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Military and Civilian Speech-Language Pathologists' Attitudes towards Evidence-Based Practice: A Pilot Study

Lauren Nicole Furr

MILITARY AND CIVILIAN SPEECH-LANGUAGE PATHOLOGISTS' ATTITUDES TOWARDS EVIDENCE-BASED PRACTICE: A PILOT STUDY

By
Lauren Furr

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Approved by

Advisor: Professor Gregory Snyder, Ph.D

Reader: Professor Lollie Vaughan, Ph.D, CCC-SLP

Reader: Professor Linda Chitwood, Ph.D, Dean

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ABSTRACT

LAUREN FURR: Military and Civilian Speech-Language Pathologists' Attitudes towards Evidence-Based Practice: A Pilot Study

(Under the direction of Dr. Gregory Snyder)

The renewal of military combat in Iraq and Afganistan (2001-) and the subsequent influx of soliders with traumatic brain injury (TBI) revealed shortcomings in the military's healthcare relative to patients with TBI. To address these concerns, the military drastically reformed TBI-related healthcare policy and services. Military healthcare policy reform claims to address the shortcomings of previous military heathcare policy, which include insufficient TBI training for healthcare providers , a problem that policy reform alone cannot remedey. Questions remain relative to the status of TBI-related military healthcare; specifically, were the shortcomings in TBI-related miltiary healthcare a function of inefficient systemic healthcare policy, or did the inoptimal TBI-related healthcare services also involve the attitudes of the healthcare proviers? This study investigated the attitudes of the healtchare providers serving veterans with TBIs relative to civilian healthcare providers. Specifically, attitudes of speech-language pathologists (SLP) treating veterans of Operation Enduring Freedom/Operation Iraqi Freedom with TBI at various military hospitals were compared to attitudes of SLPs treating patients with TBI at civilian hospitals. This study examined the use of evidence-based practice (EBP), a primary factor contributing to quality of care. A positive attitude towards EBP, which emphasizes incorporating current research findings into therapy, results in healthcare providers who do not lack training in their area of specialty, as some TBI Network of Care providers do (VAOIG). SLPs in each sector were surveyed using a modified version of the survey used by Toulkidis,

Donnelly, and Ward (2005) to investigate attitudes towards EBP. Data from this research revealed a significant difference in the years of experience with TBI reported by the SLPs (z-score: -2.164; probability of error: .030); the civilian population had more TBI experience. A trend towards significance was revealed in the SLP populations' confidence that they have sufficient communication skills with patients (z-score: -1.809; probability of error: .071); the civilian SLPs felt they had better communication skills with their patients. There was also a trend towards significance in the SLP populations' feelings regarding the expense of evidence-based practice resources (z-score: -1.675; probability of error: .094); military SLPs generally felt that EBP resources were less of a concern. Due to the limited attitudinal differences between SLPs working in the military and civilan sectors, it was concluded that there is no appreciable difference between these two sectors relative to their attitudes toward EBP.

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LIST OF ABBREVIATIONS

BIAA	Brain Injury Association of America
CHI	Closed Head Injury
DoD	Department of Defense
DVAEES	Department of Veterans Affairs Employee Education System
DVBIC	Defense and Veterans Brain Injury Center
DVHIP	Defense and Veterans Head Injury Program
EBP	evidence-based practice
NOC	Network of Care
PICO	Population, Intervention, Comparison, Outcome
PSC	Polytrauma System of Care
SF-36	Medical Outcomes Study Short Form
SLP	Speech-language pathologist
TBI	traumatic brain injury
VA	Veterans Affairs
VAIOG	Veterans Affairs Office of Inspector General

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Chapter I

Introduction

Traumatic brain injury (TBI) is "an insult to the brain, not of the degenerative or congenital nature, but caused by an external force, that may produce a diminished or altered state of consciousness" (National Head Injury Foundation, 1985, as cited in Murdoch & Theodoros, 2001). TBI is a complex injury that results in a wide range of deficits such as: higher cognitive functioning deficits, concentration and comprehension deficits, linguistic deficits, memory, and discourse deficits. Deficits in any of these areas, let alone a combination of these areas, can have an enormous effect on the quality of life of an individual with TBI (Murdoch and Theodoros, 2001). These deficits influence daily living and can be detrimental to independent living and one's quality of life (Angeleri, Bosco, Zettin, Sacco, Colle, & Bara, 2008; Cicerone, Dahlberg, Kalmar, Langenbahn, Malec, Berquist, Felicetti, Giacino, Harley, Harrington, Herzog, Kneipp, Laatsch, & Morse, 2000; Coelho, DeRuyter, & Stein, 1996).

As a result of the complex and often debilitating deficits associated with TBI, providing high quality of care services to individuals with TBI is essential in restoring pre-injury functioning and/or optimizing residual functioning. Several factors contribute to the quality of health care services provided. Among these factors are the use of an interdisciplinary team, the use of a case manager, providing additional support services

for the families of individuals with TBI, and the use of evidence-based practice (EBP) (Brain Injury Association of America [BIAA], 2007; Toulkidis, Donnelly, and Ward, 2005; Veterans Affairs Office of Inspector General [VAOIG], 2006).

According to Sackett, Rosenburd, Muir Gray, Haynes, and Richardson (1996), EBP is the use of the best current evidence along with clinical experience and the needs of the patient to make decisions regarding the treatment of each individual patient (as cited in Zipoli and Kennedy, 2005). Because of the highly variable nature of TBI, healthcare professionals should use EBP to review evidence regarding the best treatment methods for their unique patients. According to Toulkidis et al. (2005), EBP emphasizes the use of treatments with convincing evidence, thereby providing professionals with the most current and effective treatment options when faced with difficult-to-treat patients. According to Berstein-Ratner (2006), EBP is beneficial if not necessary because the use of current data can improve clinical skills and therapeutic effectiveness, thus improving quality of care.

Application of EBP

Individuals with TBI are a population with a wide range of deficits and widely varying treatment goals. The complex nature of TBI makes it is difficult to treat; thus EBP, which contributes greatly to high quality of care through the application of current data relevant to effective treatment, is beneficial when treating TBI. In addition to civilian TBIs, there are a large number of veterans returning from Operation Enduring Freedom/ Operation Iraqi Freedom (OEF/ OIF) who suffered TBI while in combat.

The growth of active military soldiers and veterans with TBI has placed a significant strain on past military healthcare policies and methods of treatment. In 1992,

the Department of Defense and Veterans Administration established the Defense and Veterans Head Injury Program (DVHIP) to research TBI rehabilitation methods in order to improve the quality of TBI-related healthcare services for active and retired military personnel (Department of Veterans Affairs Employee Education System [DVAEES], 2004). In 1997, the number of hospitals in the DVHIP was expanded to a total of 27, creating the TBI Network of Care (NOC). The TBI NOC was designed to provide the highest quality of healthcare services to veterans with TBI, and its four lead centers were located at the original DVHIP facilities. In 2002, the DVHIP was renamed the Defense and Veterans Brain Injury Center (DVBIC) and expanded to include seven facilities.

According to VAOIG (2006), the TBI NOC, which overlapped with the DVHIP/DVBIC, displayed shortcomings resulting from the significant increase of veterans with TBI sustained during Operation Enduring Freedom/Operation Iraqi Freedom. The VAOIG stated that more comprehensive case management, stronger family support, and more TBI education for members of the interdisciplinary healthcare team were all needed to improve the quality of healthcare services provided at TBI NOC facilities. These aforementioned shortcomings led to a documented reduction in quality of TBI-related healthcare services, with the lack of TBI education and training by healthcare providers being especially concerning. Regardless of their TBI training during professional schooling, healthcare providers should be proficient in the areas of self-education and continuing education in order to remain current with the latest advances in the science of healthcare or rehabilitation.

As a result of the significant influx of veterans with TBIs into the military healthcare system, significant shortcomings in the TBI NOC healthcare system were

identified and documented. As a result, the Polytrauma System of Care (PSC) was created to improve treatment outcomes of patients with TBI and polytrauma injuries (injuries in which more than one body system or organ is injured) (Sayer, Chiros, Sigford, Scott, Clothier, Pickett, & Lew, 2008). Therefore, there were three separate yet overlapping systems in place to address the same TBI patient population: the DVBIC, which includes four VA sites and 3 Department of Defense sites; the TBI NOC, which has now been absorbed into the PSC; and the PSC. Since the creation of the PSC, it has come to encompass the TBI Network of Care, but the DVBIC is still in existence. The DVBIC's four VA sites also serve as the four largest Polytrauma System of Care sites, which were known as the TBI NOC Lead Centers until the PSC absorbed them.

When developing the PSC, efforts were made to improve the shortcomings of the TBI NOC. Again these shortcomings included poor case management, a lack of family support, and an insufficient TBI education level of the interdisciplinary team (VAOIG, 2006). However, data has yet to reveal if the PSC represents a significant improvement over the TBI NOC. It is also unclear whether the military simply enacted another ineffective policy reform when switching from the TBI NOC to the PSC or if the healthcare policy reform resulted in substantive changes that filtered down to the level of individual healthcare providers and their patients. Thus far, there is no significant data to indicate that the reformation of the TBI NOC into the PSC remedied any shortcomings.

Up until the creation of the PSC, there had already been three different names for military systems addressing TBI in soldiers: the DVHIP, the TBI NOC, and the DVBIC. With the debatable success of these previous systems in mind, one questions if the fate of the Polytrauma System of Care will be any different. It is still unknown if the new PSC

has been successful in improving case management, family support, and the level of TBI training of the interdisciplinary team, thus improving quality of healthcare services. Through all of these TBI-related healthcare policy changes in the military sector, the system of care and the level of expertise needed to treat TBI already exists in the civilian sector (BIAA, 2007). The military sector has repeatedly reformed their TBI-related healthcare system with little apparent success, while the civilian sector provides adequate services. Suggesting that, without making frequent policy changes, it is satisfied with the TBI care it provides (BIAA, 2007). This leads one to question if additional military healthcare policy reform is the answer, especially since the VOAIG documents the inadequate education and training of the healthcare providers to be at least partially responsible for the breakdowns in healthcare within the TBI NOC.

