Peloquin, 2005).

These approaches seem to have been developed for adults with moderate-to-severe brain injury and no studies were found that applied these approaches to patients with mABI and/or for use with IADL, so it is unclear if these treatment approaches would be appropriate in guiding treatment for those with mABI who have goals related to the complex IADL tasks.

Continuing needs in occupational therapy. Wheatley (1994) surveyed therapists at 50 trauma centers for head injury across the country as well as at the 1989 American Occupational Therapy Association Annual Conference to discover what types of cognitive rehabilitation services were provided by them. Wheatley (1994) also sought to discover any barriers to services the therapists thought needed to be overcome. The 60 returned surveys indicated that therapists

identified a need for standardized tests, the need for a way to translate test results to occupational performance, greater and more easily accessible information about cognitive deficits and treatment methods, and better role delineation between the varied rehabilitation professionals on the team (Wheatley, 1994). The literature in recent years continues to call for more information, better evaluation tools, and improved treatment for those with mABI (Erez et al., 2009; Miotto et al., 2010; Ownsworth & Shum, 2008; Wolf, 2010). There are evaluation tools available and treatments outlined, yet the statistics reflect that people with mABI have continued difficulty returning to work or participating in IADL. There were few studies on effective treatments for mABI and no research describing current OT practices regarding evaluating and treating people with mild cognitive deficits as a result of mABI.

From the time of Wheatley's 1994 study until today, the need for occupational therapy intervention in cognitive rehabilitation remains clear and persistent. The evolution of scientific intervention has been slow and the transition from research to practice appears to have stalled with regards to cognitive rehabilitation in OT. But without understanding more about what occupational therapists are currently doing with their clients with mABI, the extent of this gap between research and practice remains unclear. Therefore, the purpose of this study was to investigate current practices and knowledge of OT practitioners regarding cognitive rehabilitation for patients with mABI, specifically what evaluations and treatments were commonly used and discharge recommendations.

Method

Design

This study was a descriptive study utilizing a survey that sought to answer questions about current practices and knowledge of OT practitioners in the United States. In the case of this

study, a survey was the best fit because the study aimed to discover things that were not well-known; the survey could therefore bring unknown factors to light. Taking into account the time frame available for the study, a survey was also beneficial because it could be given to more people in a shorter amount of time than other descriptive designs such as interview or case studies. Survey studies do have some limitations including the possibility that those who answer and return a survey are somehow different than their peers who did not, the possibility of erroneous answers due to poor question design, and because the survey is self-report participants may answer about their practices differently than they actually perform in reality.

Participants

The population of interest for the study was OT practitioners in the United States (U.S.). The most effective way to access large numbers of OT practitioners was through the AOTA, which sells lists of names and mailing addresses in 250-member blocks. These 250 members were sampled systematically from the whole member population. The accessible population was OT practitioners who work in the U.S. and were also members of AOTA's Physical Disabilities Special Interest Section. Participants were asked to fill out and return the survey if they met the following criteria: treated at least one adult with mABI in the six months preceding receipt of the survey.

Instrument

The survey consisted mainly of multiple choice and check-all-that-apply questions, with a limited number of open-ended response options (see Appendix). The questions were designed by reviewing current literature and taking into account the purpose of the study.

The beginning of the survey included demographic questions regarding number of years worked, primary work setting, region of practice, and primary client population treated in order

to be able to analyze any correlations between these factors and answers regarding OT practices and knowledge.

Next, the survey defined mABI and asked whether the OT practitioner treated clients with mABI. In this same section, the OT practitioner was asked to check off areas of occupation that were typically treated with the client such as ADL, IADL, and work.

The third section focused on questions regarding cognitive function evaluations the OT practitioner recognized the name of, which evaluations were used in practice, and whether the evaluation was valuable for treatment planning on a Likert-type scale, as well as reasons why the practitioner did or did not use the evaluations listed. The survey listed 13 assessments but one question allowed for participants to list other assessments that they may use.

The fourth section asked similar questions about treatment approaches and techniques: what the participant had heard of before, what the OT practitioner used in practice, and if the treatment approach is valuable on a Likert-type scale, as well as reason why the practitioner did or did not use the treatment approaches listed. As with the assessments section, there were six listed treatment approaches with the option for the participant to list treatment approaches they use that were not listed.

The fifth section addressed discharge planning for all settings, including whether clients were referred for cognitive evaluations at a later date. The current study was particularly interested in discharge planning in acute care and whether patients were referred for a cognitive evaluation after they have gone home and may see problems come up there. The question was asked to OT practitioners in all settings in order to avoid bias.

Procedures

The survey was reviewed by two OT faculty members on the researcher's thesis committee at the University of Puget Sound for clarity and content. The survey was approved and moved to a piloting stage. The pilot study consisted of sending the survey to three OT practitioners who met the inclusion criteria and/or had knowledge about the topics that the survey was targeting. These OT practitioners were known to the OT program through some teaching responsibilities and/or clinic instruction. Further revisions were made based on responses and comments on quality of the questionnaire.

Following approval from the university Institutional Review Board and after revisions were made from pilot testing, surveys were sent out to participants. A list of 250 AOTA Physical Disabilities Special Interest Section member mailing addresses were acquired electronically from AOTA and printed onto two sets of mailing labels. The first set was used in the initial survey mailing with the second set used in a follow-up mailing to those who hadn't returned a survey from the initial mailing. Those who had not yet returned the survey after the initial mailing were known because return envelopes were coded numerically (1-250) in order to keep track of survey returns for the second mailing. The survey itself had no code or identifying information on it. When the return envelope was received from the initial mailing, the survey was separated from the envelope. The envelope was matched to the label with the same numeric code. Then, both the coded second label and original envelope were destroyed in order to maintain confidentiality. The electronic mailing labels were limited to a two-time use (one for each set of labels) and were deleted from electronic storage after the second mailing was sent.

For the mailing, participants received the survey with a cover letter, a coded business reply envelope to return the survey, and a small thank you/incentive gift of an "OT" sticker. The cover letter explained the purpose of the study, gave information about the researcher, explained how

information would be kept confidential, how information would be used, that participants were under no obligation to complete the survey and may keep the “gift” either way, and that return of the survey indicated consent.

