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The Effect of Acupuncture on the Stress Levels of Patients with Posttraumatic Stress Disorder in Ghana

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Abstract

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MHS, Lincoln University, 2009

BS, Lincoln University, 2001

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Around the world, the use of acupuncture is increasingly becoming a common alternative treatment for the symptoms often associated with posttraumatic stress disorder (PTSD). However, the treatment of acupuncture appears to be lacking in Ghana because mental health professionals, patients, and the government representatives are largely unaware of its potential efficacy. The purpose of this study was to examine the effect of acupuncture treatment on patients with PTSD in Ghana. The study was conducted through the lens of psycho-physiological trauma. A research question was formulated to investigate the association between the independent variable, acupuncture treatment, and the dependent variable, the level of self-reported stress. A causal-comparative research study design was employed using primary data collected from 80 PTSD patients via the Davidson Trauma Scale (DTS). Research data were analyzed using a Jonckheere-Terpstra test, bivariate statistics, and Kendall's Tau-b correlation coefficient. The responses indicate mixed results given by participants between acupuncture treatment and self-reported stress levels displayed to be effective and ineffective. Future studies should examine the efficacy of acupuncture on other mental illnesses in Ghana. The implications for positive social change include informing the Ghana's government, mental health policymakers, mental health professionals, and Ghanaians about the efficacy of acupuncture treatment for PTSD and improving the mental health of Ghanaian citizens. If adopted in the Ghanaian mental health landscape, acupuncture treatment programs will provide Ghanaian citizens suffering from PTSD with an additional treatment option.

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Dedication

This dedication goes out to Walden University for allowing me to implement my research on a doctoral level. Also, I want to dedicate this study to Lincoln University for giving me an opportunity to earn my bacherlor's and master's degree which eventually led me to Walden University's doctoral program. In addition, I want to dedicate this research to my 3 daughters, Saniyah Brown, Tamia Richburg, and Docea Enimil. Lastly, I want to dedicate this research to the rest of my family and friends.

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Chapter 1: Introduction to the Study

Mental health disorders, such as posttraumatic stress disorder (PTSD), have been plaguing populations across the globe since around 8,000 B.C. (Lahr et al., 2016). In Ghana, people with PTSD may experience feelings of fear and anxiety that have been triggered by a traumatic event (Ame & Mfoafo-M'Carthy, 2016). Implementing alternative strategies for treating PTSD is an important step in providing comprehensive solutions for mental health in countries such as Ghana (Ame & Mfoafo-M'Carthy, 2016; Ae-Ngibise et al., 2017).

In 1972, Ghana legislators developed a *Mental Health Decree* to focus on policies and issues (World Health Organization, 2017). Yet, mental health disorders such as PTSD have increased with 2.5 million people receiving limited treatment in Ghana (World Health Organization, 2017). Limited treatment options for mental health disorders are the main reasons that nearly 95% of those 2.5 million Ghanaians experience substance abuse, poor memory, stress, depression, and/or suicide (Ame & Mfoafo-M'Carthy, 2016; World Health Organization, 2017).

Acupuncture can be utilized for treating PTSD to help decrease the intensity of patient's symptoms (Bourassa, 2014). However, the treatment of acupuncture is limited in Ghana for two main reasons. First, mental health professionals, patients, and the government have limited funding to treat PTSD (Roberts et al., 2014). Second, mental health professionals, patients, and the government are limited in the knowledge of the possible efficiency of acupuncture treatment in Ghana (Roberts et al., 2014).

I designed this causal-comparative research study to examine to what degree a relationship exists between the acupuncture treatment and self-reported stress levels among Ghanaians with PTSD. Chapter 1 contains the background of the problem, problem statement, and purpose of the study. In this chapter, I also provide a description of the significance of the research study and the relevant details on the nature of the study. Furthermore, I provide the theoretical framework, definitions, and assumptions. Finally, this chapter includes the scope, limitations, and delimitations of the study.

Background of the Study

PTSD is a mental health disorder that is triggered by being involved with or in a startling incident (Ame, 2016). Acupuncture is an integrative intervention that is utilized to treat mental health disorders, such as PTSD, to help decrease the intensity of patient's symptoms (Bourassa, 2014). In Ghana, for instance, a negative episode of a traumatic circumstance dealing with feelings of being frightened or experiencing anxiety or distress are frequent symptoms of PTSD (Ame & Mfoafo-M'Carthy, 2016). The use of acupuncture is increasingly becoming a common alternative treatment for the symptoms often associated with PTSD (Bourassa, 2014). The combination of acupuncture and the usual PTSD treatments have resulted in statistically significant improvements in primary and secondary outcomes (Bourassa, 2014).

Treatment of acupuncture is, however, limited in Ghana because mental health professionals, patients, and the government are limited in their knowledge of the efficiency of other alternative interventions (Ae-Ngibise et al., 2017; Badu et al., 2018). Dealing with PTSD is critical to promoting mental health. In countries characterized by

the limited mental health resources and funding, like Ghana, using alternative PTSD treatment options, such as acupuncture, is crucial (The Budget Statement and Economic Policy, 2014; Roberts et al., 2014). As of 2018, there were limited research studies and clinical trials on PTSD and, particularly, on the use of acupuncture as treatment for PTSD in Ghana (Badu et al., 2018).

This study was an attempt to determine to what extent acupuncture was effective in the treatment of people suffering from PTSD disorders in the country of Ghana. Using the Davidson Trauma Scale (DTS) instrument and the causal-comparative design, I examined the effects of acupuncture on the stress levels of patients with PTSD in Ghana. In other words, this causal-comparative study was an attempt to evaluate possible any relationship between acupuncture treatment and self-reported stress levels among people with PTSD in Ghana.

Problem Statement

According to the World Health Organization (2017), nearly 95% of the 2.5 million Ghanaians diagnosed with mental health issues, such as PTSD, do not receive treatment. Because of the lack of treatment, those people not only resort to substance abuse but also experience poor memory, stress, depression, and sometimes death (Walker, 2015; World Health Organization, 2017). Acupuncture is an alternative medical approach that may be helpful for patients who suffer from PTSD (Bourassa, 2014; Debraha et al., 2018). As trials of acupuncture treatment are being conducted in China, United States, and some parts of Europe, acupuncture is becoming an alternative approach for the treatment of stress (Bourassa, 2014; Debraha et al., 2018).

The problem was that in Ghana, mental health workers and clients are largely unaware of the potential value of using acupuncture as an alternative option to treat PTSD (Badu et al., 2018; Roberts et al., 2014). In addition, I found very limited literature about the acupuncture treatment for PTSD in Ghana (Bourassa, 2014; Debraha et al., 2018). Thus, I conducted this causal-comparative study to determine whether acupuncture treatment yields significant decreases in self-reported stress levels among people with PTSD. The findings of this study provide policy makers with insights into the potential efficacy of acupuncture treatments for people suffering from PTSD.