As data suggests that the use of evidence-based practice (EBP) is one of the greatest contributors to the quality of healthcare services, the application of and attitudes toward EBP by healthcare providers can be evaluated to infer aspects of the quality of healthcare services that the patients receive. Subsequently, existing peer-reviewed and published research has deduced the quality of healthcare services by quantifying attitudes toward EBP in the healthcare profession (Toulkidis et al., 2005).

As previously stated, the military healthcare system has passed at least three systemic TBI-related healthcare reform policies since 1992. Without access or transparent disclosure to quality of healthcare services data, it remains to be seen if the present (or future) military healthcare reforms will substantially improve the quality of healthcare services. Consequently, the purpose of this research is to indirectly assess the quality of healthcare services provided by the military sector by evaluating the attitudes

of military healthcare providers towards the application of EBP for patients with TBI. A modified version of the survey used by Toulkidis et al. (2005), which assessed personal use and attitudes relative to EBP, was used in this study. While an evaluation of attitudes and application of EBP for all members of the TBI-related interdisciplinary team would be ideal, it is beyond the scope of the current manuscript; therefore, the attitudes and application of EBP by a prominent discipline within the team will be evaluated in this study. SLPs are critical members of an interdisciplinary team treating individuals with TBI because many of the cognitive-communicative and swallowing deficits associated with TBI fall under the SLP's scope of practice. Thus, the purpose of this study is to indirectly assess the quality of military SLP healthcare services compared with SLP services in the civilian sector by measuring SLPs attitudes towards EBP for TBI-patients. Implications from these data will shed light the efficacy of military healthcare reform relative to the quality of TBI-related healthcare services and whether the shortcomings of the military sector are a result of inefficient policy or poor practitioner attitudes.

Chapter II

Literature Review

Traumatic Brain Injury Classifications and Characteristics

Traumatic brain injury (TBI) is defined as, "an insult to the brain, not of the degenerative or congenital nature, but caused by an external force, that may produce a diminished or altered state of consciousness" (National Head Injury Foundation, 1985, as cited in Murdoch & Theodoros, 2001). According to the Brain Injury Association of America (2007), traumatic brain injury is a growing health problem in both the military and civilian sectors. TBIs are complex injuries that can be categorized in several ways, such as the nature and size of the wounds. For example, subcategories of TBI based on the nature of the injury include open head wounds and closed head wounds. TBIs are also subcategorized on the relative size of the neural insult, such as focal lesions (injury affecting a specific location) or diffuse lesions (injury affecting a general region of the brain) (Khan, Baguley, & Cameron, 2003; Lezak, 1995, Murdoch & Theodoros, 2001).

According to Coelho, DeRuyter, and Stein (1996), a penetrating brain injury is one in which the meninges (the protective membranes covering the brain and spinal cord) are no longer intact. These injuries commonly result from bullets, shrapnel, or a laceration as a result of bone fragmentation (Murdoch & Theodoros, 2001). An open

wound is more likely to cause a focal injury. The distinct location of a focal injury will allow the medical team to anticipate the likely deficits caused by the injury (Lezak, 1995). According to Lezak (1995), the frontal and temporal lobes of the brain, which control many higher cognitive functions and language, are the most susceptible to injury in a focal TBI. Additionally, data reveals that small lesions are more likely to cause moderate to severe injuries and are usually easier to spot because focal lesions often penetrate the brain (Department of Veterans Affairs Employee Education System [DVAEES], 2004).

Along with penetrating and focal injuries, much research has been done on closed head injuries or a head injury in which the meninges remain intact. Lezak (1995) stated that a closed head injury could result in both primary and secondary injuries. The primary injury is a direct result of the force of impact while the secondary injury, or a coup-contre coup injury, is a result of the (brain) movement within the skull caused by the primary injury (Lezak, 1995). As the brain moves within the skull, the brain can bruise and the fibers of the brain can be sheared or torn at the cellular level. Accordingly, closed head injuries (CHI) are often associated with diffuse axonal injuries. CHIs are injuries present throughout the brain resulting from external forces that affect individual nerve fibers.

CHI is a TBI that is often mild in severity; mild TBIs are better known as concussions (brief loss of consciousness or altered mental status). According to Murdoch and Theodoros (2001), researchers found that the examination of CHIs cannot pinpoint as specifically the possible deficits caused by the TBI, but general assumptions can be made. It is known that the frontal and temporal lobes of the brain are highly susceptible to damage as a result of CHIs. Because the frontal and temporal lobes control higher

cognitive functions and language abilities, these functions are often threatened in a diffuse axonal closed injury.

Traumatic brain injury continuum of care.

As stated by the Brain Injury Association of America (BIAA) (2007), a patient with a TBI typically goes through a continuum of care that includes many steps due to the trajectory of recovery. These steps include (a) acute hospitalization (first stage of care; emergency room and ICU), (b) acute rehabilitation (intense inpatient therapy and education implemented in hopes of the patient regaining a functional life), (c) post acute rehabilitation (outpatient therapy to further regain functioning), and (d) community support services (programs such as support groups and job re-entry training). This general continuum of care and rehabilitation, which can occur over a period of years at a slow rate, is similar in both the military and civilian sectors. Ensuring optimum quality of healthcare services for patients with TBI is a difficult task because of the many variables associated with TBI and its care (BIAA, 2007).

Health-Related Quality of Life

Quality of life is a term that refers to a general sense of well-being, which includes happiness and satisfaction with life (Zullig, Valois, & Drane, 2005). According to Zullig et al. (2005), it is now commonly accepted that the leading correlates to quality of life should be integrated into the administration of healthcare services. Quality of life as it relates to healthcare services is often called health-related quality of life, which includes both physical and mental aspects of one's health that contribute to overall quality of life (Zullig et al.). As medical technology has led to more successful rehabilitative care and higher survival rates of individuals with traumatic injuries such as

TBI, the health-related quality of life of those individuals has become a topic of greater interest in any setting, whether military or civilian (Ku, 2007). Some predictors of health-related quality of life are physical limitations, emotional limitations, bodily pain, and any other health-related condition that might reduce one's usual activity level (Ku, 2007).

As a result of this increased interest in health-related quality of life, there are many methods of measuring one's health-related quality of life (Ku, 2007). According to Ku (2007), because there is no single widely accepted definition of health-related quality of life, there is no one standard way to measure it. However, the Medical Outcomes Study Short Form (SF-36) is a commonly and widely accepted method and has been translated for use in over 50 countries (Contopoulos-Ioannidis, Karvouni, Kouri, & Ioannidis, 2009; Ku, 2007). The SF-36 assesses eight areas including: " (a) limitations of physical functioning because of health problems (PF); (b) limitations in usual activities because of physical health problems (role-physical: RP); (c) bodily pain (BP); (d) general health perception (GH); (e) vitality (energy and fatigue: VT); (f) limitations on social functioning because of physical or emotional problems (SF); (g) limitations on usual activities because of emotional problems (role-emotional: RE); and (h) general mental health (psychological distress and well-being: MH)," (Ku, 2007).

These areas of assessment identify the eight major factors that determine health-related quality of life. Cognitive-communicative deficits associated with TBI could negatively affect one's health-related quality of life in any of the areas investigated by the SF-36. These areas might include limitations on social functioning, limitations on usual activities, or general health. Some of these TBI-related deficits include higher cognitive functioning deficits, concentration and comprehension deficits, linguistic deficits, and

memory and discourse deficits (Angeleri, Bosco, Zettin, Sacco, Colle, & Bara, 2008; Cicerone, Dahlberg, Kalmar, Langenbahn, Malec, Berquist, Felicetti, Giacino, Harley, Harrington, Herzog, Kneipp, Laatsch, & Morse, 2000; Coelho et al., 1996). Consequently, the consequences of TBIs and TBI-related deficits have the potential to significantly impact a patient's health-related quality of life.

Traumatic Brain Injury Deficits Affecting Health-Related Quality of Life

Higher cognitive functioning deficits.

Not only are the potential types and symptoms of TBI many, the numerous types and symptoms of TBI are often complex. Coelho et al. (1996) noted that the frontal and temporal lobes of the brain control crucial functions of the human body, and the cognitive-communicative impairments that are often diagnosed as the secondary effects of TBIs vary greatly. As stated in the DVAEES manual (2004), higher cognitive functions such as focusing attention, problem-solving, decision-making, planning skills, and judgment might be impaired as a result of a TBI. Control over behavior and emotion, which are largely controlled by the frontal and temporal lobes of the brain, can also be impaired by a TBI. Coelho et al. (1996) found that patients with mild TBIs, defined here as concussions, can have symptoms such as difficulty finding words, a lack of motivation, anxiety, depression, and increased irritability. These symptoms, which are often subtle, can affect every aspect of quality of life including the ability to maintain a job or occupation, the ability to study, and the ability to interact in normal social settings (Murdoch & Theodoros, 2001). It is not uncommon for problems such as substance abuse and general life disorganization to follow a TBI (Coelho et al, 1996). Coelho et al. (1996) also noted that patients with such deficits can greatly benefit from rehabilitative

treatment, especially therapy with a speech-language pathologist whose scope of practice includes the remediation of many higher cognitive functioning deficits.

Concentration and comprehension deficits.

Concentration and comprehension abilities, which also greatly influence one's quality of life, can be severely compromised by a TBI as well (Cicerone et al., 2000). Lezak (1995) stated that the many minute lesions caused by diffuse damage could compromise the efficiency and processing speed of the brain, possibly resulting in an attention deficit. According to Mateer and Sohlberg (1992), attention skills are crucial to all other cognitive processes because they serve as the foundation for information processing and storage (as cited in Hartley, 1995). These deficits can cause individuals with TBI to have a great deal of difficulty with the tasks and personal interactions of daily living. Despite treatment for attention deficits, which is often conducted by speech-language pathologists, individuals with TBI often have trouble reacquiring and applying certain language and communication skills in the real world (Angeleri et al., 2008). For example, discourse comprehension, especially related to pragmatics, is a critical skill that is often never reacquired (Angeleri et al.). This means that while a person recovering from a TBI might relearn vocabulary words and grammatical rules, they may never successfully apply the rules that dictate appropriate behavior and conversation in everyday situations.

Linguistic deficits.