As surveys were returned, responses were entered into a statistical program (IBM SPSS Statistics 19). Three weeks after the original mailing, a reminder mailing was sent out to non-respondents which included similar items that were in the initial mailing: the survey with a new, condensed reminder version of the cover letter, a coded business reply envelope to return the survey in, and a small thank you/incentive gift of an “OT” sticker. The responses from the second mailing were handled in the same way as the first: each survey was immediately separated from the coded envelope and then the envelope was destroyed in order to maintain confidentiality. When the surveys from the second mailing were entered into the statistical program, they were noted as from the reminder group for further statistical analysis. The surveys were then filed and will be kept for seven years before they are destroyed.

Data Analysis

Responses were statistically analyzed using IBM SPSS Statistics 19. Descriptive statistics such as percentages, means, and variability were used. This type of statistical analysis helped to discover, for example, which types of treatments were used most commonly and the average rating of value for a treatment. Frequency comparisons by group were also done to discover whether a clear pattern of differences in answers between groups existed. A Chi-square analysis was run to determine likelihood of associations between variables by group. For instance, this test may indicate whether therapists in inpatient settings are more likely to use a certain treatment than therapists in outpatient settings. Written-in responses were grouped and added to the data set.

Results

Participants

Of the 250 surveys mailed, 109 were returned (43.6%). Of those 109, 57 met the inclusion criteria for a final response rate of 22.8%. Surveys that met the inclusion criteria but were not completely filled were included in the data set. Of the 57 who met the inclusion criteria, 45 were first-survey respondents and 12 were reminder-survey respondents. Due to there being many fewer reminder-survey respondents, data from both early and late respondents were analyzed together.

Overall, the respondents had a mean of 11.9 ($SD = 9.6$) years of experience working in OT and 57.1% had earned a BA/BS entry level OT degree, while 41.1% had earned an MS/MOT (see Table 1). Respondents came from all four regions of the U.S., as classified by the U.S. Census Bureau (2001): Northeast (17.5%), Midwest (31.6%), South (19.3%), and West (31.6%). The most common primary practice setting was inpatient rehabilitation (29.8%) closely followed by acute care (22.8%) and subacute/skilled nursing (21.1%).

In regard to clients treated by the OT practitioners, 40.4% of respondents had treated 10+ clients with mABI in the six month period prior to the survey, with the next most frequent response being 26.3% who treated four-to-six clients with mABI in the same period. When asked what age group the OT practitioners most frequently treated for mABI, 16 respondents marked 61-70 years (29.1%) and 15 respondents marked 41-60 years (27.3%) (see Table 2). Respondents were asked to mark all areas of occupation evaluated and treated for clients with mABI (see Table 3). The top three most frequent areas of occupation were ADL (100% of respondents marked this), IADL (94.7%), and social participation and leisure were both third with 78.9% each. The area of work was marked by 59.6% of respondents.

Evaluations

The evaluation section was divided into three parts: evaluation tools the OT practitioner had heard of, evaluation tools the OT practitioner had received education on, and evaluations tools the OT practitioner used (see Table 4). The most commonly heard of evaluation tool was the Mini-Mental State Examination (MMSE) with 96.5% of respondents having heard of it. The MMSE was also the most common evaluation that respondents reported receiving formal education on (50.9%) and the most commonly used evaluation tool (64.9%). Therapists who used this tool rated its value as a mean of 3.24 ($N = 41$, $SD = .86$) on a Likert scale where 1 indicated “not valuable at all”, 3 indicated “I don’t feel one way or the other”, and 5 indicated “extremely valuable”.

The second most used evaluation was the Montreal Cognitive Assessment (MoCA) with 38.6% of respondents using it. Those who used it rated its value as a mean of 3.84 ($N = 25$, $SD = .8$). The Lowenstein Occupational Therapy Assessment was the second most heard of evaluation with 80.7% of respondents having heard of the test and 17.5% of respondents having used it. Its value was rated as a mean of 3.65 ($N = 17$, $SD = .99$). The Assessment of Motor and Process Skills (AMPS) was the most commonly heard of (75.4%) and used (14%) occupation-based assessment.

The highest rated evaluations were the AMPS with a mean of 4.08 ($N = 12$, $SD = .52$) and the Executive Function Performance Test (EFPT) with a mean of 4 ($N = 10$, $SD = .67$). Both of these assessments had fewer respondents rate them than the more well-known assessments. One test that was written in by some therapists was the Functional Independence Measure (FIM). It was rated by six therapists and also garnered a high value rating at a mean of 4.5 ($SD = .5$).

The most common reason for using assessments was availability at setting (70.2%), followed by having education/knowledge of the assessment (64.9%), and ease of administration (50.9%). The most common reason for not using assessments was lack of education/knowledge of the test (87.7%), followed by availability of assessment at setting (64.9%), and the assessment taking too long to administer (29.8%).

Chi-square analysis showed that those who had treated over seven patients with mABI in the six months prior to taking the survey were more likely to have heard of over eight assessments out of 13, $\chi^2(1, N = 57) = 5.13, p = .04$. Chi-square analysis either was not valid due to low number of responses or showed no significance on assessments used between inpatient and outpatient settings, years of experience, or education level.

For frequency comparisons based on entry-level degree, BA/BS respondents were grouped and MA/MSOT/OTD were grouped due only one OTD respondent. Out of 13 assessments, 16.1% of those with a bachelor's degree received education on over eight assessments while 14.3% of those with a master's or higher received education on over eight assessments. For those with a bachelor's degree, 81.3% had received education on one-to-seven assessments, while 85.7% of those with a master's degree or higher had education on one-to-seven assessments.

Treatment

The section on treatment strategies was also divided into three parts: treatment strategies the OT practitioner has heard of, treatment strategies the OT practitioner received education on, and treatment strategies the OT practitioner used (see Table 5). More than half of respondents had heard of five out of the six treatment strategies listed, the least-known being the quadrasonic approach with 36.8% hearing of the intervention. The most commonly heard of treatments were

compensatory and remediation with 100% each and task-specific training close behind at 98.2% of respondents having heard of the intervention.

Again, more than half of the respondents had been educated on five out of the six treatment strategies, with the least known being the quadraphonic approach at 28.1% having been educated on it. The top three strategies that therapists had been given education or training on were compensatory (93%), remediation (89.5%), and task-specific training (87.7%).