Purpose of the Study

The purpose of this quantitative, causal-comparative study was to determine whether acupuncture treatment has efficacy for treating PTSD in Ghana. The first group of participants consisted of people receiving the acupuncture treatment, referred to as the intervention group. The second group of participants, referred to as the controlled group, comprised participants who were not receiving the acupuncture treatment, using a quasi-experiment design.

I expected this study to determine whether the independent variable, the acupuncture treatment, has efficacy for reducing the dependent variable, self-reported stress levels among people with PTSD and other stress-related disorders. I utilized the DTS instrument to measure participants' self-reported stress levels of PTSD and gather data on the foundational levels of PTSD symptoms to use in an experimental paradigm.

The findings from the study may help inform mental health workers, decision makers, and policy makers about the efficacy of acupuncture treatments for people

suffering from PTSD in Ghana. Such an understanding is essential to improving the well-being of people with PTSD in the country under study. I anticipated that the study would fill the gap in the research literature regarding acupuncture treatments in Ghana and determine whether acupuncture has efficacy for treating PTSD in this country.

Research Question and Hypotheses

I developed the following research question to investigate the association between the independent variable, acupuncture treatment, and the dependent variable, the level of self-reported stress, in this study:

RQ: Is there a statistically significant relationship in self-reported stress levels among people with PTSD who do or do not participate in acupuncture treatment?

Hypotheses are propositions formulated for empirical testing (Cooper & Schindler, 2008). The null and alternative hypotheses in this study were:

H_0: There is no significant statistical difference between the stress levels of people with PTSD who participate in acupuncture treatment and people with PTSD who do not.

H_a: There is a significant statistical difference between the stress levels of people with PTSD who participate in acupuncture treatment and people with PTSD who do not.

Theoretical Framework for the Study

Psycho-physiological trauma theory is embedded in the DTS, the instrument used to measure self-reported levels of PTSD in this study (see Levine, 1997). The psycho-physiological trauma theory includes symptoms that transpire as an outcome of trauma

specifying nervous system dysregulation (NSD; Levine, 1997). NSD includes favorable conditions for the emergence of PTSD because of the neurophysiological changes that transpire during trauma (Levine, 2005b; Meyer, 2009). Psycho-physiological trauma theory and the DTS were developed from the mathematical catastrophe theory (Levine, 1997). When a traumatic event arises in the autonomic nervous system (ANS), features of routine automatic physiological trigger response processes (Levine, 1997). ANS is a sector of the brain that processes the automatic functions of the organs inside of the body (Levine, 1997; Porges & Furman, 2010).

The essential assumption of psycho-physiological theory is to formulate and pinpoint the process of defensive responses activated during a horrific situation for an individual to sustain homeostasis in the nervous system (Levine, 1997). This theory and the DTS instrument have been used by mental health workers to help patients with PTSD to cope with dealing with symptoms (Levine, 1997). An intervention, such as somatic experiencing (SE), is incorporated by the mental health workers to the psycho-physiological theory to reduce symptoms of PTSD (Levine, 1997). Researchers have linked psycho-physiological trauma theory and the use of SE with the DTS to identify trauma (Levine, 1997). Those who study symptoms, such as those of PTSD, process the theory and use the DTS instrument to try and decrease trauma symptoms, irrational behaviors, external stressors, and intrusive thoughts (Levine, 1997; Levine, 2005b; Meyer, 2009; Tan et al., 2011). Practitioners use SE coping methods of dealing with the trauma to treat the neurological memory with trying to decrease the severe intensity symptoms in the nervous system (Levine, 1996).

Psycho-physiological trauma theory is also utilized by professionals along with the DTS instrument to examine the level of intensity of their client's PTSD (Davidson, 1996). When a human body experiences a traumatic event, psycho-physiological trauma theory with the use of the DTS can show the occurrence of PTSD through neurophysiological variations caused by the trauma (Levine, 2005b). Then, an accumulation of NSD occurs, developing an increased probability for the increase of high or moderate intensity levels of PTSD that are processed by the theory and DTS instrument (Levine, 2005b; Meyer, 2009; Tan et al., 2011). Data collection helps distinguish transformations by regulating the level to which PTSD participants who receive acupuncture treatments and those who do not receive acupuncture treatments respond to stress (Schenker & Rumrill, 2004; Wang & Brown, 2007). In addition, the theory is utilized along with the DTS for calculating the frequency and intensity evaluating scores dealing with PTSD indicators, such as intrusive thoughts and behaviors, anxiety, and shock (Levine, 2010; Schenker & Rumrill, 2004; Wang & Brown, 2007).

Nature of the Study

In this causal-comparative study, I compared self-reported stress levels between PTSD clients who received acupuncture treatment, the intervention group, with those of PTSD clients who did not receiving acupuncture treatment, the control group, to determine whether the use of acupuncture treatment significantly decreases self-reported stress levels of PTSD clients. A psychiatric facility in Ghana approved my research study and allowed me to administer surveys to their PSTD clients. The study site provided me with samples of the two groups of patients.

I distributed the DTS self-report stress scales to 80 Ghanaian patients with PTSD. There were 40 participants in the intervention group and who received acupuncture treatment, and the remaining 40 participants were in the control group and did not receive the acupuncture treatment. Using the causal-comparative design, I had the opportunity to understand if the independent variable, the acupuncture treatment, has efficacy for decreasing the dependent variable, the self-reported stress level among people with PTSD symptoms. I utilized the Jonckheere-Terpstra test (Laerd & Laerd, 2018) to analyze the ordinal data to compare these two participant groups.

Operational Definitions

PTSD: A psychological condition in which a person experiences a terrifying event and symptoms last for at least 1 month after the traumatic event occurred (Anxiety and Depression Association of America, 2018).

Acupuncture: An integrative intervention in which thin needles are inserted into the certain points of the body in order to treat physical, mental, and emotional issues (American Academy of Medical Acupuncture, n.d.). In the study, this variable will be measured at the ordinal level. The value of 0 signified that no acupuncture treatment was administered to the study participants. The value of 1 signified that participants in the study underwent the acupuncture treatment.

Assumptions

For this study, I made seven assumptions. First, I assumed that the findings from the research study will reflect the reality. Another assumption was that the use of the DTS would help collect research data that represents the two variables of the study (see

Davidson, 1996; Schenker & Rumrill, 2004; Wang & Brown, 2007). It was assumed that the participants would answer each survey question truthfully. I also assumed that participants in the study were Ghanaians suffering from PTSD and that enough questionnaires would be completed and returned for the study results to be significant. For this reason, I utilized appropriate strategies to increase completion rates, such as follow ups and reminders after the delivery of the self-administered DTS, and meet the proposed response rate (see Cooper & Schindler, 2013). Another assumption was that that the ordinal data used would justify the use of a Jonckheere-Terpstra test (see Laerd & Laerd, 2018). In other words, the dependent variable was measured at the ordinal level, and the independent variable included a minimum of two ordinal, independent groups (see Laerd & Laerd, 2018). Finally, I assumed that the distribution of both groups–the intervention group and controlled group–would have the same distribution shape (see Laerd & Laerd, 2018).