The research of Angeleri et al. (2008) determined that higher cognitive functioning deficits are especially apparent in the communication deficits of individuals with many forms of TBI. Not only do patients with TBI struggle with comprehension and

linguistic tasks, but paralinguistic abilities are often lacking as well. Paralinguistic cues include tone, rhythm, prosody, and intonation. These cues allow people to understand spoken language, for example, to decipher between interrogative and declarative statements. Angeleri et al. (2008) conducted an extensive study in which the *Assessment Battery of Communication-ABaCo* (Sacco, Angeleri, Bosco, Colle, Mate, & Bara, submitted for publication) was used to conduct a complete pragmatic analysis on 21 people with brain injuries. The research assessed linguistic and extralinguistic communication, paralinguistic communication, social and contextual appropriateness, and conversational aspects. The data found by Angeleri et al. (2008) suggests that individuals with TBI performed worse than the control group in all of these areas. Poor linguistic abilities can result in a multitude of social interaction problems. For example, a person with TBI might say inappropriate things, become frustrated because of his or her inability to effectively or efficiently communicate, or appear to have an altered personality as a result of his or her lack of understanding regarding socially acceptable language use (Angeleri et al., 2008; DVAEES, 2004).

Memory and discourse deficits.

Memory dysfunction and discourse deficits are other cognitive-communicative deficits commonly seen in patients with TBI. Patients with TBI can work to improve performance in these areas, but neither success nor any degree of restoration is guaranteed. In her study, Wilson (1995) noted that there is no definite way to restore memory loss, and this memory loss carries over into daily living tasks (as cited in Avery & Kennedy, 2005). Therefore, according to Wilson, methods to compensate for memory loss or bypass memory problems are necessary (as cited in Avery & Kennedy, 2005).

Techniques such as mnemonic training and the practice of multiple strategies at once have been identified as promising in the treatment of memory dysfunction (Avery & Kennedy, 2005).

Discourse is a complex procedure that involves the appropriate use of sentence structure, cohesion (the successful linkage of sentences in a narrative), content (how informative the discourse is), coherence (the relation of the meaning of one statement to the statement before it), story grammar abilities (ability to logically organize information in the discourse), response appropriateness (the level of appropriateness of one speaker's response to the statement or question before it), and topic maintenance (how often and in what manner new topics are introduced). Cannizzaro, Coelho, and Youse (2005) studied the treatment of discourse deficits and found that, due to the complicated nature of discourse and the inability to define the many variables associated with discourse, there is a lack of agreement across studies regarding how to elicit discourse and how to analyze it. It is the job of the speech-language pathologist to try to elicit discourse, to decide which of the above discourse components need the most work, and to determine how to best treat discourse deficits (Cannizzaro et al., 2005).

The above discussion on the cognitive-communicative deficits associated with TBI demonstrated that TBI is a condition that can greatly alter one's health-related quality of life. TBIs have any number of potential etiologies that result in any number of possible deficits, all of which can be difficult to treat or restore (Coelho et al., 1996). Memory, judgment, communication, problem-solving, discourse, pragmatics and other cognitive-communication deficits can be affected by a traumatic brain injury. An individual can also have a combination of any number of these deficits, all of which can

either directly or indirectly impact one's health-related quality of life. TBI is a highly varied, but distinctive condition that presents many treatment challenges. As a result of these challenges, providing high quality of healthcare services to individuals with TBI is difficult to ensure and requires extra effort on the part of healthcare professionals (BIAA, 2007).

Factors Contributing to Quality of Care

Despite all of the possible deficits discussed above and the difficulties associated with treating said deficits, there are several noteworthy factors that promote a high quality of healthcare services. Among these factors are the use of an interdisciplinary team, the use of a case manager, and support for the families of patients with TBI (BIAA, 2007; Department of Veterans Affairs Office of Inspector General [VAOIG], 2006; Khan et al., 2003). The use of evidence-based practice (EBP) is also critical to ensuring high quality of care (Toulkidis, Donnelly, and Ward, 2005). Discovering and quantifying all of the possible factors associated with improving the quality of healthcare services for patients with TBI would be a daunting task and beyond the scope of any single manuscript; thus, the use of an interdisciplinary team, the use of a case manager, the provision of family support, and most importantly the use of evidence-based practice will be examined. While these factors are difficult to measure, examining their use in treatment is valuable because it can be indicative of the treatment effectiveness.

Interdisciplinary teams.

The numerous deficits and subsequent reduction in the clients' health-related quality of life associated with TBI have resulted in the necessity of an interdisciplinary team, and such teams are used in both the military and private sectors (BIAA, 2007;

Khan, Baguley, & Cameron, 2003). The use of an interdisciplinary team began after World War II as a result of the complex injuries sustained by soldiers (Strasser, Uomoto, & Smiths, 2008). In this approach, clinicians of various disciplines work together to help the patient reach treatment goals and to promote collaborative and comprehensive care (Strasser et al.; Wood, 1989, as cited in Gillis, 1996). The interdisciplinary team might consist of physicians, speech-language pathologists (SLPs), psychologists, audiologists, physical therapists, recreational therapists, occupational therapists, social workers, case managers, and vocational rehabilitation counselors (DVAEES, 2004). All members of the team are important. However, as the cognitive-communicative deficits are often found in patients with TBI, the SLP's treatment is often central to the rehabilitation process (Coelho et al., 1996).

Case managers.

Due to the extensive treatment often required for individuals with TBI, case managers are assigned to coordinate the interdisciplinary care of an individual with TBI and to provide services to the family of that individual to better ensure quality of healthcare services (VAOIG, 2006). Case management is a collaborative process used to assess, plan, coordinate, and evaluate the services needed to best treat a patient (VAOIG). Case managers coordinate treatment based on the goals and schedules of the interdisciplinary team and based on the transitions between levels of care that a patient with TBI typically experiences (VAOIG). Additionally, case managers deal with the demands of patients' families discussed by Strasser et al. (2008). Case managers are responsible for informing families of services available to them, as well as keeping them in contact with the healthcare professionals treating their loved one. Case managers can

serve as a liaison between families and healthcare professionals, ensuring that all concerns of the families are heard and taken into account.

Family support.

The VAOIG (2006) found that the families of patients with TBI need support and resources to help them effectively care for their loved one. According to Strasser et al. (2008), families play an active part in making major treatment decisions and daily clinical care decisions. Additionally, they often take on the role of advocate for their loved one and for themselves. Families now demand education relative to their loved one's condition and have become proactive to obtain the best quality healthcare and rehabilitation opportunities available. For example, families frequently request support groups, community-based rehabilitation programs for their loved ones, employment opportunities for their loved ones, and more information about TBI (VAOIG, 2006).

Evidence-Based Practice

One of the largest contributing factors to the promotion of high quality of healthcare services to those with TBIs is the use of evidence-based practice (EBP) by healthcare professionals (Toulkidis et a., 2005). According to Sackett, Rosenburg, Muir Gray, Haynes, and Richardson (1996), EBP is defined as the pursuit and use of the best current evidence along with clinical experience and the needs of the patient to make decisions regarding the treatment of each individual patient (as cited in Zipoli and Kennedy, 2005). Dr. Cochrane, a British epidemiologist, started the EBP movement in 1972 when he criticized the medical profession for not using the most current research (Fineout-Overholt, Melnyk, and Schultz, 2005). In essence, the purpose of evidence-based practice is to keep the healthcare industry focused on the latest scientific data

relative to client care, as opposed to the rote use of the customary practice of the day. Without the consistent review of the latest data and the assimilation of treatment methods supported by these data, medical sciences and subsequent improvements in patient care are slow to progress. In fact new data may reveal commonly accepted treatment methods are less unbeneficial than originally thought, and a clinician will remain ignorant of these data unless he or she regularly pursues the research literature and implements evidence-based practice into his or her clinical practice (Berstein-Ratner, 2006).

The process of evidence-based practice.

According to Toulkidis et al. (2005), EBP assigns greater emphasis to treatments for which there is convincing evidence. A four-step process has been created to determine what this convincing evidence is, whether or not it is appropriate for a particular client, and how to include the evidence in treatment effectively. The first step in the process is framing the clinical question (Nail-Chiwetalu & Berstein-Ratner, 2006). The question is often framed using the Population, Intervention, Comparison, Outcome (PICO) format (Bliss-Holtz, 2007). This includes determining the population of interest, the type of intervention, comparing intervention methods, and exploring possible outcomes (Bliss-Holtz, 2007). Step two of the EBP process is finding the evidence, and sources such as PubMed and Medline are often good resources for peer-reviewed information. The third step of the EBP process is evaluating the strength of the evidence, or the ability of the evidence to predict the cause and effect of the intervention in question (Bliss-Holtz, 2007). Finally, if the three prior steps deem findings credible, the information is implemented.

After implementation has occurred, the patient's progress must be periodically evaluated to determine effectiveness of the new techniques (Bliss-Holtz, 2007). The use of evidence-based practice should lead to progress in therapy. In order to determine if progress is being made, evaluation of an individual's needs and abilities is necessary. According to Coelho et al. (1996), each patient's unique treatment needs must be carefully considered throughout treatment because as needs are assessed and adjusted, treatment goals and methods will also change.

Evidence-based practice implementation and importance.

EBP has been implemented by healthcare providers such as nurses, speech-language pathologists, physical therapists, and physicians (Berstein-Ratner, 2006; Cleary-Holdforth & Leufer, 2008; Jette, Bacon, Batty, Carlson, Ferland, Hemingway, Hill, Ogilive, &Volk, 2003; Toulkidis, Donnelly, & Ward, 2005). In each of these fields, new research is being performed and published faster than ever before, and EBP necessitates that clinicians and physicians stay up to date (Berstein-Ratner, 2006). According to Berstein-Ratner (2006), EBP is beneficial and imperative because new data is essential to improve clinical skills and advance therapeutic effectiveness. Additionally, professional schooling and/or training prepare the healthcare professional for the current treatment paradigm; but as the science and treatment in healthcare evolve, actively practicing EBP keeps the healthcare provider current with the latest research and treatment data. In all of the fields in which EBP has been implemented, the inclusion of new data has assisted in improving the therapeutic process and the clinical skills of the clinician (Berstein-Ratner, 2006).