For use of strategies, the same five out of six had over half of the respondents using these treatments. The top two treatment strategies used were compensatory (100%) and task-specific training (98.2%), with self-awareness training (75%) and multicontext approach (57.4%) among the least used.

Chi-square analysis either was not valid due to low responses or showed no significance on type of treatment used between inpatient and outpatient settings, years of experience, education level, or number of mABI patients treated in a six month period. A frequency comparison by inpatient and outpatient settings showed no large differences on use of the various treatment strategies, except for use of the multicontext approach (see Table 6). For the multicontext approach, 77.8% of outpatient respondents reported using the strategy in treatment, while 52.4% of inpatient therapists reported having used the strategy in treatment.

In a frequency comparison by entry-level education level, 62.5% of those with a bachelor's degree received education on self-awareness training and 64.5% used it; while 87% of those with a master's degree or higher received education and 87% used the same treatment. For multicontext approach, 43.8% of those with a bachelor's degree received education on it and 46.9% of the respondents used the approach; while 69.6% of those with a master's or higher received education and 65% used the approach.

Five out of the six listed treatment strategies were rated for their value by the therapists at 4.0 or above. The highest value was given to task-specific training with a mean score of 4.35 ($N = 55$, $SD = .75$) and the lowest value was given to remediation, earning a mean score of 3.94 ($N = 54$, $SD = .8$).

The most common reason for using treatments was identified as those leading to functional gains for most clients (98.5%), followed by having education/knowledge of the treatment (94.7%), and treatments addressing client goals (91.2%). The most common reason for not using the treatment strategies was lack of education/knowledge of the strategy (77.2%), followed by treatment not leading to functional gains (10.5%), then the treatment not making sense to address client goals (8.8%).

Discharge Planning

For discharge planning, 45.6% of respondents stated that they “sometimes (50-89% of the time)” recommend clients with mABI for further cognitive evaluation and treatment, with 36.8% who responded that they “always (90-100% of the time)” recommended clients for further cognitive evaluation and treatment. Respondents most commonly referred clients to outpatient occupational therapy (57.9%), followed by speech-language pathology (47.4%), then home health occupational therapy (42.1%) (see Table 7). When comparing inpatient and outpatient settings, 14.6% of inpatient therapist referred to vocational rehabilitation and 20% of outpatient therapists referred to vocational rehabilitation. Additionally, of 13 respondents working in acute care, eight (61.5%) responded that they “always” recommend clients for further cognitive evaluation/treatment, while five (38.5%) responded that they “sometimes” recommend clients to further cognitive evaluation/treatment. Of 43 respondents working in inpatient settings (including the acute respondents), 37.2% reported “always” referring for further cognitive

evaluation/treatment and 48.4% reported referring “sometimes.” Chi-square analysis revealed that those with a MSOT/MOT entry-level degree tended to refer patients to outpatient OT more than those with a BA/BS degree did, $\chi^2 (1, N = 53) = 8.43, p = .004$.

Discussion

The aim of this study was to discover current OT practices in cognitive rehabilitation for those with mABI, particularly in the evaluations and treatment approaches used, as well as discharge planning. Results demonstrated that over half of therapists reported most frequently treating patients aged 41-70 years old. The MMSE was the most commonly heard of and used assessment, while compensatory and remediation techniques were the most commonly used treatment techniques. For assessments, having knowledge and availability of the tests were reported as main reasons therapists used the assessments. A lack of knowledge and availability of assessments were cited as reasons why certain assessments were not used. In treatment approaches, making functional gains and having education on the treatment approaches were reported as top reasons for using a certain treatment approach. A lack of knowledge was the top reason why a certain approach would not be used. For discharge planning, 82.4% of therapists discharged clients for further cognitive evaluation/treatment at least 50% of the time. In each of the three areas studied in the survey, there are indications that OT treatment for those with mABI could be improved. These include education on both assessments and treatments appropriate for those with mABI, development of efficient and comprehensive occupation-based cognitive assessments, treatment approaches that are appropriate for complex tasks such as IADL and work, and increased discharge recommendations to disciplines such as vocational rehabilitation which may partner well with OT to help a client reach goals.

Evaluations

Assessment tools are a part of the evaluation process, which helps to determine the occupational outcomes that will be addressed by the OT practitioner and which interventions should be used to meet these goals (Rogers & Holm, 2009). So, it is important that appropriate assessment tools are known and used. This study found that the most common cognitive assessment used was the MMSE. However, Jaillard et al. (2009) stated that the MMSE does not provide a comprehensive evaluation of cognition and they found that when many who had passed the MMSE were assessed for memory and executive function, they had cognitive dysfunctions. Since the MMSE is the most commonly used assessment, it is possible that patients with mABI pass this cognitive screen due to the mild nature of their deficits and therefore do not receive further treatment for cognitive dysfunction. This is problematic because if the mild cognitive dysfunction is not assessed and therefore not treated, these patients may not be able to return to their prior occupations due to the nature of some tasks that require higher-level cognitive skills such as money management, work, and varied IADL. In fact, this is exactly what was found for clients in the study by Wolf et al. (2009). They found that those with mild to moderate stroke typically do not have difficulties in basic needs such as toilet transfers or ADL and that stroke scales do not help identify the mild cognitive deficits that occur after the stroke. Additionally, they state that 71% of those with mild to moderate stroke are discharged home with minimal to no services (Wolf et al, 2009)

One of the main reasons respondents reported using a certain assessment was ease of administration whereas a reason they would not use an assessment was if it took a long time to administer. The MMSE and MoCA were designed as “rapid screening instruments” for cognition (Nasreddine, 2012; PAR, n.d.). Because screens are meant to be administered quickly and easily, it is unsurprising that tools like the MMSE and MoCA are most popularly used when reviewing

the reported reasons of assessment use or disuse by respondents. While it has been stated that the MMSE does not provide comprehensive evaluation (Jaillard et al., 2009), Toglia, Fitzgerald, O'Dell, Mastrogiovanni, and Lin (2011) found that between the MMSE and MoCA, the MoCA was a slightly better predictor of functional outcome as measured by a modified Functional Independence Measure score. Particularly, the visuoexecutive domain of the MoCA, which includes the Trail Making B and clock drawing test, has been shown to have a stronger correlation with functional outcomes (Toglia et al., 2011). Additionally, 67% of people who scored above a 27 on the MMSE scored as having abnormal cognition on the MoCA, suggesting that the MoCA is a slightly more sensitive screening tool for cognition. However, respondents of the current study reported having used the MMSE almost double over the use of the MoCA, which may imply that patients with mild cognitive deficits are, again, being missed for further cognitive rehabilitation to return to work and IADL.