These seven assumptions imply that the predictions of the association between the response variable, self-reported levels of stress, and the explanatory variable, acupuncture, can be inferred. It was critical that these seven assumptions be acknowledged in the study; however, they do not negate the value of the study.

Scope and Limitations

I conducted the study in a mental health facility in Ghana. I utilized the DTS instrument to collect data from patients with PTSD at the study site. The treatment to be utilized in the mental health facility is acupuncture. There was a possibility that some

patients would not participate in the study because of their religion or because they lacked transportation from rural areas to the study site located in the capital city.

Expectedly, there may be some limitations to a study of this nature. First, the self-administered instrument used to gather research data could have been a problem because of the lack of participants' prior knowledge of PTSD. Since I was present to explain or probe, the sample may have been poor because of nonresponse. Furthermore, it was impossible to know who completed the questionnaire (see McDaniel & Gates, 2007). The lack of random assignment also reduced the efficacy of potential findings. In addition, the study design relies on respondents understanding and engaging with the survey questions truthfully. Moreover, the quality of the research data has significance on the reliability and/or validity of outcomes (Campbell & Lele, 2014).

The small population and sample for study limited the generalizability of the findings. The results derived from laboratory experiments may not generalize to situations outside the laboratory (Papalia et al., 2007). Because I used a quasi-experimental design in this causal-comparative study, the findings may not generalize to other settings in Ghana or beyond the national boundaries of Ghana.

Delimitations

The study was confined to examining the effect of acupuncture treatment on patients with PTSD and other mental disorders. The study did not address other kinds of complementary and alternative medicine (CAM). I utilized primary data collected from self-administered DTSs to determine the potential effect of the acupuncture treatment on

PTSD patients. The acupuncture treatment was performed by one of the mental health facility practitioners.

Significance of the Study

The results of this study include information that may help mental health policy makers and related professionals understand the potential efficacy of acupuncture treatments resulting in decreases in self-reported stress levels among people with PTSD in Ghana. As the results showed a decrease in the self-reported stress, then the results may be generalized to others across similar settings.

Summary and Conclusion

Chapter 1 contained: (a) an overview of the causal-comparative research study designed to determine to what degree a relationship existed between acupuncture treatment and self-reported stress levels among people with PTSD; (b) the purpose and the significance of the study; and (c) the research question, the hypotheses, and the nature of the study. Chapter 2 will contain a review of literature about PTSD and acupuncture.

Chapter 2: Review of Literature

Nearly 95% of 2.5 million people in Ghana with mental health issues, like PTSD, who received no treatment suffered from substance abuse, poor memory, stress, depression, and/or death (Ame & Mfoafo-M'Carthy, 2016; World Health Organization, 2017). In clinical trials, acupunture has been shown to be an effective, integrative medicine in treating PTSD (Bourassa, 2014). Dealing with PTSD is critical in countries like Ghana (Roberts et al., 2014). However, the treatment of acupuncture appears to be lacking in Ghana because mental health professionals, patients, and the government representatives are largely unaware of its potential efficacy (Ame & Mfoafo-M'Carthy, 2016). In addition, there appears to not be enough research and clinical trials conducted on mental health in Ghana (Roberts et al., 2014).

I conducted this study of acupuncture and the stress levels of adult patients with PTSD in Ghana to help bring an increased understanding for mental health workers and patients about the potential use of acupuncture treatment for PTSD.

In this chapter, I review literature that focused on the relationship between acupuncture and PTSD symptoms. In addition, I review literature related to acupuncture and psychological services used as an attempt to understand how the use of self-reported stress levels helps the target population and key informants hopefully develop an awareness of how to deal with PTSD. This literature review chapter contains sections on: (a) the literature search strategy, (b) the history of trauma and PTSD, and (c) acupuncture.

Literature Search Strategy

I searched the databases accessible through the Walden University Library for relevant topics in scholarly books, empirical journal articles, and seminal resources to identify the treatments for and results of PTSD. I retrieved 75 resources for this review using Google Scholar, EBSCOhost, and ProQuest Dissertations and Theses. Furthermore, the Thoreau multidisciplinary search engine was used to locate literature on different aspects of PTSD. I also searched the psychology databases, like PsycINFO, PsycARTICLES, PsycCRITIQUES, and SAGE Journals. The following keyword search terms were used: *mental health issues, mental health in Ghana, trauma, ancient trauma, history of trauma, psychological disorders, acupuncture, alternative medicine for mental health,* and *world health*.

I conducted two types of searches for this study. First, I performed a search with no definite time restraint. Second, I wanted to create an understanding of the present conditions of the research. For this reason, a second search was performed that focused on literature published between the years of 2007 and 2020. I used the reference lists and bibliographies of articles I found to retrieve additional articles. The search efforts yielded 57 articles that I reviewed as part of this study.

Theoretical Foundation

Psycho-physiological trauma theory and the DTS originated from the mathematical catastrophe theory (Levine, 1997). When a traumatic event arises, there is a sudden change in the features of routine, automatic physiological responses that process

in the ANS (Levine, 2005b, Levine, 1997). There are risk factors involved when NSD develops because PTSD levels may rise to be more severe (Levine, 2005b).

Researchers have used psycho-physiological trauma theory, SE, and DTS identify trauma (Levine, 1997). In addition, investigators have used this theory to study symptoms, like those of PTSD, in order to alleviate trauma, irrational behaviors, external stressors, and intrusive thoughts (Levine, 1996). Practitioners use SE coping methods of dealing with the trauma to treat the neurological memory by decreasing the severe intensity symptoms in the nervous system (Levine, 1996).

Psycho-physiological trauma theory and the DTS are used by practitioners to evaluate how PTSD symptoms can be aroused to high intensities if the human body experienced a traumatic event (Tan et al., 2011). When coupled with the use of the DTS, psycho-physiological trauma theory can show the occurrence of PTSD that is due to neurophysiological variations caused by the trauma (Levine, 2005b). Then, an accumulation of NSD occurs, and the patient develops an increased probability for the increase of high or moderate intensity levels of PTSD that are processed and measured by the theory and DTS instrument (Levine, 2005b).

Psycho-physiological trauma theory and the DTS instrument can also be used to measure self-reported levels of PTSD to bring findings of foundational levels of PTSD symptoms to an experimental paradigm (Levine, 1997). In this study, data collection helped me distinguish stress transformations by regulating the level to which PTSD participants who received acupuncture treatments and PTSD participants who did not receive acupuncture treatments.