The use of EBP can also provide a roadmap for achieving the best possible treatment outcomes (Sprang, Craig, and Clark, 2008). According to Berstein-Ratner (2006), even if one therapeutic approach works well, the use of new information may allow an approach work better or reveal a new approach that is more beneficial for a specific client or case. Knowledge of treatments that have been demonstrated as being effective in a population, especially a population as complicated as those with TBI, can undoubtedly help a clinician make more informed treatment decisions. Hockenberry, Walaen, Brown, and Barrera (2008), stated that an environment in which EPB is used can turn good healthcare into excellent healthcare by utilizing the most current research to make educated decisions. Hockenberry et al. (2008) also stated that EBP is extremely important for adapting to today's ever changing military and civilian healthcare systems.

Despite the beneficial nature of EBP, it is uncertain how much EBP has been implemented in the day-to-day treatment of patients. In a survey conducted by Toulkidis, Donnelly, and Ward (2005), the attitudes of Australian physicians towards evidence-based practice were examined. This survey looked at many facets of EBP use from the availability of research materials to the availability of time in which to conduct research and found that Australian physicians view the use of EBP favorably. Since the extensive survey used by Toulkidis et al. (2005) has been previously tested and peer-reviewed, it was adapted to assess SLP attitudes and implementation of EBP, as detailed later in the manuscript.

Effect of evidence-based practice on quality of care.

Since the EBP movement began, it has received acclaim and been noted for its positive effects on health-related quality of care. Schlosser (2003a) noted that the use of

EBP may connect the fields of research and practice, improve services provided, increase clinician accountability, and reduce variation in services provided (as cited in Zipoli and Kennedy, 2005). Most importantly, EBP also has the ability to improve patient outcomes (Killeen and Barnfather, 2005; Profetto-McGrath, 2005; Craig and Smyth, 2007; as cited in Clearly-Holdforth and Leufer, 2008). According to Fineout-Overholt et al. (2005), the Institute of Medicine has ranked the use of EBP fifth in its ten rules of healthcare.

Application of evidence-based practice in new populations.

One opportunity to evaluate the application of EBP as it relates to quality of care is found in the treatment of individuals with TBI because the unique nature of this population necessitates an extensive knowledge base on the part of healthcare providers. The current population of Operation Enduring Freedom/Operation Iraqi Freedom veterans who received a TBI while in combat provides an opportunity to infer quality of care by examining healthcare attitudes of members of the military and civilian sectors when treating individuals with TBI. Treating of soldiers currently serving in Operation Enduring Freedom/Operation Iraqi Freedom who have sustained a TBI has become the primary healthcare concern of this military conflict. Thus far, an estimated 150,000 Operation Enduring Freedom/Operation Iraqi Freedom veterans have sustained a traumatic brain injury (BIAA, 2007). As a result, the evolution of the military healthcare system treating soldiers with TBI provides a direct comparison to the healthcare system used by the civilian sector to individuals with TBI (BIAA, 2007).

Traumatic Brain Injury in the Military

Variables of etiology in military traumatic brain injury.

At this point, there is no definitive evidence indicating why an increase of TBIs has been reported in Operation Enduring Freedom/Operation Iraqi Freedom. There are however, several hypotheses. First, the actual percentage of TBIs may be the same, but our awareness of TBI and our ability to diagnose TBI have improved. Second, medical care has improved and individuals with complex injuries are surviving when they once would have died in battle or shortly after (Sayer, Chiros, Sigford, Scott, Clothier, Pickett, & Lew, 2008). In previous military conflicts, killed-in-action rates ranged from 15-25%, and the killed-in action-rate is less than 12% in Operation Iraqi Freedom (Grathwohl & Venticinque, 2008). Therefore, soldiers with more complex injuries are surviving to reach medical care (Grathwohl & Vhenticinque, 2008). Third, there is the possibility of an increased number of TBIs present in Operation Enduring Freedom/Operation Iraqi Freedom veterans (BIAA, 2007).

To account for this last possibility, researchers are now examining how the evolution of combat munitions and tactics could be responsible for the increase in military personnel with TBIs. Research done by Taber, Warden, and Hurly (2006) examines TBI resulting from blasts injuries, which are those injuries caused by artillery, rocket and mortar shells, mines, booby traps, aerial bombs, improvised explosive devices and rocket-propelled grenades (Sayer et al., 2008). These data suggests that blast-waves change the surrounding atmospheric pressure, thereby creating a primary blast injury resulting in the TBI. Taber et al. (2006) stated that secondary blast injuries occur when the blast waves move objects and cause them to hit people. The blast waves can also put

the people themselves in motion, causing tertiary blast injuries when the people land (Taber et al.). According to Sayer et al. (2008), 60 % of all combat related blast injuries result in TBIs. Unfortunately, these TBIs can be very difficult to detect because they are often caused without any physical object-to-object contact. Instead, a shock wave moves through the body, damaging the brain and other organs with little obvious physical evidence (Sayer et al., 2008; Taber et al., 2006).

According to Sayer et al. (2008), the severity of blast injuries varies depending on several factors including the composition and amount of material involved in the explosion, the surrounding environment, the delivery method, and the distance between the victim and the blast. The presence of barriers between the victim and blast is also relevant. For example, the military now uses improved body armor (Sayer et al.). Improved body armor, along with improved acute care, has led to reduced mortality rates. Therefore, more severely injured patients are surviving, and the Department of Defense (DoD) and Department of Veterans Affairs (VA) are now treating more patients with complex injuries such as TBI (Sayer et al., 2008). Additionally, the ability to diagnose mild TBIs has improved, widening the spectrum of TBIs patients on the less severe end (Sayer et al., 2008).

Regardless of why the population of veterans of Operation Enduring Freedom/Operation Iraqi Freedom with TBI seems larger when compared to the number of veterans with TBI from other military conflicts, the fact remains that TBI is a very complex condition. TBI causes higher cognitive functioning, concentration and comprehension, linguistic abilities, memory, and discourse deficits (Angeleri, Bosco, Zettin, Sacco, Colle, & Bara, 2008; Coelho et al., 1996; Cicerone, Dahlberg, Kalmar,

Langenbahn, Malec, Berquist, Felicetti, Giacino, Harley, Harrington, Herzog, Kneipp, Laatsch, & Morse, 2000). As mentioned, ensuring quality of healthcare services for those with TBI is a difficult process that relies on factors such as the use of an interdisciplinary team, the use of case management, family support, and the use of evidence-based practice. The complicated nature of TBI in combination with the many factors contributing to quality of care and the influx of veterans with TBI has undoubtedly put a strain on the military's healthcare system in recent years.

Former system of care: Defense and Veterans Brain Injury Center and the TBI Network of Care.

Although the treatment of patients with TBI presents a prevalent and immediate problem, TBIs have always occurred at some level in military populations as a result of military conflicts. Therefore, the VA and DoD systems established the DVHIP in 1992 (DVAEES, 2004). Its base was located at Walter Reed Army Medical Center in Washington D.C., and it was established as a leader in TBI research and care (DVAEES, 2004). In 1997, the DVHIP expanded to include a total of 27 locations; the four original DVHIP hospitals became the four lead centers for what was then called the TBI Network of Care (NOC). These lead centers remained part of the DVHIP as well. In 2002, the Defense and Veterans Head Injury Program was renamed the Defense and Veterans Brain Injury Center (DVBIC), and it expanded to include seven sites in addition to the one at Walter Reed Army Medical Center (DVAEES, 2004). The DVBIC, which fell under the umbrella of the TBI NOC, was also established to ensure optimum care for patients with TBI (DVAEES, 2004). In summary, three systemic military healthcare policy reforms were made in ten years: the DVHIP was created in 1992; the TBI NOC was created in

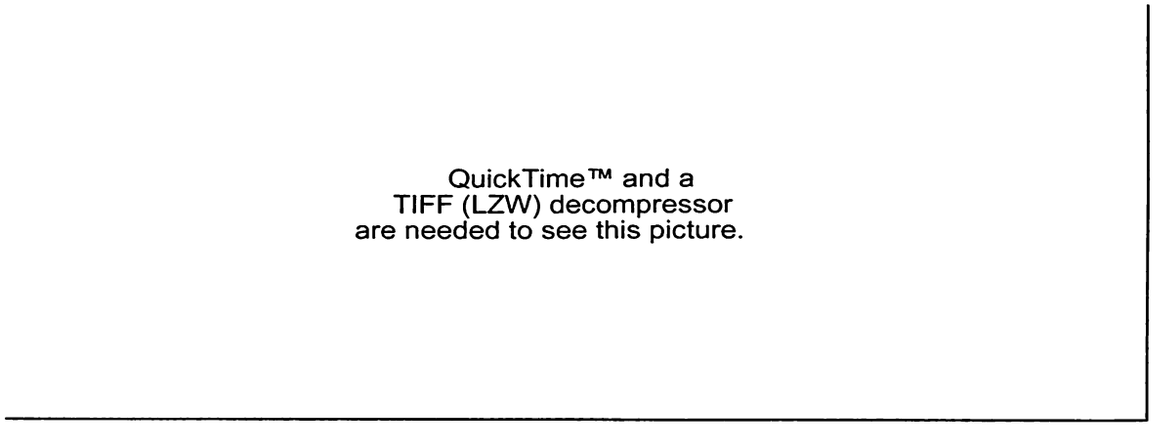
1997, absorbing the DVHIP in the process; and in 2002, the DVHIP, whose facilities are also part of the NOC, was renamed the DVBIC.

The DVAEES (2004) stated that as part of the TBI continuum of care in these three overlapping systems, patients would go through trauma care (emergency room and ICU), specialized acute inpatient rehabilitation (three- five hours of rehabilitation per day), sub-acute rehabilitation (less than three hours of rehabilitation per day, ventilator and coma care), post-acute rehabilitation (outpatient, day treatment and home care), community re-entry (vocational rehabilitation and transitional living), and the extended care level (nursing facilities, respite care, assisted living). An injured soldier was treated at either a DVBIC facility, which is technically a part of the TBI NOC as well, or at a facility that is solely part of the TBI NOC based upon his or her location and the location of the nearest treatment facility. According to the DVAEES (2004), the DoD and VA have an agreement in place allowing active duty personnel to be transferred from the DoD system to the VA system, which is typically reserved for military veterans, without losing active duty status, ensuring a smoother transition from one facility to another.