Out of the 13 non-exhaustive assessments listed in the survey, only four (MMSE, LOTCA, MoCA, & AMPS) had even reached over the 50% mark as far as therapists having heard of the assessment. The only assessment used by over 50% of therapists was the MMSE. One of the main reasons therapists cited for not using assessments was a lack of knowledge/education, followed by lack of availability at their practice setting. So, it stands to reason that there needs to be an increased exposure to varied assessments, their uses, and benefits to the occupational therapy process with a client. Particularly, results showed that those with the bachelor's level education reported being slightly more educated on eight or more assessments than those with a master's level degree. Furthermore, those with a BA/BS had nearly equal education on seven-or-less assessments to that of those with master's level or higher. These results are somewhat surprising, considering that a master's level degree should include an increased knowledge base

over a bachelor's degree, especially with more recently developed cognitive assessments. So, OT programs and educators may need to increase instruction on cognitive assessments in their curricula.

Of the assessments listed, there were four occupation-based assessments (AMPS, EFPT, A-ONE, and Multiple Errands Test). The most popular occupation-based assessment was the AMPS with 75.4% of respondents having heard of it, but only 14% having used it. However, the AMPS was the most valued assessment based on respondent ratings. The number of people who used it was low which may have inflated the rating slightly, though those who did use it did find it to be valuable. An occupation-based assessment like the AMPS may be better able to detect mild cognitive deficits because the client actually performs a complex task where the higher-level cognitive skills have more demand placed upon them. Though even with a valued occupation-based assessment like the AMPS available, it is still underused. Part of the reason that this assessment is under-used may be that it requires a five-day training course and certification to use (Gillen, 2009). The AMPS can take up to 60 minutes to administer and evaluates motor and process skills with an emphasis on IADL tasks (Gillen, 2009). So, the length of administration for the AMPS may also be a barrier to its use amongst therapists as respondents identified lengthy assessments as a reason to not use the assessment, along with other lesser-known assessments such as the EFPT or A-ONE. What is apparent is a need for occupation-based tests for cognitive deficits that are easy and fairly short to administer.

Treatment

Respondents seemed to have good knowledge and use of all six of the therapy techniques listed on the survey. All of the techniques were also thought by the OT practitioners to be valuable to therapy. The most used therapy was compensatory techniques which were defined on

the survey as use of external aids such as a diary, calendar, or checklist. Compensatory, remediation, and task-specific treatment approaches were the treatment strategies respondents reported receiving the most education on as well.

With fairly high use of at least half of the treatment strategies and with all of them thought to be fairly valuable by therapists in reaching client goals, it appears that clients should be receiving interventions that help them meet their goals successfully. Particularly, task-specific training, defined in the survey with an example of practicing a specific dressing technique repeatedly until it is learned, was scored as the most valuable, and was the second most frequently used treatment strategy. . This is a fine strategy for learning a task in a single, specific environment and could have contributed to a high value rating by the respondents. Generally, though, when a strategy is taught for a specific task, a person will not automatically transfer that strategy to other tasks, even if the tasks are similar (Gillen, 2009). Toglia (1991) wrote of the importance of teaching skills in a way that allows patients to learn to transfer strategies between contexts, as task-specific learning does not. She developed the multicontext treatment approach to address this issue.

In addition to limited generalizability of skills, people with acquired brain injury tend to have a decreased awareness of impairments, particularly in complex cognitive and socioemotional/behavioral domains (Hart, Sherer, Whyte, Polansky, & Novak, 2004; Gillen, 2009). The multicontext approach also involves elements of self-awareness training. Toglia (1991) wrote that metacognitive, or self-awareness training, can improve an individual's ability to use compensatory treatments. If therapists are most commonly treating patients with mABI with techniques like compensatory or task-specific training and not including the multicontext approach to help generalize skills, this may limit patients' ability to return to IADL or work

tasks, which require varied skills in fluctuating environments. In this study, 47.5% of respondents reported most frequently treating patients with mABI who were between 21 and 60 years old. To add to this, many people over the age of 60 are still working and may also still be taking care of children (AARP, 2006; U.S. Census Bureau, 2011, January 20). So, of these respondents, 76.4% most commonly treated people between 21 and 70 years old. It is likely that these clients with mABI were working and/or managing homes through completion of complex IADL. In light of this, it would be expected that there would be an increased use of treatment approaches that help patients gain the ability to generalize and use self-awareness, which are important skills when addressing IADL and return-to-work because these involve cognitively complex demands and are done in changing environments.

Therapists in outpatient settings may have more time than those in acute or inpatient rehabilitation to execute the types of treatments for those with mABI who may have difficulty with transfer of skills or decreased insight to problems such as the multicontext approach and self-awareness training. Additionally, outpatient therapists are more likely to see or receive reports from clients that IADL and work skills are difficult as the clients may have tried to return to their usual routine at home which would not have yet happened at an inpatient facility. So, it is problematic that 21.4% of therapists do not use self-awareness training and 31.6% do not use the multicontext approach. Particularly, outpatient OT practitioners are in a prime position to work on these needed IADL and work skills with treatment approaches that may require time and use over multiple contexts, but are important for patients with mABI. While outpatient therapists did tend towards more use of the multicontext approach than inpatient therapists, it still remains that almost 25% of outpatient therapists did not use the multicontext approach. What does seem promising is the education and use of the approach by education level, in which those with a

master's degree did report having been educated on and having used both self-awareness and the multicontext approach more than those with a bachelor's degree. This may indicate that the educational system is doing a good job of teaching OT students about these approaches to cognitive rehabilitation, though multicontext approach was reported to be less educated on and less used than self-awareness training so there is room for improvement in this area.

