

SPLH 660

Is there an increase of cognitive impairments to veterans of war due to blasts and explosions compared to previous wars?

Studies have reported that over 300,000 United States veterans coming home from Iraq and Afghanistan have returned with mild to severe Traumatic Brain Injury (TBI); up to 60% of these service members' symptoms are going unreported (Hoge, 2009; Elder & Cristian, 2009). TBI is caused by a jolt, hit, or rupture to the head that impedes the function of the brain, damaging nerve axons, and a loss of synaptic terminals (Okie, 2005). More men and women are showing signs and symptoms of cognitive impairments from the blasts. A blast is a change in atmospheric pressure that creates a high wind (Okie, 2005). With these rapid changes in the air it can impact the skull resulting in a concussion or contusion that will lead to TBI. Little research has addressed war victims with TBI until recently (Cherny et al. 2010). The way wars are fought has advanced immensely and with new equipment, technology, and training, more soldiers are being saved. Researchers have started comparing the outcomes of current and past service members and the effects of TBI. During WWI and WWII TBI had two different names; commotion cerebri and shell shock, it was not until the Vietnam war that these terms were banned and Post Traumatic Stress Disorder (PTSD) came about. Because so many cases were misdiagnosed and not reported there is a lack of research of victims with TBI in past wars. PTSD continued to be used until the current war. Now, larger numbers of service men and women are returning home with cognitive impairments due to blast induced injury.

A range of testing has been done with service members from current and past wars to distinguish the different characteristics of TBI compared to PTSD symptoms. Early researchers struggled determining if it was a physical injury or emotional trauma. This has been difficult for the last 75 years and still continues. PTSD and TBI show similar characteristics and clinicians want to ensure they are treating the correct problem or treating both (Bogdanova & Verfaellie, 2012). It is important to understand both so a correct diagnosis is determined and proper treatment is given.

In the 1970s, a cognitive researcher named William Black examined veterans with a test called WAIS which surveyed the following: a verbal IQ, performance IQ, full scale IQ, vocabulary, similarities, block design, and object assembly (Black, 1974). The study looked at the veterans from the Vietnam War and how the left and right lobes of the brain were affected with blast induced wounds by missiles or shrapnel. Results showed the left hemisphere had lower scores in verbal testing, and the right hemisphere had lower scores in nonverbal testing (Black, 1974).

Current studies are emphasizing more on cognitive impairments of TBI. Three studies look at the damage of axons in the brain and how this affects neural communication. These three studies measured cognitive impairments with an Electroencephalogram (EEG) and used diffusion tensor imaging (DTI) to point out the axonal injury. The first study showed that soldiers with TBI show diminished EEG along with attention difficulties (Hurley, 2006). The second study compared two groups of TBI; mild TBI (mTBI) and TBI. The last study again showed results of axonal injury using DTI. Results showed that cognitive impairment is brief and does not show a month later with patients who have mTBI (Sponheim, McGuire, Kang, Davenport, Aviyente, Bernat & Lim, 2010).

There are many weaknesses in the experimental controls regarding the research conducted on these studies. Currently, only two tests are used to diagnose TBI, the Glasgow Coma Scale (GCS) and the Ranchos Los Amigos Scale (Saatman, Duhaime, Bullock, Maas, Valadka & Manley, 2008). This leads to an issue of treatment being started on time, this will ensure that the cognitive rehabilitation process is on the right track. The tests are structured and do not account for real life situations and are only measured in one environment (Bogdanova & Verfaellie, 2012). A small amount of research has been conducted with veterans who have TBI which leads to low participation in the research.

The results point out a need for more research but because of the advances of war, similar injuries from previous wars still continue to occur. Unfortunately the soldiers from previous wars were not surviving the blasts like they do today. Therefore, is there an increase of cognitive impairments to veterans of war due to blasts and explosions compared to previous wars?

Method

Participants: The participants were referred from the Veterans Affairs Hospital. There were 13 women and 77 men that have been reported by doctors at the medical center to have had blast induced injury for no more than 5 years. The ages range from 18-50. The medical professional will use the GCS to rate the patient on a scale of 1-15 in all three areas: motor response, verbal response, and eye opening. 13- 15 indicates mTBI, 9-12 moderate disability, 3-8 severe disability, less than 3 vegetative state, less than 3 for a period longer than a month persistent vegetative state, and 0 brain death. If the participant scores below a 3 they will not be able to participate in the study. Medical professionals scored 25 out of the 90 patients below a 3 and these participants will not be included in the study. This will decrease the size of the study

down to 65 participants. The Table of Recommended Sample Size recommends randomly choosing 56 of those 65. Names were randomly drawn from a hat to determine who would be picked.