As mentioned, TBI often causes debilitating deficits such as higher cognitive functioning and concentration deficits. These deficits result in complex patient needs such as the use of an interdisciplinary team and case management. To meet these patient needs at every possible level of care, the TBI NOC (See Figure 1) was created as a tiered system (DVAEES, 2004). The TBI NOC consisted of four TBI Lead Centers, 18 TBI Network Centers, and 5 TBI Associate Network Centers (DVAEES, 2004). According to the DVAEES (2004), all of the Lead Centers offered a full range of rehabilitative services, such as any medical care needed, speech therapy, physical therapy, occupational

therapy and any other services an individual with TBI might need. The Network Centers were in place to (a) provide specialized care closer to the patients home, (b) coordinate rehabilitation after hospital discharge, and (c) identify any federal, state, or community resources (DVAEES, 2004). According to the same study, Associate Network Centers were in place to provide case-management and coordinate care, as well as find hometown or nearby resources for patients.

Figure 1. The TBI Network of Care levels of care.



TBI Network of Care shortcomings.

With increased diagnoses of TBI in Operation Enduring Freedom/Operation Iraqi Freedom veterans, demands on the NOC system significantly increased, and shortcomings of this healthcare system became apparent. However, it is unclear whether these shortcomings were a result of inefficient or poorly designed healthcare policy, a result of problems in the overall education and training of healthcare providers, or a combination of the two. Through government review of the NOC, several components necessary components for high quality healthcare services were identified and were found to be lacking (VAOIG, 2006). For example, the necessity of an interdisciplinary team to properly treat an individual with TBI mandates strong case management in order

to coordinate all necessary services and to facilitate a seamless transition from one level of care to the next. According to the VAOIG (2006), it was found that TBI coordinators or case managers were often unable to provide the best care for the complex problems faced by individuals with TBI. This was in large part due to the barriers between the VA healthcare system and the DoD healthcare system that prohibited case managers from tracking patients as they moved from one system to another, which is indicative of poorly conceived and executed healthcare policy. Also, it was determined that family members dealt with unnecessary accessibility issues, another possible policy issue. Family support is a necessary part of the rehabilitation process, and the existing NOC inhibited this aspect of the rehabilitation process by not providing information and resources to the families (VAOIG, 2006). Additionally, it was found that members of the interdisciplinary teams treating the veterans with TBI needed more education and training on TBI itself (VAOIG, 2006). Why the interdisciplinary team members were found as being deficient in the education and training of TBI remains poorly documented. However, one could suggest that educational and training deficiencies of the interdisciplinary team members are likely most impacted by the professional attitudes and accountability of the healthcare providers themselves, such as the active practice of EBP.

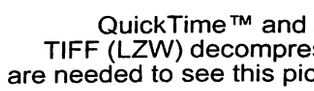
Development of the Polytrauma System of Care.

In order to reduce the shortcomings of the TBI NOC and improve outcomes when treating patients with TBI, the Department of Veterans Affairs established the Polytrauma System of Care (PSC) (see Figure 2) in 2005 (VAOIG, 2006). This system was created especially for individuals with polytrauma injuries; polytrauma injuries are those injuries in which more than one body system or organ is injured (Sayer et al., 2008).

Polytraumatic injuries usually result from blasts and cause an array of complicated injuries, often including TBI. With the prevalence of polytruama injuries in Operation Enduring Freedom/Operation Iraqi Freedom, this new system was developed to provide more comprehensive treatment for these patients and therapy for their families (DVAEES, 2004; H.R. Rep. No. 110-166, 2007).

The PSC was created with four tiers in an attempt to better provide access to services in many locations, making care more available to veterans living in remote areas. According to the VAOIG (2006), the four tiers of the system include Polytrauma Rehabilitation Centers, Polytrauma Network Sites, Level III Polytrauma Facility Teams, and Level IV Polytrauma Care Coordination Points of Contact (see Figure 2). The four Polytrauma Rehabilitation Centers are now located where the TBI Lead Centers were, and there is an overlap in the two systems. The DVBIC is still in place, with Walter Reed Army Medical Center continuing to serve as its headquarters.

Figure 2. The Polytrauma System of Care levels of care.



In summary, there have now been three overlapping systems in place to provide care to veterans with TBI; the DVBIC, which was once called the DVHIP; the TBI NOC; and the PSC, which is latest and largest TBI-related healthcare reform. In their attempt to

improve care to veterans with TBI, the military created another system with four tiers (the PSC) instead of three (the NOC), making another apparent healthcare policy reform. The review of TBI NOC concluded that the issues leading to reduced quality of healthcare services were policy in nature; however, since the quality and attitudes of healthcare providers themselves were never assessed, it remains to be seen if the shortcomings in TBI NOC were solely due to poorly designed or inefficient healthcare policy.

Quality of care in the Polytruama System of Care.

The PSC was established in an effort to improve quality of care for patients with complex injuries such as TBI relative to the quality of care found within TBI NOC facilities. As part of the changes from the TBI NOC to the PSC, case management was reportedly improved and services for families were reportedly increased, however there is no firm evidence indicating if improvement actually occurred (VAOIG, 2006). According to VAOIG (2006), an independent study course on TBI was also established to increase service providers' knowledge of TBI. While the independent study course on TBI was implemented, no testing has been performed to measure if the independent study course has had any impact on the quality of TBI related healthcare services. Providing information on TBI to members of the interdisciplinary team is likely a positive step; however, the attitudes of the interdisciplinary team towards actively pursuing the most current research literature and assimilating the latest data into TBI treatment remain unknown. In order to determine if policy changes alone have any chance of improving quality of care, the attitudes of healthcare providers also need to be reviewed. The attitudes of healthcare providers in the military sector, which has had several

unsuccessful TBI care system reforms since 1992, can be compared to the attitudes of healthcare providers in the civilian sector, which has remained relatively stable, to gauge the likelihood that there are problems in the attitudes of healthcare providers in addition to problems in policy (BIAA, 2007).

Evidence-based practice in the Polytrauma System of Care.

Due to the fact that EBP is one of the greatest contributors to the quality of healthcare services, the attitudes toward and use of EBP by healthcare providers within the PSC can be examined to infer the quality of care being provided (Sprang et al., 2008; Toulkidis et al., 2005). The factors contributing to an optimum quality of care are many, and examination of all factors collectively is beyond the scope of a single manuscript or study. EBP is an extremely relevant factor to providing a high quality of care to patients with TBI because it allows doctors and clinicians to make informed treatment decisions, based on the latest data, regarding a patient population whose symptoms and possible outcomes vary widely. The active use of EBP also allows members of the interdisciplinary team to attain the best possible outcomes (Sprang et al., 2008). The VA itself determined that those treating patients with TBI in the military sector needed more knowledge on the subject (VAOIG, 2006). This makes the use of EBP seem especially pertinent because, as new and relevant data emerges, it will serve to increase service providers' knowledge base on the complex nature and many possible therapies for TBI, improving the services of the care providers themselves.

The Speech-Language Pathologist as an Important Member of the Interdisciplinary Team

All of the healthcare professionals involved in the interdisciplinary team should engage in evidence-based practice, especially speech-language pathologists (SLP) because they play a central role in the interdisciplinary healthcare team (Berstein-Ratner, 2006). The higher cognitive functioning, paralinguistic, memory, and discourse deficits previously discussed all fall under the SLP's scope of practice. Consequently, this makes SLPs an integral part of the interdisciplinary team. It would be extremely difficult to examine the attitudes towards EBP by every member of the interdisciplinary team treating patients with TBI in both the military sector and the civilian sector, and is thus beyond the scope of this thesis. Instead, the use of EBP, a critical component of high quality of care, should be examined in one population of TBI-related healthcare providers. Because the SLP treats many of the deficits commonly associated with TBI, making them central to the rehabilitation process of an individual with TBI, they are a valid population to examine.

Speech-language pathologists' use of evidence-based practice in the Polytrauma System of Care and the civilian sector.

As previously stated, the military healthcare system has undergone numerous radical changes relative to how soldiers with TBI are treated. And while this transformation from the TBI NOC to the PSC is perceived to result in improved healthcare for the soldiers of Operation Enduring Freedom/Operation Iraqi Freedom, no data has been collected (or has been made public) to support this assertion. Additionally, it is unclear whether the changes made in the move from the NOC to the PSC were

strictly administrative policy changes or if true reform filtered down to the level of the care providers themselves.

Therefore, the purpose of this study is to infer the quality of healthcare at the level of the healthcare provider found within the military sector relative to comparable healthcare providers found within the civilian sector. The attitudes towards EBP by SLPs in the military sector will be compared against SLPs in the civilian sector. Due to the relationship between EBP use and quality of healthcare services, it can be measured to gain insights into the quality of the healthcare services provided by SLPs by quantifying their attitudes towards EBP.

In this study, the population in question is SLPs treating patients with TBI. The independent variable in this study is group affiliation, which will be defined as SLPs directly treating the TBI population in either the military sector or the civilian sector. The dependent variable represents surveyed responses relative to the attitudes, beliefs and implementation of EBP practices, as assessed by modified version of a peer-reviewed survey measuring attitudes toward EBP (Toulkidis et al., 2005).

Chapter III

Methodology

This study surveys the attitudes and practices of speech-language pathologists (SLP) working in either Veterans Affairs or Department of Defense hospitals and of those working in civilian hospitals relative to their beliefs regarding EBP use in the care of individuals with TBI. Prior to beginning this study, the Institutional Review Board at the University of Mississippi granted approval.

Participants

Two groups of participants will be surveyed for this study. One group will consist of SLPs who are currently employed at a Veterans Affairs or Department of Defense hospital. Members of this group must currently be working with soldiers returning from Operation Enduring Freedom/Operation Iraqi Freedom who have sustained some form of TBI that resulted in the need for an SLP evaluation or SLP services of any type. The second group will consist of SLPs who are currently employed at a civilian hospital. Members of this group must currently be working with patients who have sustained some form of TBI that resulted in the need for an SLP assessment and/or

treatment. All SLPs participating in this study have a minimum of a master's level education, and must have a Certificate of Clinical Competence by the American Speech Language and Hearing Association.

Materials

This study utilized a 27-question survey to assess SLPs' attitudes and believes toward the use of EBP. The survey was a modified version of the survey used by Toulkidis, Donnelly, and Ward (2005), which examined physicians' use of EBP. The modified survey used in this research can be found in Appendix A.