The History of Trauma

Some of the first evidence of trauma discovered came from the time of 8,000 B.C. and the location of Nataruk in Turkana, Kenya, where ruins and human remains were discovered (Lahr et al., 2016). Nataruk is known to be the first location where trauma symptoms appeared in an aftermath of a war. The Nataruk massacre left the remains of human beings and their trauma transitioned into transgenerational trauma. The loved ones and family members who learned of the traumatic event became shocked by it because psychological trauma and grief equate. Evidence of the traumatic conflict between two rival armies discovered at this site in Kenya consisted of human limbs and generations of people, such as family members or citizens of Kenya affiliated with the traumatic event, experienced symptoms like vivid memories, anxiety, intrusive thoughts, avoidant symptoms, hyperarousal symptoms, and nightmares of the reoccurring traumatic event.

The history of trauma is mainly derived from the aftermath of battles between enemies in warfare that yielded trauma symptoms (Kaneria, 2015). In 1808, Napoleon's chief surgeon, Larrey, began a trauma staff to treat soldiers during war when getting wounded (Kaneria, 2015). Afterwards, trauma units emerged during the First World War because of the high volume of injured soldiers (Kaneria, 2015).

History of PTSD

In ancient history, traumatic symptoms experienced by people included anxiety issues, such as avoiding certain scenarios, nightmares, angry outbursts, being hyper, having frightening flashbacks, and/or having no sympathy for certain parts of life (Snir et al., 2017; U.S. Department of Veterans Affairs, 2015a). The essential feature of

symptoms shown by individuals with PTSD during the 17th and 18th centuries was the trauma being negatively relived by survivors (Snir et al., 2017).

PTSD predates the *Diagnostic and Statistical Manual of Mental Disorders* (Andreasen, 2010). PTSD was studied during the Civil War years (i.e., 1861–1865) by psychologists and started the data collection from several resources for decades until 1952 (Snir et al., 2017). In 1952 in the first edition of the *Diagnostic and Statistical Manual of Mental Disorders*, the American Psychological Association created the term, "gross stress reaction," which was similar to PTSD and used as a diagnosis for people who experienced a tragedy, horrific situation, or traumatic event (Snir et al., 2017).

History of Acupuncture

The acupuncture treatment was likely first developed in China (Zhang et al., 2019). Buddhist monks and the Fourth Shastra in India began acupuncture treatment on people in 5,000 B.C. (Faircloth, 2015). In 1,000 B.C., Chinese therapists began acupuncture treatment on people using bamboo needles or gold and silver needles (Faircloth, 2015). Even though archaeologists do not know the prime reason for the initial use of acupuncture treatment in 5,000 BC, therapists usually treated people to help cure physical and mental health problems (Faircloth, 2015; Zhang et al., 2019).

History of Trauma and PTSD in Ghana

The treatment of mental health in Ghana was led by the U.K. presence in 1972 and was focused on patients dealing with disorders like PTSD (Ame & Mfoafo-M'Carthy, 2016; Roberts et al., 2014). However, religious leaders and healers of shrines in Ghana also attempted to heal mental health issues, such as PTSD, in people (Ame &

Mfoafo-M'Carthy, 2016). The healers used rural shrines, prayers, and ritual ceremonies aiming to cure and/or reduce mental health problems shown by patients in the 18th and 19th centuries (Ame & Mfoafo-M'Carthy, 2016; Roberts et al., 2014).

Anxiety and fear are feelings that traumatized people display when having PTSD; these feelings were caused in some people in Ghana by the loss of a love one from an unexpected death (Ame & Mfoafo-M'Carthy, 2016; Roberts et al., 2014). Nonetheless, limited information on people with mental health issues in Ghana has been collected by mental health workers, with PTSD being a specific barrier (Roberts et al., 2014). In 1972, Ghana psychiatric professionals, along with U.K. psychiatric professionals, developed a *Mental Health Decree* to focus on policies to assist people in Ghana (Ame & Mfoafo-M'Carthy, 2016; Roberts et al., 2014).

Patients with mental health disorders were seen by human rights sectors as having limited access to productive mental health interventions using multidisciplinary research to identify a strategy to empower the patients (Ame & Mfoafo-M'Carthy, 2016; Roberts et al., 2014. In the 19th and 20th centuries, some mental health patients were mistreated, like being chained to trees or placed in prayer camps or shrines (Ame & Mfoafo-M'Carthy, 2016; Roberts et al., 2014). Human rights activists have debated whether Ghana has been neglecting patients with mental health issues and treating them unethically despite mental health laws be passed in 1972 (World Health Organization, 2017).

Current Findings

This section contains information on PTSD in Ghana, acupuncture, acupuncture in Africa, and acupuncture in Ghana. Afterwards I will provide the summary and transition to conclude the chapter.

PTSD in Ghana

Some patients with mental health symptoms like PTSD in Ghana struggle with substance abuse, poor memory, stress, depression, and/or death because of not receiving any mental health treatment (World Health Organization, 2017). There is a 98% treatment gap for the 2.1 million people in Ghana with a mental health disorder like PTSD. Symptoms of PTSD consist of some patients feeling sad, losing enjoyment, and suffering from headaches and/or body pain.

Because 1 in 5 people worldwide will experience a mental health problem in their lifespan (Badu et al., 2018), the importance of available mental health treatment is a global worry. According to Badu et al. (2018), the need to have access to mental health treatment is no less important in Ghana. There are, however, challenges to overcome when providing mental health care in Ghana. Badu et al. identified two categories of barriers to in accessing mental health services in Ghana. The first category pertains to those who need mental health services: their attitude, the lack of knowledge about services, the cost of treatment, transportation due to geographical remoteness, and their perceived efficacy of the treatment (Badu et al., 2018). Under this first category, Ben-Zeev (2018) also identified limited literacy as a significant barrier. The second category of barriers in accessing mental health services in Ghana includes systemic factors, such as

low priority, limited sources of funding, irregular supply of medicine, limited services for the marginalized strata of the population, poor state of psychiatric institutions, and poor management of mental health specialists (Badu et al., 2018).

Addressing PTSD and other mental health disorders necessitates strategies that enable service users (Badu et al., 2018). Badu et al. (2018) asserted that "the potential enablers for service users involved increased decentralisation and integration, task-shifting and existing support services" (p. 1). Another enabler consists of using mobile technologies in the delivery of mental health services (Badu et al., 2018).

As the use of mobile technology has the potential to improve healthcare delivery in terms of offsetting shortage of health care providers, overcoming distance and lack of medical facilities (Kabashiki, 2015), the use of health mobile technologies could be an enabler for mental health services in Ghana because of the degree of advances in telecommunications (Ben-Zeev, 2018). The evaluation of the viability of mobile health for mental health initiatives in Ghana indicated the openness of relevant stakeholders from all sectors to explore the use of mobile health technologies in mental health (Ben-Zeev, 2018). In other words, relevant stakeholders in Ghana are open to find out whether mobile health could foster more humane care, minimize human rights violations, and better clinical outcomes of mental health patients (Ben-Zeev).