The sample size totaled to 56 veterans. 52 men and 4 women, but gender did not make a difference in this study. The participants in this study had mild TBI, moderate TBI, or severe TBI. The veteran's ethnic background or socioeconomic status was not taken into consideration. The sample was recorded using a video camera and a recording device.

Measures: Stated previously, TBI was determined by reports from doctors at the Veterans Affairs hospital. The GCS scale was used to prove the severity of TBI. The purpose is to see if there had been an increase of cognitive impairments with current veterans who returned from war.

One measure was used to determine patients cognitive abilities. The measure was the Montreal Cognitive Assessment (MoCA). MoCA has been recognized as a reliable measure for patients with cognitive impairments and a test that measures all age ranges. MoCA has been tested through studies to prove reliability in test- retest and interrater reliability and convergent validity. It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation, making this test valid for its purpose. The ending score resulted in a comprehensive assessment of the patients cognitive abilities. The MoCA was tested twice using parallel forms. The second test was taken 15 days after the first test. The test was administered in a quiet and comfortable room. The test administrator ensured that the patient was relaxed and the only person in the room while the test was conducted. Using inter- observer reliability, there was a

second observer in the observation room. The second observer was included during the administration of testing to ensure accurate results.

Reliability: The Department of Veterans Affairs has conducted several trials of studies with MoCA using test- retest. The VA compared pretests and posttest scores, over a range of studies, among members of the VA hospital in patients above the age of 18 with many types of cognitive disabilities. Scores were compared for discrepancies. The results showed that the standard average differences between the first and second testing was very small, giving the MoCA high reliability.

Within this research design, veterans will have taken the MoCA test two times, using parallel forms of reliability. By completing the test at two different times it allowed the researcher to compare scores of other individuals, look for improvement, and look for change of the patient's cognitive abilities. In the MoCA manual, its measures and forms of clinical evaluations are proven valid.

Data Analysis: Scores from the 11 different areas of cognitive abilities from the MoCA will be listed in a chart that compares those tested to a normative group of veterans from previous wars that have a severity of TBI. Within each of the 11 different areas, there will be a difference listed in descriptive statistics. These will be completed, reviewed, and summarized to answer the following questions:

1. Are the scores in this specific evaluation of TBI patients lower in specific categories than the scores of the normative group?
2. Did any of these scores display the opposite of the predicted outcome?

Data will determine the answers to the two questions when broken down into the different areas of the cognitive assessment. The Pearson product-moment correlation coefficient will be used with the test results from the veterans with TBI and the normative scores. This will provide a direct relationship to the scores and cognitive impairments of TBI in veterans. The test is appropriate because the size of the TBI patients is being correlated with the variable of the cognitive scores. This study will determine if there is an increase in cognitive impairments with current veterans of war returning with TBI compared to veterans of previous wars.

References

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Trait	Skills	Course Specific Notes	Grader Comments	Grade			
				Mastered	Emerging	Basic	Absent
Content	Content is appropriate for topic/question/assignment	review is a synthesis of information and not merely a string of abstracts	Yes				
	Content is accurate	major trends and commonalities in the research are pointed out gaps in the literature are pointed out	Yes				
	Content is complete/sufficient in scope	review ends with a stated research problem that can be addressed through research	Yes				
Critical Thinking /30	Appropriate critique/critical evaluation of content	Methods includes description of participants, recruitment and instruments/measures Description of research design is included	no description of control group, or participants from previous wars				
	Accurate interpretation/conclusions from content	review discusses strengths and weaknesses in sampling, instrumentation, and/or experimental controls validity and reliability of measures described	the design is off in several areas, you should do a group comparison, not a correlation to address your research question.				
	Appropriate integration between topics/articles or with content from course	plan is described for analyzing results to determine if outcomes are significant					
Clarity/ Organization 30	Logical flow/sequencing. Organized and cohesive	Review begins with statement of problem area, statistics or a conceptual definition	yes very good				
	Writing is easy to understand upon first reading. Writing is appropriate to the type of audience (e.g., professional) and level of audience (e.g., advanced vs. naive).	references are grouped together according to a common topic	yes				
	Punctuation and spelling are error free.	Methods are described in sufficient detail for replication	no				
Mechanics 10	Word choice and sentence structure are appropriate (i.e., no awkward phrasing or word use).	quotations are used sparingly or not at all	yes				
	Professional conventions are adhered to (e.g., appropriate citation conventions).	transition terms such as however, as a consequence, etc. are used	yes				
		references are cited in text using APA style Reference list is formatted correctly according to APA style	yes				
no. names of journals should be capitalized							

Your research question implies comparing rates of the now to past wars, but you don't have anything in your methods or analyses about data from past wars.

Instructor's grade	
Content	22
Critical Thinking	26
Clarity organization	30
Mechanics	9
Total	87