Procedures

In order to conduct this study, several steps were followed. First, the primary investigator compiled a list of applicable healthcare facilities. Military healthcare facilities included all VA Medical Centers or Healthcare Systems, as listed on the Veterans Affairs website (http://www2.va.gov/directory/guide/home.asp?isFlash=1). Major urban healthcare facilities were also selected to represent the civilian sector; urban areas include New Orleans, Chicago, Detroit, and Cincinnati. Next, the primary investigator contacted SLPs from all healthcare facilities (detailed above) via telephone. Once contact was made via phone, the SLPs were asked to participate in the study by providing his or her e-mail address. Once the SLPs agreed to participate, the website hosting the survey was sent to them via email (www.esurveyspro.com).

In addition to calling healthcare facilities, an American Speech-Language-Hearing Association (ASHA) Special Interest Division 2 listserve was also used to solicit study participants. Any SLP on the listserve received the website for the survey.

Analysis

This research represents a between group study design. Due to the ordinal nature of the survey, central tendencies were used to describe the data and the Mann-Whitney *U* test was used to analyze the data.

Chapter IV

Results

This study measured the attitudes towards the use of and the implementation of evidence-based practice in two populations. Population/group affiliations are certified speech-language pathologists in the military/Veterans Affairs (VA) sector and certified speech-language pathologists in the civilian sector. The following table describes the participants in greater detail.

Table 1
Participant descriptors

	Military	Civilian
Age		
N	28	82
25-30 years	17.9%	19.5%
30-39 years	25.0%	30.5%
40-49 years	28.6%	28.0%
50-59 years	21.4%	17.1%
60-69 years	7.1%	3.7%
Gender		
N	28	82
Male	7.1%	11.0%
Female	92.9%	87.8%

Years in SLP	Military	Civilian
N	28	82
0-10 years	35.7%	43.9%
10-20 years	25.0%	26.8%
20-30 years	35.7%	23.2%
40 or more years	3.6%	6.1%
Years of TBI Experience		
N	28	82
0-3 years	42.9%	18.3%
4-7 years	21.4%	31.7%
8-11 years	7.1%	9.8%
12-15 years	14.3%	11.0%
16 or more years	14.3%	29.3%
Hospital Type		
N	28	82
Veterans Affairs (VA) Polytrauma Rehabilitation Center	17.9%	n/a
Other VA hospital	82.1%	1.2%
Department of Defense Hospital	n/a	n/a
Civilian Hospital	n/a	81.7%

Due to the ordinal nature of the surveyed data, the Mann-Whitney *U* test was used to assess any significant differences between the military/ VA population and civilian population. The results reveal significant differences or data that trends toward significant differences in three questions of the survey. The first documents the amount of experience the participants have with individuals with TBI (z-score: -2.164; probability of error: .030); central tendency analysis reveals that the civilian sector reports more years of experience with the TBI population. Other results also reveal two areas trending towards significance. One are is the populations' confidence that they have sufficient communication skills with patients (z-score: -1.809; probability of error: .071); a central tendency analysis reveals that the civilian sector reports feeling more comfortable communicating with patients. The second area is the populations' feelings regarding the expense of evidence-based practice resources (z-score: -1.675; probability of error: .094);

a central tendency analysis reveals that the civilian sector feels that EBP resources are too expensive. These results, which include the median and mode of the responses, as well as the Z-score and the probability of error, can be seen in Table 1.

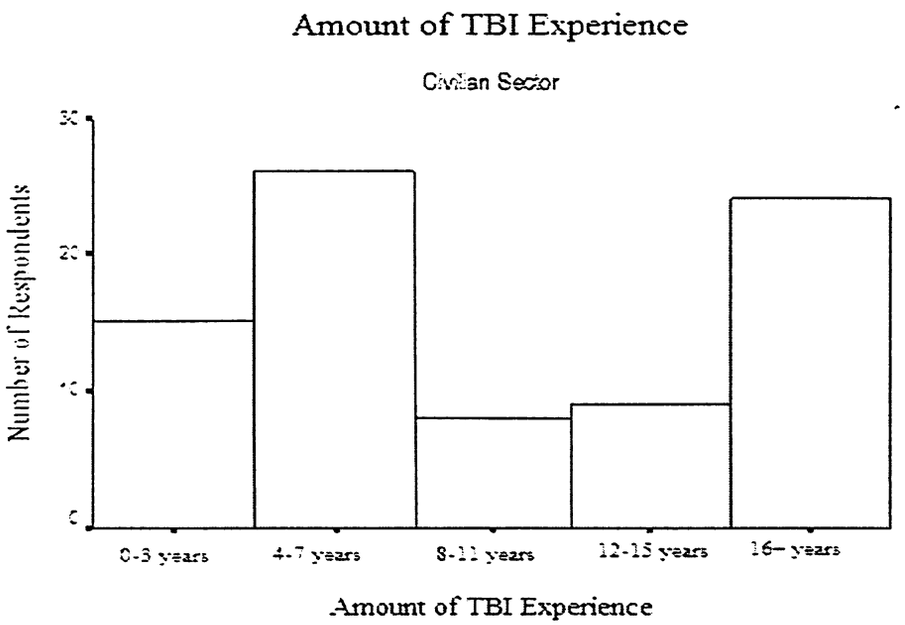
Table 2
Significant differences in evidence-based practice (EBP) use and/or beliefs by speech-language pathologists

	Years of TBI experience	Sufficient Communication skills with patients	EBP resources are too expensive
Median			
Military	4-7 years	Agree	Not sure
Civilian	4-7/8-11 years	Strongly agree	Not sure
Mode			
Military	0-3 years	Agree	Not sure
Civilian	4-7 years	Strongly agree	Not sure
Z-score *	-2.164	-1.809	-1.675
Probability of Error*	.030	.071**	.094**

* Based on the Mann-Whitney *U* test
** Trending towards significance

Additional results can be found in Appendix B. The central tendencies, z-scores, and probability of error of all of the data collected by the survey can be found in Appendix B, Table 2. Confidence intervals for the three areas of significant statistical difference can be seen in the figures below. The difference in years of TBI experience is seen in Figure 3. The difference in feelings regarding communication skills with patients with TBI is seen in Figure 4. The difference in feelings regarding expense of EBP resources is seen in Figure 5.

Figure 3. Speech-language pathologists' experience with TBI.



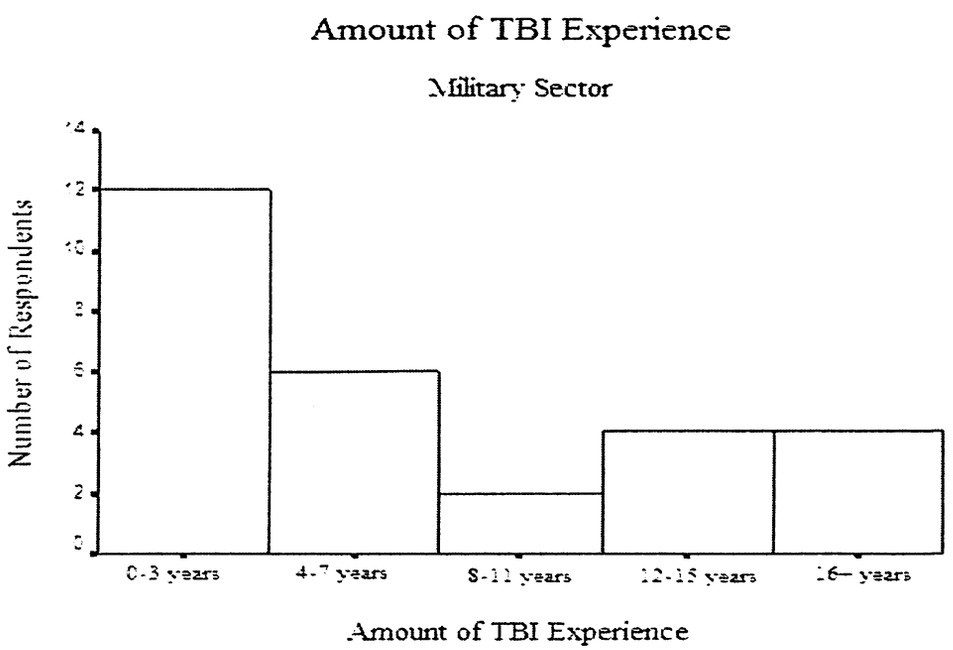
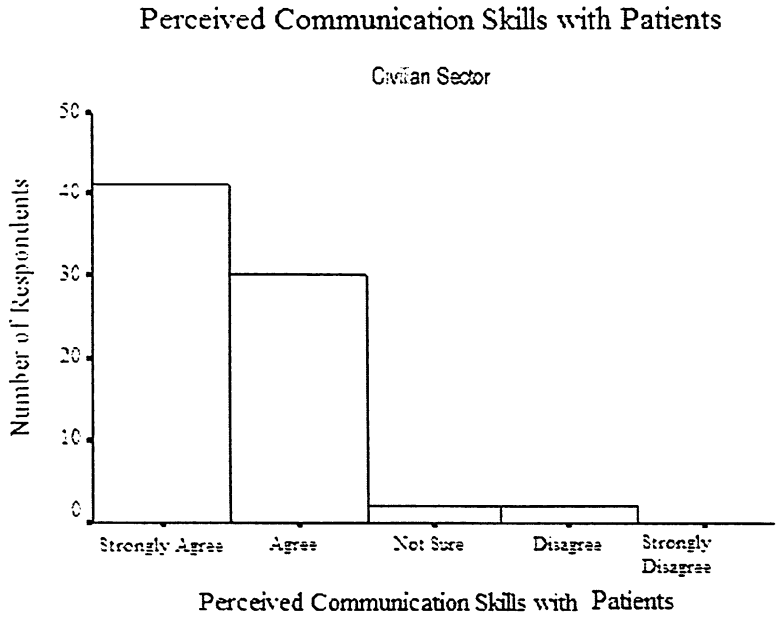


Figure 4. Speech-language pathologists' perceived communication skills with patients.