To overcome barriers associated with limited literacy, mobile health strategies should use audio and video content (Ben-Zeev, 2018). There are arguments that to be successful in the Ghanaian mental health landscape, any mobile health model must be

culturally and contextually reshaped to meet not only the needs and beliefs of all stakeholders, but also the capacities of those stakeholders (Ben-Zeev).

Acupuncture

Acupuncture is a traditional Chinese practice of medicine that entails the insertion of thin needles into the skin to induce nerves, muscles, and connective tissues throughout the body of the patient (Patil et al., 2016). The goal of acupuncture is to relieve pain, tension, and stress (Patil et al.,). This practice of medicine has gained popularity in Western culture and around the world (Patil et al.).

LaPaglia et al. (2016) conducted a study to examine patients' satisfaction with acupuncture services in two community mental health settings. Their study discoveries indicated for the most part patients' high satisfaction with the acupuncture services they received (LaPaglia et al.). The study findings also suggested patients' high satisfaction with a variety of benefits which include (a) improved focus and concentration, (b) relaxation, (c) improvement in psychiatric symptoms or substance use craving, and (d) somatic benefits (LaPaglia et al.).

The use of acupuncture is increasingly becoming common alternative treatment for countries like the China and Germany, also the treatment has received government support from the United States. (Faircloth, 2015). In 2018, over 16,000 therapists use acupuncture and over 20 million patients have use acupuncture for treatment for some sort of health-related reason in the United States (Faircloth).

Acupuncture in Africa

In Africa, Egyptian doctors utilize acupuncture for a variety of different symptoms such as stress and pain (Faircloth, 2015). However, acupuncture seems to be seldom used in the entire continent of Africa (Faircloth). Acupuncture appears to be used more in China, United States than in Africa (Bourassa, 2014).

Acupuncture is gaining popularity in China, United States, and parts of Western Europe (Patil et al., 2016). This traditional Chinese practice of medicine is however less used in Africa (Bourassa, 2014). There is a need to encourage the use of acupuncture or other complementary and alternative medicine across Africa (Debraha et al., 2018). Complementary and alternative medicines are widely used in some African countries to treat mental health disorders; in Ghana for instance, CAM is being used to treat schizophrenia and bipolar disorders (Debraha et al.).

Thus, the creation in 2001 of the PanAfrican Acupuncture Project (PAAP) which is a volunteer-based not-for-profit training organization (Kirschner et al., 2014). PAAP "encourages community empowerment and wellness through training local healthcare providers how to use simple, effective acupuncture protocols to treat the symptoms of HIV/AIDS, malaria, tuberculosis, and other chronic conditions" (Kirschner et al., para. 1). The primary focus of PAAP consists of helping integrate acupuncture into the local context and current public-health system (Kirschner et al.). The argument is that integrating acupuncture with other traditional complementary and alternative medicines can increase access to treatment in a sustainable manner (Kirschner et al.).

Acupuncture in Ghana

The World Health Organization reports indicated that globally between 40% and 60% of patients with mental illness use CAM therapy (Debraha et al., 2018). Treatment of acupuncture appears to be lacking in Ghana because mental health professionals, patients, and the government staffs are largely unaware of the treatment (Badu et al., 2018). Overall, mental health alternatives treatments like acupuncture appear to be limited in Ghana (Ame et al., 2016; Roberts et al., 2014).

A study conducted by Debraha et al. (2018) to describe the patterns of use and perceived outcome of CAM therapy among Ghanaian patients with schizophrenia and bipolar disorders in a health facility indicated the pervasiveness of CAM therapy. From the study findings, nearly 92% of family caregivers indicated that their patients had used some kind of CAM therapy (Debraha et al., 2018). The therapies used by those who participated in the study conducted by Debraha et al. included "spiritual interventions (100%), herbal therapies (83%), dietary supplements (50%), and music therapies (6%)" (p. 298). The revelation of the study conducted by Debraha et al. is that the use of CAM should not be an alternative to mental health care; it should rather be a complementary choice to mental health care in Ghana.

The state of PTSD and acupuncture in Ghana continues to appear unnoticed frequently by mental health workers and government staff. PTSD population has not been added to census, but psychological distress in Ghana is at 18.7% of the population (Walker, 2015). In 2012, the government in Ghana applied a mental health legislation called the Mental Health Act (MHA, 2012). Previous mental health system has been

ineffective because of overcrowded facilities to the degree minimal care of progress appears to be exhibited in Ghana (Ame, 2016). Mental health legislation authorities are now working on mental health disorders and treatments with more government funding and treatments (Walker, 2015).

Synthesis of Literature

Trauma is as old as hills. One of the first traumatic events was evidenced back in 8,000 B.C. in Kenya, Africa (Lahr et al., 2016). The aftermath of battles between enemies in warfare yielded trauma symptoms (Kaneria, 2015). Symptoms of psychological trauma have been experienced since the ancient history (Snir et al., 2017). Those symptoms were, among others, (a) anxiety, (b) fear, (c) guilt, (d) shame, (e) self-blame, (f) anger, (g) irritability, (h) disconnectedness, (i) angry outbursts, (j) flashbacks, and (k) having no sympathy for certain parts of life (Snir et al.; U.S. Department of Veterans Affairs, 2015a).

As long as people have exposure to traumatic situations, they will suffer from PTSD. Almost the totality of those suffering from PTSD who, unfortunately, do not have receive treatment show symptoms of psychological trauma (Ame & Mfoafo-M'Carthy, 2016; World Health Organization, 2017). Resorting to substance abuse; experiencing poor memory, stress, depression, and sadness or hopeless; and committing suicide are common PTSD symptoms (Bourassa, 2014). The World Health Organization (2017) reports indicated that, in Ghana for instance, people with PTSD struggle with substance abuse, poor memory, stress, depression, and death because of not receiving any mental health treatment.

Acupuncture is a traditional Chinese practice of medicine that entails the insertion of thin needles into the skin to induce nerves, muscles, and connective tissues throughout the body of the patient (Patil et al., 2016). The goal of acupuncture is to relieve pain, tension, and stress (Patil et al., 2016). This practice of medicine has gained popularity in the Western world and around the world (Patil et al., 2016). Acupuncture has been used in China and other countries to treat mental health issues (Zhang, et al., 2019). Acupuncture appears to be used more in China, United States than in Africa (Bourassa, 2014). Studies have shown the efficacy of acupuncture in treating PTSD issues in clinical trials (Bourassa, 2014).

In the 18th and 19th centuries, some Ghanaian religious leaders and healers of shrines attempted to heal mental health issues in people (Ame & Mfoafo-M'Carthy, 2016). Those religious leaders and healers used rural shrines, prayers, and ritual ceremonies in the hope of curing and/or reducing mental health problems shown by patients (Ame & Mfoafo-M'Carthy; Roberts et al., 2014). Yet, the treatment of acupuncture appears to be lacking today in the Ghana's mental health landscape for one main reason (Ame & Mfoafo-M'Carthy). Ghanaian mental health professionals, patients, and the government representatives are largely unaware of potential efficacy acupuncture treatment (Ame & Mfoafo-M'Carthy). In addition, there is insufficiency of research and clinical trials on mental health in general, and particularly on PTSD, in Ghana (Roberts et al., 2014).