Discharge Planning

Overall, 82.4% of therapists reported referring clients to receive further cognitive evaluation/treatment at least 50% of the time. This study was particularly interested in whether acute care therapists were referring out for further cognitive evaluation/treatment, especially in light of the study by Wolf et al. (2009), which suggested that patients with mild stroke may be discharged home with minimal rehabilitation since they would generally be able to complete ADL independently. Thirteen OT practitioners working in acute care responded to the survey and 100% of those referred patients for further cognitive evaluation at least 50% of the time, with the majority of patients being referred "always" or 90-100% of the time. This number suggests that acute care therapists are very aware that there is a need for further cognitive evaluation and treatment for those with mABI. However, there were only a small number of acute care therapists represented and results may be different in the general population. When analyzing inpatient therapist referral practices as a whole, including the acute care therapists, 88.4% of inpatient therapists referred at least 50% of the time for further cognitive evaluation. In any inpatient setting, it is possible that the mild cognitive deficits would not be caught with assessment screenings and that the client may not have difficulties until they arrive home, especially if they plan on returning to work, which is why it is important for therapists to increase referrals for further cognitive treatment for clients at discharge. Additionally, only

14.6% of inpatient and 20% of outpatient therapists refer to vocational rehabilitation which may be helpful in return-to-work for some clients.

Limitations

Because this study was extracted from 250 OT practitioners registered with AOTA and in the Physical Disabilities Special Interest Section (SIS), it can only really be generalized to OT practitioners registered with AOTA in the Physical Disabilities SIS. However, this sampling can provide some thought and insight into OT practice as these 250 people are a part of the wider population of OT practitioners. It is important to note that in frequency comparisons between inpatient and outpatient settings, there were far fewer outpatient respondents (11) than inpatient respondents (43). So, the frequency comparisons for these groups should be taken with caution. On the survey, respondents had the opportunity to write in additional assessments or treatment strategies they use with clients. Some wrote in assessments of physical capabilities or treatments based on physical approaches, so it is possible that some respondents' perspective on the survey was not solely focused on cognitive rehabilitation. However, the opening paragraph did provide a description of a client's cognitive level to keep in mind while taking the survey and the assessments and treatments listed were all geared to cognitive evaluation or intervention. So, their answers regarding those specific tests and treatments are likely to be accurate. A way to improve the clarity in the future would be to make sure to add the word "cognitive" to the questions that ask to list other evaluations or treatments used with clients.

Implications for Occupational Therapy

Overall, it seems that there was some knowledge and use of assessments and treatment strategies for those with mild cognitive impairments and awareness that discharge planning for further cognitive evaluation and treatment was important for those with mABI. However, results

show a continued need for increased knowledge and use of appropriate and efficient assessments, and effective treatment strategies, as well as continued increasing focus on discharge planning for those with mABI. It appears that there is still a lack of efficient occupationally-based assessment tools available for OT practitioners to use to evaluate mild cognitive impairments, considering that screens such as the MMSE and MoCA, which tend to miss some milder cognitive impairments, were the most frequently used assessments. If there are tools shown to be effective, such as the EFPT (Baum et al., 2008), there may not be enough education or availability of these tools for OT practitioners to use since these reasons were most frequently reported by the respondents to keep them from using certain assessments. Additionally, the near-equal numbers of assessments educated on for therapists with bachelor's and master's entry-level degrees may also support the need for increased education on cognitive assessments. Increased education through both universities and institutions on effective assessments would help OT practitioners be able to assess and detect cognitive difficulties in those with mABI. A main reason respondents reported using assessments was the speed in which they could be administered. There is a need for development of faster, more accurate occupationally-based tools that will capture mild cognitive dysfunction, particularly in inpatient settings where evaluation time may be limited.

Clients who are in inpatient settings and whose OT practitioners may have limited time to evaluate cognition may benefit from being referred to an outpatient setting for further cognitive evaluation and treatment. According to the results, inpatient therapists seem to be doing this well, but considering the ages of patients being treated it is important that all clients with mABI that are not comprehensively assessed for mild cognitive impairment be referred for further evaluation and treatment, especially in the area of work. Additionally, referrals to vocational

rehabilitation in conjunction with OT cognitive treatment may allow clients to get back to work, but reported discharge planning to this setting only totaled 14%.

When receiving outpatient treatment, clients may best benefit from treatment strategies that incorporate multicontext and self-awareness training. While outpatient therapists did show a tendency to use these treatment approaches more often than inpatient therapists, the percentages revealed that frequency of use of these techniques could improve. This is especially important because of the ages of those being treated with mABI and the complexity of the tasks that the mild cognitive dysfunction may interfere with.

Future Research

While results reflected that OT practitioners felt that all of the treatments listed were valuable, it would be beneficial for further research to look into which treatments have most effective outcomes for clients and in what areas of occupation. Additionally, a study that determines efficacy of cognitive assessments in detecting impairments and translation to functional difficulties with those with mABI is needed. Such a study would support a clearer picture of what assessments would be best used with patients who have mABI. The results from that study could possibly allow universities and institutions to have a better idea of which assessments to focus on while teaching about evaluation of those with mild cognitive deficits. Another avenue of research is for studies that investigate the efficacy of treatment strategies such as the multicontext approach for those with mABI, as previous studies have only focused on populations with moderate-to-severe stroke.

Conclusions

This study sought to investigate current practices and knowledge of OT practitioners regarding cognitive rehabilitation for patients with mABI. Results revealed that the most

commonly heard of, educated on, and used assessment was the MMSE; that those with a BA/BS entry-level degree report being educated on and using almost equal the amount of assessments that those with an MOT/MSOT/OTD entry-level degree do; the most commonly heard of, educated on, and used treatment was compensatory; that outpatient settings do tend to use multicontext approach slightly more than inpatient settings; and that a strong majority of inpatient therapists are referring patients with mABI out for further cognitive evaluation and treatment at least half of the time. Knowing what OT practitioners currently do with patients with mABI is important due to the decreasing age and severity of stroke, the increased number of people sustaining mTBI and not fully recovering cognitively, and the increased number of people sustaining mABI and not being able to go back to work or other IADL tasks due to mild cognitive deficits. Continuing to refer clients for further cognitive evaluation and treatment, increasing OT practitioner knowledge of assessments and treatments, and improving research on assessment and treatment efficacy will allow us to best meet clients' goals of participating more independently in IADL and work activities.