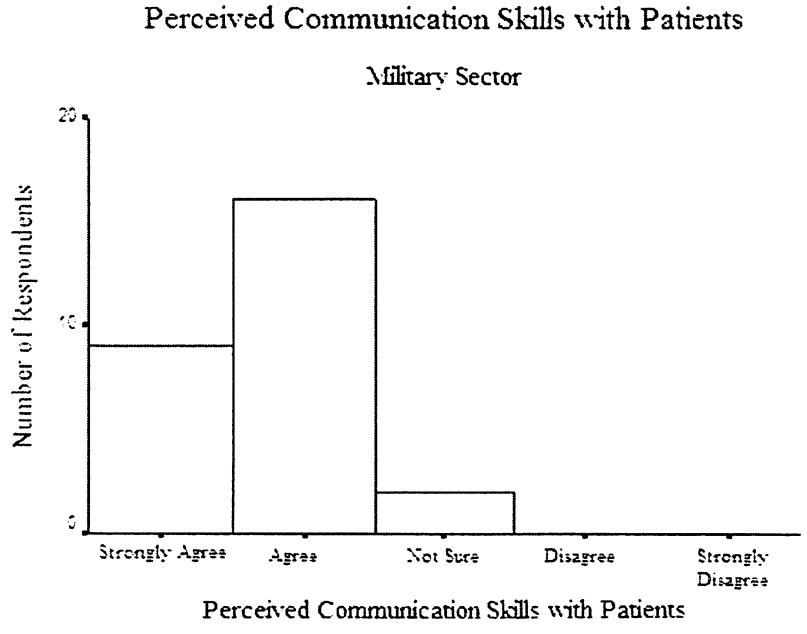
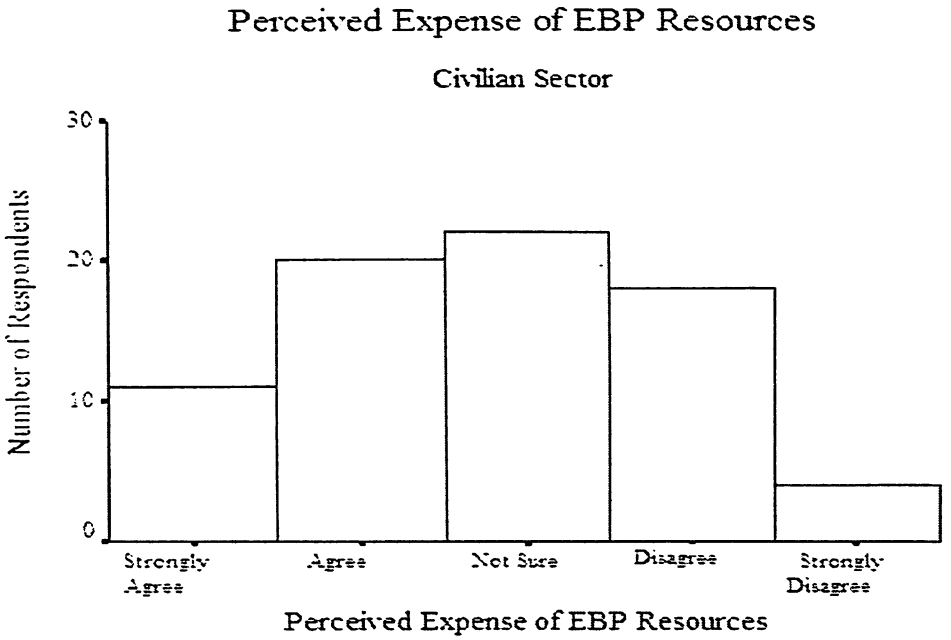
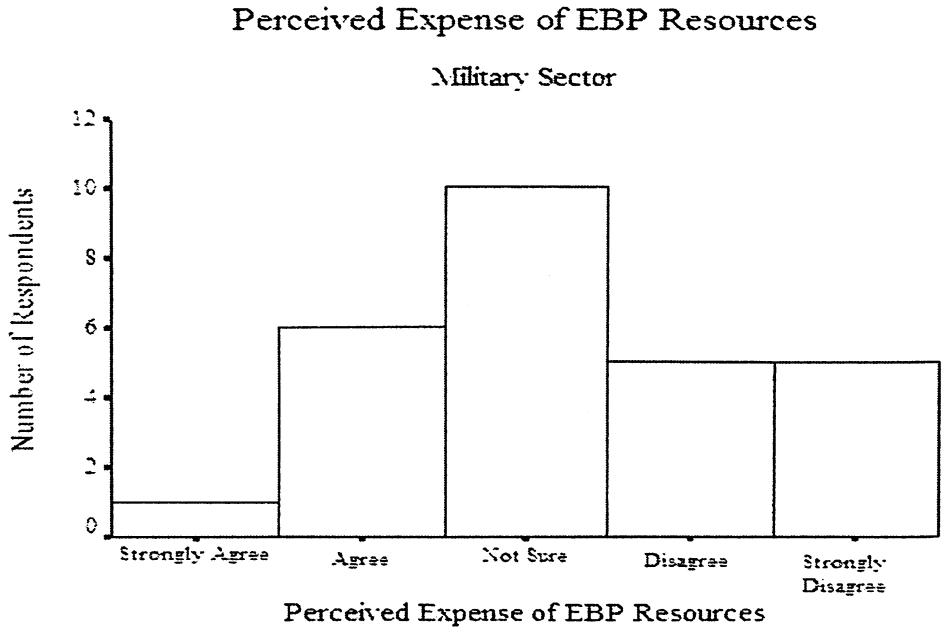


Figure 5. Speech-language pathologists' perceived expense of EBP resources.


Perceived Expense of EBP Resources
Civilian Sector
Number of Respondents
30
20
10
0
Strongly Agree
Agree
Not Sure
Disagree
Strongly Disagree
Perceived Expense of EBP Resources


Perceived Expense of EBP Resources
Military Sector
Number of Respondents
12
10
8
6
4
2
0
Strongly Agree
Agree
Not Sure
Disagree
Strongly Disagree
Perceived Expense of EBP Resources

Chapter V

Discussion

As previously stated, three questions revealed either a significant difference or trended towards statistical significance between the two participant groups. These data revealed a significant difference in the years of experience with individuals with TBI. A trend towards significance in the population groups' confidence was revealed relative to sufficient communication skills with patients and in the populations' feelings regarding the expense of evidence-based practice resources. Why there are differences in these particular areas is uncertain, but there are several possible explanations.

The survey revealed that there is a significant difference in the number of years of experience SLPs have working with individuals with TBI. Specifically, the civilian population as a whole has more experience working with TBI. Civilian SLPs most commonly indicated that they had 4-7 years of TBI experience while military SLPs most commonly indicated having 0-3 years of TBI experience. This could be explained by a number of factors. First, the civilian sector might provide higher salaries, allowing it to recruit more experienced speech-language pathologists. If the civilian sector does in fact pay more, it could demand SLPs have more experience in specialized areas of treatment

such as TBI. Additionally, the differences in population sample sizes between the military and civilian sectors may have a previously undocumented skewing effect on these data. Several other factors such as the availability of jobs, the work conditions, and the location of facilities in both sectors are also likely to affect this result.

Survey data also revealed a trend towards significance relative to how comfortable SLPs in the civilian and military sectors feel communicating with patients. The survey showed that SLPs in the military sector generally feel less comfortable when communicating with their patients with TBI. Military SLPs most commonly said they agreed that they felt comfortable communicating with patients; civilian SLPs most commonly said they strongly agreed that they felt comfortable communicating with patients. Of course, there are several factors that could contribute to this result. For example, returning veterans likely face numerous issues regarding their combat experiences, and this could definitely affect their mental state and the level of understanding between client and clinician, limiting communication. Also, the average severity of TBI in veterans might be worse than the average severity of TBI found in patients in the civilian sector. Increased severity in one's injury could literally make communication more difficult or impossible, necessitating therapy with an SLP in the first place. It is uncertain whether the reason for strained communication in the military sector is a lack of understanding between client and clinician or a physical inability to communicate due to more severe TBI, but either is a possibility. Finally, if the civilian sector does indeed have more experience with the TBI population, then one could hypothesize that the SLP population with more TBI experience would feel more comfortable dealing with the TBI population.

The final area trending towards a significant difference between participant groups was SLPs' feelings regarding the expense of EBP resources. Generally, civilians felt that EBP resources are more expensive. Both participant groups most commonly said that they were not sure if EBP resources are too expensive. However, civilian SLPs agreed or strongly agreed that resources were too expensive, and military SLPs tended to disagree that EBP resources were too expensive. The most likely explanation for this finding would be to suggest that civilians might have to pay for their own EBP resources out-of-pocket. Also, it is possible that the military sector provides more resources for EBP in the area of TBI, as TBI is such a prevalent issue in the military sector at the moment. Whether or not the policy changes associated with the PSC resulted in additional EBP or TBI-related resources and materials is unknown. The military has had several administrative policies in place over the years to manage the treatment of patients with TBI, and it is likely that funding for research materials was included as part of one or all of these systems.

While differences were found in these three areas, representing differences found on three separate questions, the survey consisted of 27 questions. Because only three of the 27 questions of the survey showed a significant difference or trended toward a significant difference, it is suggested that these data reveal no appreciable difference between the civilian and military SLP sectors as it pertains to attitudes toward EBP. The civilian sector appears to provide better services in two of these three questions (the clinicians have more experience with TBI and feel more comfortable communicating with patients); however, this limited number of attitudinal differences suggests that data collected by this study are inconclusive. More extreme attitudinal differences and more

frequent attitudinal differences would provide a stronger case suggesting that these two SLP populations are significantly different from each other. Consequently, the differences revealed by these data are insignificant enough to suggest that the two populations studied are in fact one population of speech-language pathologists who treat patients with TBI.

Limitations

While these data may be a clear reflection on reality, it is also important to note the weaknesses of the research. First, this study used a modified version of a EBP survey that has been peer-reviewed and published in refereed journals; however, some of the modified survey questions may have been flawed in the way questions were asked, the possible answers provided, or by excluding questions that might have provided valuable information. Certainly, the available answers provided were somewhat limiting. For example, question number six asked with what frequency SLPs met with other members of the interdisciplinary team. Once a week was the highest frequency available to choose, but many SLPs meet with members of the team as often as every day. Also, question number five asked at what type of facility the clinicians worked, and rehabilitation centers were not a possible answer, eliminating many participant responses.