From the literature I reviewed in this study, it became evident that acupuncture has the potential to treat mental illnesses in general. Literature suggested that acupuncture

was an alternative treatment for PTSD (Bourassa, 2014). In Ghana, where nearly 92% of family caregivers indicated that their patients had used some kind of complementary and alternative medicine therapy (Debraha et al., 2018), acupuncture could be an effective alternative treatment for PTSD in Ghana. However, the state of PTSD and acupuncture in Ghana continues to appear unnoticed by mental health workers and policy-makers (Ame & Mfoafo-M'Carthy, 2016; Badu et al., 2018; Roberts et al., 2014).

The acupuncture treatment appears to be lacking in Ghana because mental health professionals, patients, and the government staffs are largely unaware of its potential efficacy (Badu et al., 2018). Consequently, the use of acupuncture, as an alternative treatment for PTSD, is lacking in the Ghana's mental health landscape (Ame & Mfoafo-M'Carthy, 2016; Roberts et al., 2014).

Summary and Conclusion

Chapter 2 contains a review of literature about PTSD and acupuncture. In addition, this chapter includes history of trauma, history of PTSD, history of acupuncture, and history of Trauma and PTSD in Ghana. Furthermore, I explore current findings of trauma, PTSD, and acupuncture in Ghana.

Chapter 3 contains sections relating to (a) the research design, (b) the appropriateness of the design, (c) the research questions, and (d) the null and alternative hypotheses. I also provide a description of the population and the geographic location. I describe the sampling frame, data collection procedures, as well as the validity and reliability pertaining to this causal-comparative study. Furthermore, I provide a discussion about the reliability and validity of the instrument used to collect research

data. In addition, I provide a detail about the analysis of ordinal data, threat to validity, and ethical procedures. Chapter 3 ends with a summary.

Chapter 3: Research Method

Globally, the use of acupuncture is increasingly becoming a common alternative treatment for the symptoms often associated with PTSD (Bourassa, 2014). However, the treatment of acupuncture appears to be lacking in Ghana because mental health professionals, patients, and the government representatives are largely unaware of its potential efficacy (Ame & Mfoafo-M'Carthy, 2016). In addition, there appears to not be enough research and clinical trials on mental health in Ghana (Roberts et al., 2014). The findings of this causal-comparative study may help determine whether acupuncture treatment, the independent variable, yields significant decreases in self-reported stress levels among Ghanaian patients with PTSD, the dependent variable.

The purpose of this quantitative, causal-comparative, quasi-experimental study was to compare two groups of participants in order to determine whether acupuncture has efficacy for treating PTSD in Ghana. The first group consisted of people receiving acupuncture, referred to as the intervention group. The second group, referred to as the control group, comprised participants who were not receiving acupuncture. I used the DTS instrument to measure participants' self-reported levels of PTSD and gather data regarding the foundational levels of PTSD symptoms to apply to an experimental paradigm.

The findings from the study may help inform mental health workers, decision makers, and policy makers about the efficacy of acupuncture treatments for people suffering from PTSD in Ghana. Such an understanding is essential to improving the well-being of people with PTSD in the country. I anticipated that the study would fill the gap

in the research literature regarding acupuncture treatments in Ghana and determine whether acupuncture has efficacy for treating PTSD in this country.

This chapter contains details on the research methodology, guiding research question, and the hypotheses. In addition, I discuss the research design and a justification for its use, the study population, sampling procedures, and the procedures for recruitment and data collection. Furthermore, this chapter contains a description of the intervention, potential threats to validity, and ethical procedures followed in the study.

Research Methods

Because a goal of the study was to compare two groups of participants in order to determine whether acupuncture had efficacy for treating PTSD in Ghana, a quantitative, causal-comparative design was appropriate. A causal-comparative design is a research design in which a researcher seeks to find associations between independent and dependent variables after an episode has happened (Iqbal et al., 2017). In a causal-comparative research design, the researcher strives to identify whether the independent or dependent variable affected the result by contrasting two or more groups of subjects (Iqbal et al., 2017). In this study, I examined whether the independent variable affected the result by contrasting two groups of people with PTSD who received different treatment methods (i.e., one group underwent acupuncture treatment and one group did not undergo acupuncture treatment).

This study was also an attempt to determine whether there was a statistically significant trend between an ordinal independent variable and an ordinal dependent variable (see Laerd & Laerd, 2018). To make such determination and compare the two

groups of people with PTSD, I used a rank-based, nonparametric, Jonckheere-Terpstra test (see Laerd & Laerd, 2018). The results from the Jonckheere-Terpstra test helped determine whether the differences that existed in the outcomes were related to the acupuncture treatment in Ghana. In other words, the study findings helped assess the efficacy of the use of the acupuncture treatment for PTSD in Ghana.

Research Design and Rationale

The causal-comparative research design, also referred to as ex post factor research, appeared appropriate to answer the research question in the current study (see Campbell & Lele, 2014; Salkind, 2010). In this research study, I attempted to determine whether there was a statistically significant trend between an ordinal independent variable and an ordinal dependent variable, (see Iqbal et al., 2017; Laerd & Laerd, 2018; Salkind, 2010). A causal-comparative design was appropriate for this study because I compared two groups to discover relationships between the independent variable, acupuncture treatment, and the dependent variable, the levels of self-reported stress (see Salkind, 2010).

Because I used ordinal data in this causal-comparative research study, the Jonckheere-Terpstra test was deemed appropriate for data analysis and for comparing two groups for statistical significance (see Laerd & Laerd, 2018). Laerd and Laerd (2018) opined that "the Jonckheere-Terpstra test is a rank-based nonparametric test that can be used to determine if there is a statistically significant trend between an ordinal independent variable and a continuous or ordinal dependent variable" (para. 1). Because the Jonckheere-Terpstra test is a rank-based, nonparametric test for significant

differences between the means of two or more groups (see Laerd & Laerd, 2018), it was appropriate to use in this causal-comparative study.

The goal of this study was to determine whether differences existed between the two groups by manipulating the treatment, which was the intervention. First, I proctored the assessment with the two groups (see Campbell & Lele, 2014). Second, I conducted the Jonckheere-Terpstra test to compare the two groups and examine the differences in this causal comparative study (see Campbell & Lele; Laerd & Laerd, 2018).

It is crucial to mention that the Jonckheere-Terpstra test is an omnibus test statistic that cannot be used to tell where the differences between the groups lie or which specific group of the independent variable is statistically significantly different from each other (Laerd & Laerd, 2018). The Jonckheere-Terpstra test only indicates that at least two groups are different (Laerd & Laerd, 2018). A study design that has more than two groups will require using a post hoc test to determine which of these groups differ from each other (Laerd & Laerd, 2018). Because there were two groups in this study design, a post hoc test was not required (see Laerd & Laerd, 2018) to assess the difference between the intervention and control groups (see Campbell & Lele, 2014).