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Appendix

Survey: Occupational Therapy Practices for Mild Acquired Brain Injury

This survey has questions regarding occupational therapy evaluation and treatment of people with mild acquired brain injury (mABI), namely mild stroke and mild traumatic brain injury. For the purposes of this survey, clients with mild stroke and mild traumatic brain injury would resemble those on level VIII or IX on the Rancho Los Amigos Cognitive Scale¹. This means that clients can complete familiar ADL and IADLs with assistance occasionally. For unfamiliar tasks and unexpected problems that do not follow the “usual” routine, the client will need more assistance. In general, these clients would be independent in ADL, but would have difficulty with IADL and return to work.

If you **have not** treated **at least one** client who has mABI **in the past six months**, I thank you for your time. You do not need to complete the rest of the questions. Please check here ____ and return the survey via the business reply envelope included in this mailing.

If you **have** treated **at least one** client who has mABI **in the past six months**, please continue with the survey.

GENERAL INFORMATION:

Please fill in the blanks and/or place a mark next to items as appropriate.

1. Number of years working as an occupational therapist: _____
2. Entry level OT degree earned (BA/BS, MOT/MSOT, OTD): _____
3. Region of US where you practice (check only one answer):
 - Northeast
 - Midwest
 - South (includes southeast)
 - West (includes southwest)
4. Current primary practice setting (check only one answer):
 - Acute
 - Inpatient Rehabilitation
 - Sub-acute/Skilled Nursing
 - Outpatient Clinic
 - Community based
 - Transitional care
 - Home health

¹ Retrieved from Northeast Center for Special Care website, January 2012.
http://www.northeastcenter.com/rancho_los_amigos_revised.htm

___ Other: _____

5. On average, how many clients with mild acquired brain injury do you treat in a six month period? (Check only one answer)

- ___ 1-3
- ___ 4-6
- ___ 7-9
- ___ 10+

6. What are the top three most frequent age ranges of clients you treat with mild acquired brain injury?

Place a 1 next to the first most frequent age range, a 2 next to the 2nd most frequent, and a 3 for the 3rd most frequent.

- ___ 1-12 years old
- ___ 13-20 years old
- ___ 21-40 years old
- ___ 41-60 years old
- ___ 61-70 years old
- ___ 70+ years old

7. When evaluating and treating clients with mild acquired brain injury what areas of occupation, as listed by the Occupational Therapy Practice Framework (2008)², are considered? (check all that apply)

- ___ ADL (e.g., dressing, grooming, toileting)
- ___ IADL (e.g., medication management, money management, meal preparation)
- ___ Work (e.g., job acquisition, job performance)
- ___ Rest and Sleep (e.g., sleep routine preparation, staying asleep through the night)
- ___ Education (e.g., participation in formal education settings, educational interest exploration)
- ___ Social Participation (e.g., community, family, friend interactions)
- ___ Leisure (e.g., exploring interests, participating in leisure activities)
- ___ Play (e.g., exploring play activities, types of play, participation in play)

² American Occupational Therapy Association. (2008). Occupational therapy practice framework: Domain and process (2nd ed.). *American Journal of Occupational Therapy*, 62, 625-683.

EVALUATIONS:

Please check yes, no, or not sure for each evaluation listed.

8. For the following, indicate whether **you have heard** of the evaluation tool.

Evaluation Tool	Yes	No	Not sure
Assessment of Motor and Process Skills (AMPS)			
Arnadottir OT-ADL Neurobehavior Evaluation (A-ONE)			
Behavioural Assessment of the Dysexecutive Syndrome (BADs)			
Contextual Memory Test (CMT)			
Dynamic Assessment of Categorization: The Toggia Category Assessment (TCA)			
Executive Function Performance Test (EFPT)			
The Extended Rivermead Behavioral Memory Test (ERBMT)			
Lowenstein Occupational Therapy Cognitive Assessment (LOTCA)			
Mini-mental State Examination (MMSE)			
Montreal Cognitive Assessment (MoCA)			
Multiple Errands Test			
Test of Everyday Attention (TEA)			
Tinkertoy Test (TTT)			

9. For the following, indicate whether **you have received training or education** on the evaluation tool.

“*Formal*” education refers to school or continuing education programs, “*informal*” education refers to reading manuals and guides on your own.

Evaluation Tool	Yes (formal)	Yes (informal)	No	Not sure
Assessment of Motor and Process Skills (AMPS)				
Arnadottir OT-ADL Neurobehavior Evaluation (A-ONE)				
Behavioural Assessment of the Dysexecutive Syndrome (BADs)				
Contextual Memory Test (CMT)				
Dynamic Assessment of Categorization: The Toggia Category Assessment (TCA)				
Executive Function Performance Test (EFPT)				
The Extended Rivermead Behavioral Memory Test (ERBMT)				
Lowenstein Occupational Therapy Cognitive Assessment (LOTCA)				
Mini-mental State Examination (MMSE)				
Montreal Cognitive Assessment (MoCA)				
Multiple Errands Test				
Test of Everyday Attention (TEA)				

Tinkertoy Test (TTT)				
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10. For the following, indicate whether **you use the evaluation tool** to assess a client with mild acquired brain injury.

Evaluation Tool	Yes	No	Not sure
Assessment of Motor and Process Skills (AMPS)			
Arnadottir OT-ADL Neurobehavior Evaluation (A-ONE)			
Behavioural Assessment of the Dysexecutive Syndrome (BADS)			
Contextual Memory Test (CMT)			
Dynamic Assessment of Categorization: The Toggia Category Assessment (TCA)			
Executive Function Performance Test (EFPT)			
The Extended Rivermead Behavioral Memory Test (ERBMT)			
Lowenstein Occupational Therapy Cognitive Assessment (LOTCA)			
Mini-mental State Examination (MMSE)			
Montreal Cognitive Assessment (MoCA)			
Multiple Errands Test			
Test of Everyday Attention (TEA)			
Tinkertoy Test (TTT)			

11. Please list any other evaluations you use to assess clients with mild acquired brain injury that are not listed above:

12. Rate the value of each tool for guiding the treatment of clients with mild acquired brain injury by circling a number below. If you are unsure whether you feel it is valuable or not or have no experience with the assessment, please circle the matching response.