In addition to limiting answer choices, participants of the study likely know what they "should" answer when taking the survey. The participants know that the survey measures attitudes towards and use of EBP, and it is very possible that many participants, knowing that EBP is a strong contributor to quality of care, responded that they support and/or use EBP regularly regardless of their actual EBP use. This could have been done intentionally or unintentionally, but there is a definite possibility that participants were

intentionally or unintentionally insincere in how they responded to survey questions because the "correct" answers, or those that indicate a favorable view of EBP, were rather obvious.

Another potential weakness in this survey was the small population size. The military SLP population ranged from 24 to 28 respondents for each question, and the civilian population ranged from 73 to 82 respondents. Larger numbers of both populations, especially of SLPs in the military sector, would have improved the statistical regression of the data, thereby improving internal and external validity, as well as better revealing subtle differences between the two participant groups. In fact, the comparison of the two populations may be skewed because they populations were not matched for size. Additionally, a more systematic approach to participant selection would prove useful in ensuring internal validity.

Future research may consider using a much larger population pool and revising survey questions and answer choices. Also, a similar study examining the attitudes towards EBP of different members of the interdisciplinary team might provide a more comprehensive look at the military healthcare system. Additionally, a survey of the patients with TBI (or their families) might be beneficial if one wanted to examine the quality of care provided based on more subjective measures. Patients could not answer questions about EBP use, but they could answer questions regarding the level of treatment they felt they received. This information in combination with information collected from SLPs on their EBP use might better indicate if the quality of care provided varies from one sector to another.

In conclusion, the purpose of this study was to assess the attitudes of military and civilian speech-language pathologists in relation to the use of evidence-based practice. This was done to determine if the lack of TBI training found in the interdisciplinary teams of the TBI Network of Care was a result of poor policy or poor practitioner attitudes. It was found that there is very little difference between the two populations, and they are essentially the same population. The only area of significant difference was the number of years of TBI experience. This suggests that, if similar results were found with other members of the team, a lack of TBI experience could account for the lack of TBI training and knowledge in the interdisciplinary teams of the TBI Network of Care.

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APPENDIX A

Survey

Numeric values in tables coordinates to survey answer choices as follows: 1=Answer A;

2=Answer B; 3=Answer C; 4=Answer D; 5=Answer E; 6=Answer F

1. Please indicate your age group.
A. 25-30 years
B. 30-39 years
C. 40-49 years
D. 50-59 years
E. 60-69 years

2. Please indicate your gender.
A. Male
B. Female

3. How many years have you practiced as a Speech-Language Pathologist?
A. 0-10 years
B. 10-20 years
C. 20-30 years
D. 30-40 years
E. 40 or more years

4. How many years have you had direct clinical experience with TBI patients?
A. 0-3 years
B. 4-7 years
C. 8-11 years
D. 12-15 years
E. 16 or more years

5.* At which type of hospital do you work?

A. VA Polytrauma Rehabilitation Center

B. Other VA hospital
C. Department of Defense hospital
D. Civilian hospital
*This question is not included in the data. It is used to separate data between military and civlian.

6. On average, how often do you communicate with other members of your patient's rehabilitation team (i.e. physicians, occupational therapist, physical therapist, nutritionist, psychologists, recreational therapists)?
A. Once a week
B. Once every two weeks

C. Once a month
D. At the beginning of the treatment process and at discharge
E. Never

7. Which of the following best reflects your data collection during the treatment process?
A. I collect data during every treatment session.
B. I collect data during every other treatment session.
C. I collect data every third treatment session.
D. I collect data every fourth treatment session.
E. I collect data every fifth treatment session.
F. I do not collect data.

2. Evidence-Based Practice Use by Speech-Language Pathologists

Please express your feelings towards the following statements about evidence-based practice with regards to your direct clinical experience with TBI patients only.

8. I value the use of evidence-based practice when treating patients with TBI.
See above.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

9. I have sufficient skills to communicate research results to my patients.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

10. I have sufficient skills in searching for evidence.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

11. I have sufficient skills to apply the results of a research article to the patient in front of me.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

12. I have sufficient skills to appraise evidence.
A. Strongly agree

B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

13. Using evidence-based practice reduces my chances of being sued.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

14. I have sufficient time to search for evidence.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

15. The use of evidence-based practice improves patient care.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

16. Patients have fixed expectations that influence my treatment choices more than evidence.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

17. The evidence based practice movement has been driven by non-practicing academics.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

18. There is not enough evidence relative to my specialty.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

19. The resources (e.g. Medline, etc.) with which to conduct evidence-based practice are

too expensive.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

20. Evidence based practice is a good concept but fails in practice.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

21. Evidence based practice places too great a burden on already overloaded SLPs.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

22. Using evidence-based practice prolongs consultations and reduces productivity.
A. Strongly agree
B. Agree
C. Not sure
D. Disagree
E. Strongly disagree

23. Peer review meetings involving all members of the multi-disciplinary team (physicians, other SLPs, psychologists, audiologists, physical therapists, recreational therapists, occupational therapists, and social or case workers) involved in patient care.
A. Very useful
B. Somewhat useful
C. Not sure
D. Not useful at all

24. Informal discussions with other SLPs
A. Very useful
B. Somewhat useful
C. Not sure
D. Not useful at all

25. Journal service to provide journal articles on requests
A. Very useful
B. Somewhat useful
C. Not sure
D. Not useful at all

26. Medline availability where you see patients

A. Very useful
B. Somewhat useful
C. Not sure
D. Not useful at all

27. Internet access in your office
A. Very useful
B. Somewhat useful
C. Not sure
D. Not useful at all.

APPENDIX B

Table 2

Significant differences in evidence-based practice (EBP) use and/or beliefs by speech-language pathologists

	N		Median		Mode		Z-Score*	Probability of error
	Military	Civilian	Military	Civilian	Military	Civilian		
Years of TBI experience	82	28	0-3 years	0-3/4-7 years	0-3 years	4-7 years	-2.164	.030
On average, how often do you communicate with other members of your patient's rehabilitation team?	78	28	Once a week	Once a week	Once a week	Once a week	-.100	.920
Which of the following best reflects your data collection during the treatment process?	81	28	I collect data during every treatment session.	I collect data during every treatment session.	I collect data during every treatment session.	I collect data during every treatment session.	-.928	.353
I value the used of EBP when treating patients with TBI	75	27	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	-1.189	.235

I have sufficient skills to communicate research to my patients.	75	27	Agree	Strongly Agree	Agree	Strongly Agree	-1.809	.071
I have sufficient skills in searching for evidence	75	27	Agree	Strongly Agree	Agree	Strongly Agree	-1.473	.141
I have sufficient skills to apply research to a patient	75	27	Agree	Agree	Agree	Strongly Agree	-1.011	.312
I have sufficient evidence appraisal skills	75	27	Agree	Agree	Agree	Strongly Agree	-.541	.588
EBP reduces legal risks	75	27	Not Sure	Not Sure	Agree	Not Sure	-.462	.644
I have sufficient time to search for evidence	73	27	Disagree	Disagree	Disagree	Disagree	-1.243	.214
The use of EBP improves patient care.	75	27	Agree	Agree	Agree	Strongly Agree	-.943	.346
Patients have fixed expectations that influence my treatment choices more than evidence.	75	27	Disagree	Disagree	Disagree	Disagree	-.336	.737

	N		Median		Mode		Z-Score*	Probability of Error
	Military	Civilian	Military	Civilian	Military	Civilian		
EBP is driven by non-practicing academics.	75	27	Disagree	Disagree	Disagree	Disagree	-.625	.532
There is not enough evidence relative to my specialty.	75	27	Agree	Agree	Agree	Agree	-.318	.751
The resources with which to conduct EBP are too expensive.	75	27	Not sure	Not sure	Not sure	Not sure	-1.675	.094
EBP is a good concept but fails in practice.	75	25	Disagree	Disagree	Disagree	Disagree	-.280	.779
EBP places too great a burden on already overlaoaded SLPs.	75	26	Disagree	Disagree	Disagree	Disagree	-.403	.687
EBP prolongs consultations and reduces productivity.	75	26	Disagree	Disagree	Disagree	Disagree	-.021	.983

	N		Median		Mode		Z-Score*	Probability of Error
	Military	Civilian	Military	Civilian	Military	Civilian		
Usefulness of peer meetings involving all members of the multi-disciplinary team involved in patient care.	74	25	Very useful	Very useful	Very useful	Very useful	-.029	.977
Usefulness of informal discussions with other SLPs	75	25	Very useful	Very useful	Very useful	Very Useful	-1.149	.251
Journal services	75	25	Very useful	Very useful	Very useful	Very useful	-1.559	.119
Usefulness of Medline availability where you see patients	75	24	Very useful	Very useful	Very useful	Very useful	-.710	.478
Usefulness of internet access in your office	75	25	Very useful	Very useful	Very useful	Very useful	-.675	.499

*Numerical values in the table refer to the answer choices provided to the questions in the survey (see Appendix A).
1=Answer A; 2=B; 3=C; 4=D; 5=E; 6=F

APPENDIX C

The University of Mississippi
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Office of Research and
Sponsored Programs
100 Barr Hall
Post Office Box 907
University, MS 38677
(662) 915-7482
Fax: (662) 915-7577

October 3, 2008

Ms. Lauren Furr
Post office Box 8723
University, MS 38677

Dr. Gregory Snyder
Communication Sciences and Disorders
University, MS 38677

Dear Ms. Furr and Dr. Snyder:

This is to inform you that your application to conduct research with human participants, ***The Use of Evidence-based Practice by Speech-Language Pathologists Treating Patients with TBI: Polytrauma Rehabilitation Centers versus Civilian Hospitals*** **(Protocol No. 09-034)** has been approved as Exempt under 45 CFR 46.101(b)(2).

Please remember that all of The University of Mississippi's human participant research activities, regardless of whether the research is subject to federal regulations, must be guided by the ethical principles in *The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research.*

It is especially important for you to keep these points in mind:

- You must protect the rights and welfare of human research participants.
- Any changes to your approved protocol must be reviewed and approved before initiating those changes.
- You must report promptly to the IRB any injuries or other unanticipated problems involving risks to participants or others.

If you have any questions, please feel free to call me at (662) 915-7482.

Sincerely,

Diane W. Lindley

Diane W. Lindley
Coordinator, Institutional Review Board