The Jonckheere-Terpstra test provided the information needed to determine whether significant differences existed between the intervention and controlled groups in the current study (see Anders, 2017; Laerd & Laerd, 2018). I utilized the DTS instrument to collect data about PTSD symptoms and measure the levels of severity in the participants (see Davidson, 1996).

A review of literature suggested that acupuncture was an alternative treatment for PTSD (Bourassa, 2014). The following research question guided the examination ofthe efficacy of acupuncture treatment in Ghana in this study.

Research Question and Hypotheses

The following research question guided this investigation of the association between the independent variable, acupuncture treatment, and the dependent variable, the level of self-reported stress:

RQ: Is there a statistically significant relationship in self-reported stress scales among people with PTSD who do or do not participate in acupuncture treatment?

Hypotheses are propositions formulated for empirical testing (Cooper & Schindler, 2013). The null and alternative hypotheses in this study were:

H_0: There is no significant statistical difference between the stress levels of people with PTSD who participate in acupuncture treatment and people with PTSD who do not.

H_a: There is a significant statistical difference between the stress levels of people with PTSD who participate in acupuncture treatment and people with PTSD who do not.

In this study, the rejection of the null hypothesis would suggest that there is a causality between the acupuncture treatment and the level of self-reported stress among people with PTSD symptoms (see Campbell & Lele, 2014; Chambliss & Schutt, 2016).

Population

I conducted the study at a mental health facility in Ghana. The study participants were the mental health facility clients suffering from PTSD. There are approximately 10,012 people suffering from PTSD in the Greater Accra region (Mental Health Society of Ghana, 2017).

Sampling Strategy

In a research study, sampling strategies aim to limit error that may affect the independent or dependent variables when comparing two groups (Baldwin, 2018; Campbell & Stanley, 1963). I used a purposive, nonprobability sampling strategy to recruit PTSD clients who were suited to address the research question in this study (see Etikan et al., 2016; see Martinez-Mesa et al., 2016). I divided my sample into two groups of patients to compare scores on self-assessment of stress between the two groups: (a) the first group consisted of 40 PTSD clients who received psychological services and (b) the second group consisted of 40 PTSD clients who received acupuncture treatment and psychological services.

To strengthen the research sample, I used two techniques. First, I identified similar characteristics and assigned participants to both groups based on those attributes; this technique is referred to as *matching* (see Baldwin, 2018). Second, I strived to compare homogeneous groups (i.e., intervention and control groups; see Baldwin, 2018; see Campbell & Stanley, 1963).

Sample Size and Demographic

Power is the likelihood of discerning a situation where a true difference exists (Sheperis, n.d.). Determining the correct sample size is one of the steps in a research study (Sheperis, n.d.). Power and sample size have a connection: The greater the sample size, then statistical power rises (Sheperis). Determining the precision desired when deciding whether to reject the null hypothesis depends on identifying the right size of the sample for the study (see Campbell & Lele, 2014).

In the Greater Accra region, people suffering from PTSD amount to 10,012 (Mental Health Society of Ghana, 2017). Using G*Power (Faul et al., 2007), I estimated a sample size of 80 to have an effect size of 0.10. Therefore, the sample size in the current study was 80 individuals suffering from PTSD.

Selecting the sample size at the study site required a manual distribution of flyers to advertise about this acupuncture treatment study for individuals suffering from PTSD. Those who were interested in participating in the study contacted me via email or phone. The study participants were selected on a first-come-first-serve basis. The first 40 patients with PTSD who volunteered to participate in the study did not receive the acupuncture treatment, while the next 40 volunteers did receive the acupuncture treatment.

After receiving 92 expressions of interest, I emailed those potential participants an online link to the informed consent form. Those potential participants were required to complete the consent form in order to participate in the self-reported surveys. Ninety

potential participants returned their completed informed consent forms; however, only 80 volunteers were found to be eligible to participate in the study.

In the study, I used a sample size of 80 volunteers that self-identified as Ghanaian citizens with PTSD symptoms. For selecting the participants in the study, I used the following factors: (a) age, (b) gender, (c) language, and (e) willingness to share private information. In other words, I recruited volunteers who were 18 years or older, with PTSD symptoms, and were able to read and speak English. Each participant received, via an online link, the same pre- and posttest self-reported survey.

The pretest was completed first by the study participants before any treatment. A series of one treatment per week was administered for a total of 4 weeks. Upon completion of the one-session per week treatment for 4 weeks, a posttest was conducted the fourth week after the last session with the same participants. The study participants were asked a series of 17 semistructured, in-depth questions about symptoms they have experienced with their PTSD issues. The study participants had privacy to answer the survey anonymously because there were no names recorded on the self-reported surveys.

Recruitment Procedures

I used non-randomly purposive sampling (see Baldwin, 2018; see Campbell & Stanley, 1963) to recruit 80 patients with PTSD to participate in the study. Forty study participants received the acupuncture treatment at the study site in Ghana. I put those participants into the intervention group. The remaining 40 participants who did not receive acupuncture treatment were put into the control group.

Participation and Data Collection

I provided each potential participant with an informed consent link via email. Participants had the options to complete the survey online or to download the survey, complete it, and hand it to me. As the participation was voluntary, human subjects were informed that they were free to stop participating in this research any time without penalty. Then, I emailed the informed consent and survey in one link for PTSD patients from the study site in Ghana (Essays, 2018).

The participation in the study was voluntary. The opportunity to participate in the study was open to patients who are 18 years of age or older. Upon the approval of this proposal, I started collecting research data. Both groups of participants used the DTS instrument shown in Appendix A to self-report levels of PTSD.

I provided the DTS self-report stress scales (Davidson, 1996) in a link to those 80 patients with PTSD. Eighty selected Ghanaian patients with PTSD provided quantitative research data. I entered collected data into the Statistical Package for the Social Sciences (SPSS) for analysis and interpretation.

Instrument

In this study, I used the DTS instrument (Davidson, 1996; Levine, 1997) to collect data from patients with PTSD that have access to the mental health facility in Accra, Ghana. The DTS was appropriate for this study for three reasons. First, DTS is created as a self-rating instrument to diagnose and calculate symptom intensity for PTSD (Davidson et al., 2002). Second, not only the DTS captures quantitative data (Davidson, 1996), but also, as a scale, it has been universally adopted because it tracks changes in the severity

of symptoms in treatment outcome studies (Davidson et al., 2002). Third, the DTS has demonstrated good reliability and validity in previous studies. Permission to use the DTS is included in Appendix G.