Circling 1 indicates "I don't find this tool valuable at all", 3 indicates "I don't feel one way or the other", 5 indicates "I find this tool extremely valuable."

- Assessment of Motor and Process Skills (AMPS): [1---2---3---4---5] [not sure] [no experience]
- Arnadottir OT-ADL Neurobehavior Evaluation (A-ONE): [1---2---3---4---5] [not sure] [no experience]
- Behavioural Assessment of the Dysexecutive Syndrome (BADS): [1---2---3---4---5] [not sure] [no experience]
- Contextual Memory Test (CMT): [1---2---3---4---5] [not sure] [no experience]
- Dynamic Assessment of Categorization The Toggia Category Assessment (TCA): [1---2---3---4---5] [not sure] [no experience]

(Please continue rating on the next page)

Executive Function Performance

- Test (EPFT): [1---2---3---4---5] [not sure] [no experience]
- The Extended Rivermead Behavioral Memory Test (ERBMT): [1---2---3---4---5] [not sure] [no experience]
- Lowenstein Occupational Therapy Cognitive Assessment (LOTCA): [1---2---3---4---5] [not sure] [no experience]
- Mini-mental State Examination (MMSE): [1---2---3---4---5] [not sure] [no experience]
- Montreal Cognitive Assessment (MoCA): [1---2---3---4---5] [not sure] [no experience]
- Multiple Errands Test: [1---2---3---4---5] [not sure] [no experience]
- Test of Everyday Attention (TEA): [1---2---3---4---5] [not sure] [no experience]
- Tinkertoy Test (TTT): [1---2---3---4---5] [not sure] [no experience]
- Others (written in earlier):
- _____ : [1---2---3---4---5] [not sure]
- _____ : [1---2---3---4---5] [not sure]
- _____ : [1---2---3---4---5] [not sure]

13. Of the assessments you **do** use, which of the following describe the reason(s) you use them? (Check all that apply)

- I have education on/knowledge of the assessment(s)
- The assessment(s) are easy to administer
- The assessment(s) are easy to score
- The assessment(s) are available for use at my setting
- The assessment(s) take an appropriate amount of time to administer
- The assessment(s) give me useful information
- Other (please describe below)

Other:

14. Of the assessments you **do not** use, which of the following describe the reason(s) you **do not** use them? (Check all that apply)

- I don't have education/knowledge of them
- The assessment(s) are difficult to administer
- The assessments(s) are difficult to score
- The assessment(s) aren't available for use at my setting
- The assessment(s) take too long to administer
- The assessment(s) do not give me useful information
- Other (please describe below)

Other:

TREATMENTS:
Please check yes, no, or not sure for each treatment strategy listed.

15. For the following, indicate whether **you have heard** of the treatment strategy.

Treatment	Yes	No	Not sure
Compensatory: external aids (e.g., diary, calendar, checklist)			
Remediation (e.g., memory games, pencil-and-paper brain training tasks, computer games to retrain cognitive skills)			
Self-awareness training (e.g., predicting performance, “stop-and-check”, monitoring performance quality)			
Task-specific training (e.g., practicing a dressing technique repeatedly until that technique is learned – the skill is usually limited to that specific task practiced)			
Multicontext approach (brief description: a systematic treatment approach that focuses on transferability of cognitive strategies to multiple contexts/situations/tasks. Often includes a self-awareness component.)			
Quadraphonic approach (brief description: a treatment strategy based on an evaluation approach that considers aspects of clients’ functioning on both a micro (cognitive subskills, such as memory) and macro (occupational performance) level. Often uses remediation and compensation in treatment.)			

16. For the following, indicate whether **you have received training or education** on the treatment strategy.

Treatment	Yes	No	Not sure
Compensatory: external aids (e.g., diary, calendar, checklist)			
Remediation (e.g., memory games, pencil-and-paper brain training tasks, computer games to retrain cognitive skills)			
Self-awareness training (e.g., predicting performance, “stop-and-check”, monitoring performance quality)			
Task-specific training (e.g., practicing a dressing technique repeatedly until that technique is learned – the skill is usually limited to that specific task practiced)			
Multicontext approach (brief description: a systematic treatment approach that focuses on transferability of cognitive strategies to multiple contexts/situations/tasks. Often includes a self-awareness component.)			
Quadraphonic approach (brief description: a treatment strategy based on an evaluation approach that considers aspects of clients’ functioning on both a			

micro (cognitive subskills such as memory) and macro (occupational performance) level. Often uses remediation and compensation in treatment.)			
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17. If you indicated that you received training for any of the treatment strategies listed in question #16, where did you receive the training? (Check all that apply.)

- OT school program
- Reading articles in AJOT or other journals
- Self-study course
- Workshop
- Other (please describe): _____

18. For the following, indicate whether **you use** the following treatment strategies with a client with mild acquired brain injury.

Treatment	Yes	No	Not sure
Compensatory: external aids (e.g., diary, calendar, checklist)			
Remediation (e.g., memory games, pencil-and-paper brain training tasks, computer games to retrain cognitive skills)			
Self-awareness training (e.g., predicting performance, “stop-and-check”, monitoring performance quality)			
Task-specific training (e.g., practicing a dressing technique repeatedly until that technique is learned – the skill is usually limited to that specific task practiced)			
Multicontext approach (brief description: a systematic treatment approach that focuses on transferability of cognitive strategies to multiple contexts/situations/tasks. Often includes a self-awareness component.)			
Quadraphonic approach (brief description: a treatment strategy based on an evaluation approach that considers aspects of clients’ functioning on both a micro (cognitive subskills such as memory) and macro (occupational performance) level. Often uses remediation and compensation in treatment.)			

19. Please list any other treatments you use with clients with mild acquired brain injury that were not included above:

20. Rate the value of each treatment strategy for clients with mild acquired brain injury listed by circling a number below. If you are unsure whether you feel it is valuable or not or have no experience, please circle the matching response.

Circling the number 1 indicates “I don’t find this treatment valuable at all”, 3 indicates “I don’t feel one way or the other”, 5 indicates “I find this treatment extremely valuable.”

Compensatory: external aids: [1---2---3---4---5] [not sure] [no experience]

Remediation: [1---2---3---4---5] [not sure] [no experience]
 (Please continue rating on the next page)
 Self-awareness training: [1---2---3---4---5] [not sure] [no experience]
 Task-specific training: [1---2---3---4---5] [not sure] [no experience]
 Multicontext approach: [1---2---3---4---5] [not sure] [no experience]
 Quadraphonic approach: [1---2---3---4---5] [not sure] [no experience]
 Others (written in earlier):
 _____: [1---2---3---4---5] [not sure]
 _____: [1---2---3---4---5] [not sure]
 _____: [1---2---3---4---5] [not sure]

21. Of the treatment strategies you **do** use, which of the following describe(s) the reason you use them? (Check all that apply)

- I have education on/knowledge of the treatment(s)
- The treatment(s) is covered by insurance
- The treatment(s) leads to functional gains for most clients
- The treatment(s) address client goals
- The treatment(s) is an effective use of time
- Other (please describe below)

Other:

22. Of the treatment strategies you **do not** use, which of the following describe(s) the reason you **do not** use them? (Check all that apply)

- I do not have education on/knowledge of the treatment(s)
- The treatment(s) are difficult to get covered by insurance
- The treatment(s) are not covered by insurance
- The treatment(s) do not lead to functional gains for most clients
- The treatment(s) do not make sense to address client goals
- The treatment(s) are a waste of time
- Other (please describe below)

Other:

DISCHARGE PLANNING:
Please fill in the blanks and/or check next to items as appropriate.

23. In discharge planning, do you recommend clients with mABI receive further cognitive evaluation and treatment?

- Always (90-100% of the time)
- Sometimes (50-89% of the time)
- Rarely (10-49% of the time)
- Never (0-9% of the time)

24. If you do recommend further evaluation and treatment, what is your most common recommendation for clients with mABI who need further cognitive evaluation and treatment?

- Outpatient OT
- Home Health OT
- Community Based OT
- Vocational Rehabilitation
- Speech-Language Pathology
- Neuropsychologist
- Other (explain below)

Other: _____

If you would like to leave additional feedback or comments, please feel free to write below:

Please place your survey into the enclosed business reply envelope and return in the mail to the University of Puget Sound Occupational Therapy department by March 30, 2012. Thank you for participating in the survey! Your time and consideration are very much appreciated.

Table 1

Respondents by Entry-Level Degree

Degree Type	Number of Respondents ^a	Percentage of Respondents
BA/BS	32	57.1
MSOT/MOT	23	41.1
OTD	1	1.8

^a*n* = 56.

Table 2

Most Frequent Ages Treated

Age Range	Number of Respondents ^a	Percentage of Respondents
21-40 years	11	20
41-60 years	15	27.3
61-70 years	16	29.1
70+ years	13	23.6

^a*n* = 55.

Table 3

Areas of Occupation Evaluated and Treated for those with mABI

Area of Occupation Evaluated and Treated	Number of Respondents ^a	Percentage of Respondents
Activities of Daily Living	57	100
Instrumental Activities of Daily Living	54	94.7
Social Participation	45	78.9
Leisure	45	78.9
Work	34	59.6
Rest and Sleep	24	42.1
Education	20	35.1
Play	9	15.8

^a*n* = 57.

Table 4

OT Practitioners and Evaluation

Evaluation Tool ^a	Percentage of Respondents Answering "Yes" ^b			
	Heard of	Formal Education	Informal Education	Use
Mini-mental State Examination	96.5	50.9	14	64.9
LOTCA	80.7	24.6	29.8	17.5
Assessment of Motor and Process Skills	75.4	38.6	14	14
Montreal Cognitive Assessment	52.6	19.3	28.1	38.6
Executive Function Performance Test	43.9	8.8	15.8	14
Contextual Memory Test	42.1	10.5	17.5	8.8
TCA	33.3	10.5	14	7.5
ERBMT	33.3	10.5	12.3	3.5
Test of Everyday Attention	31.6	7	17.5	0
Multiple Errands Test	21.1	3.5	7	8.8
A-ONE	17.5	7	7	3.5
BADS	14	3.5	14	0
Tinkertoy Test	5.3	1.8	1.8	0

^aLOTCA = Lowenstein Occupational Therapy Cognitive Assessment; TCA = Dynamic Assessment of Categorization: The Toggia Category Assessment; ERBMT = The Extended Rivermead Behavioral Memory Test; A-ONE = Arnadottir OT-ADL Neurobehavior Evaluation; BADS = Behavioural Assessment of the Dysexecutive Syndrome. ^b*n* = 57, though some items were not answered by some respondents so the number may vary between 52 and 57.

Table 5

OT Practitioners and Treatments

<u>Treatment Strategy</u>	<u>Percentage of Respondents Answering “Yes”^a</u>		
	Heard of	Received Training/Education	Use
Compensatory	100	93	100
Remediation	100	89.5	94.7
Task-Specific training	98.2	87.7	98.2
Self-awareness training	80.7	71.9	73.7
Multicontext approach	68.4	54.4	54.4
Quadraphonic approach	36.8	28.1	28.1

^a*n* = 57, though some items were not answered by some respondents so the number may vary between 55 and 57.

Table 6

Treatment Strategy Use by Setting

<u>Treatment Strategy</u>	<u>Percentage of Respondents Answering “Yes”</u>	
	Inpatient ^a	Outpatient ^b
Compensatory	100	100
Remediation	95.3	90.9
Self-awareness training	71.4	81.8
Task-specific training	100	90.9
Multicontext approach	52.4	77.8
Quadraphonic approach	28.6	22.2

^a*n* = 43. ^b*n* = 11.

Table 7

Discharge Recommendations for Further Cognitive Evaluation and Treatment

Discharge Setting	Number of Respondents ^a	Percentage of Respondents
Outpatient OT	33	57.9
Speech-Language Pathology	27	47.4
Home Health OT	24	42.1
Neuropsychologist	14	24.6
Vocational Rehabilitation	8	14
Community Based OT	4	7

^a*n* = 57, though some items were not answered by some respondents so the number may vary between 54 and 57.