Reliability of the DTS

About the reliability of the instrument used in the study, Cooper and Schindler (2013) recommend the use of robust and suitable instrument capable of working effectively in changing times and conditions. The DTS scale is suitable for the study because of its very good internal consistency and test–retest reliability regardless of the participants and their cultural characteristics (Leiva-Bianchi & Araneda, 2013). Findings from the work of McDonald et al. (2009) which studied the psychometric properties and diagnostic efficiency of the DTS has suggested good internal consistency. Its reliability has been established in the study conducted by Villafañe et al. (2003) which indicated that DTS had very high reliability ($\alpha = 0.890$).

In 1951, Lee Cronbach created Cronbach's alpha focused on a group of scales to measure reliability (McDonald et al., 2009). Also, in the social sciences, Cronbach's alpha is the most accepted measure of reliability (Eaton, 2006). Its coefficient of reliability ranges from 0 to 1. A coefficient between 0.65 and 0.8 (or higher) is recommended by numerous methodologists (Goforth, 2015).

A study by Davidson et al. (1997) indicated that DTS exhibited good test–retest reliability ($r = 0{\cdot}86$), internal consistency ($r = 0{\cdot}99$). In addition, a Greek version of the DTS developed to respond to the needs of Greek-speaking people was applied to 128 HIV outpatients and 166 control patients (Kontoangelos et al., 2017). The Cronbach's

alpha coefficient of the Greek version of the DTS was 0.93; its Guttman split-half coefficient was 0.88 (Kontoangelos et al.). The work of Davidson et al. suggested that the DTS had good reliability.

Validity of the DTS

Regarding the validity of the instrument that was used in the study, the work of Villafañe et al. (2003) suggested that DTS had a structure made up of four factors very consistent not only with the original structure, but also with other previous validity studies. For the reasons mentioned in the work of Villafañe et al., Leiva-Bianchi and Araneda (2013, p. 2) opined that the "DTS is widely used after potentially traumatic events."

The findings from the study conducted by Davidson et al. (1997) to assess a new self-rating scale (DTS) showed predictive validity against response to treatment. The discoveries suggested that DTS is sensitive to treatment effects (Davidson et al., 1997). Discoveries from the same study indicated good convergent and divergent validity (Davidson et al.). The work of Davidson et al. suggested that DTS had good validity. Findings from the work of McDonald et al. (2009) which examined the psychometric properties and diagnostic efficiency of the DTS suggested concurrent validity, and convergent and divergent validity.

As a scale, DTS was appropriate to assess the severity of symptoms, the outcome of the treatment and in screening for the likely diagnosis of PTSD (Davidson et al., 1997). The work of Kevan (2017) sought to validate the application of a standardized DTS with a large, heterogeneous population of earthquake victims. Kevan's study

findings revealed that the DTS was, overall, reliable and valid, indicating good concurrent validity.

Permission to Use the Instrument

Permission from developer to use the instrument was provided on October 3, 2020. The permission letter is included in Appendix G of this study.

Operationalization of Constructs

The next section includes information about on PTSD and acupuncture. In addition, I offer the linkages between the constructs and types of variables.

PTSD

It is a psychological condition in which a person experiences a terrifying event and symptoms last for at least 1 month after the traumatic event occurred (Anxiety and Depression Association of America, 2018). In the study, PTSD was assessed by using self-reported stress scales among people with PTSD symptoms. The levels of self-reported stress of PTSD clients are the dependent variable.

Acupuncture

It is an integrative intervention in which thin needles are inserted into the certain points of the body in order to treat physical, mental, and emotional issues (American Academy of Medical Acupuncture, n.d.). In the study, this variable was measured at the ordinal level. The value of "0" signifies that no acupuncture treatment is administered to the study participants. The value of "1" signifies that participants in the study undergo the acupuncture treatment.

Research Data Analysis

The Jonckheere-Terpstra test was appropriate for this research because this causal-comparative study was an attempt to compare two groups (Anders, 2017; Campbell & Lele, 2014; Laerd & Laerd, 2018). As the study used ordinal data which are the level of severity of symptoms, the Jonckheere-Terpstra test helped measure changes in the severity of symptoms as a response to treatment for the intervention group. The Jonckheere-Terpstra test was conducted to determine whether there was a statistically significant difference between the intervention group and the controlled group under investigation (Laerd & Laerd). In other words, I conducted the Jonckheere-Terpstra test to determine to what degree statistically significant differences existed between the two groups under investigation.

The first group of 40 PTSD clients received psychological services (independent variable). The second group consisting of 40 PTSD clients received acupuncture treatment and psychological services (Iqbal et al., 2017). Based on the results of the Jonckheere-Terpstra test, I was able to draw a conclusion regarding the null hypothesis (Laerd & Laerd, 2018).

Overview

A causal comparative design is a research design that compares the independent and dependent variables (Iqbal et al., 2017). The study compared two groups of participants in order to determine whether acupuncture has efficacy for treating PTSD in Ghana. The outline for using a causal comparative research design was not different from that of other research designs (Iqbal et al.). After determining the focus of the research

and developing hypotheses, the following step consisted of selecting a sample of participants (Iqbal et al.).

This study was an attempt to determine to what extent acupuncture treatment (independent variable) had efficacy on the levels of self-reported stress (dependent variable) among people with PTSD in Ghana. The analysis provided the opportunity to determine whether acupuncture could treat PTSD in Ghana. Appendix E shows the levels of stress severity. Appendix F shows the intervention types. For the study, metrics included the use of ordinal numbers because participants' responses in the DTS are coded as consecutive integers from 0 to 4 (Long & Freese, 2006).

I first collected data about the level of stress for all 80 participants in the study. Each participant in the intervention group received four sessions of the acupuncture treatment. Those in the controlled group did not receive the acupuncture treatment. Afterward, the levels of self-reported stress scales were collected from all 80 participants in the study for post hoc testing.

As I used the Jonckheere-Terpstra test in the study, I needed to have access to the post hoc results to determine whether a significant difference existed between the two groups (Laerd & Laerd, 2018). As an omnibus test statistic, the Jonckheere-Terpstra test results cannot tell which specific groups of independent variables are statistically different from each other (Laerd & Laerd). For this reason, it was critical to follow up my results with a post hoc test (Laerd & Laerd). The post hoc test results was produced when I ran the Jonckheere-Terpstra test procedure (Laerd & Laerd).

In this study, I used two groups of patients with PTSD. I compared self-reported levels of stress between PTSD patients who received the acupuncture treatment and those who did not receive the acupuncture treatment. Such comparison helped determine whether the use of acupuncture significantly decreased levels of self-reported stress of PTSD patients in Ghana. The use of the Jonckheere-Terpstra test helped determine whether a statistically significant trend existed between the ordinal independent variable (acupuncture treatment) and the ordinal dependent variable (self-reported stress level) in this causal-comparative study.

Descriptive Statistics

Demographic statistics

In this study, the demographic data from two groups are described and presented in narrative and graphic format. Descriptive statistics showing gender, age range, and geographic location are used to recap demographic information at a view with a percentage rate. Descriptive statistics are displayed in figures.

Frequency distribution and graphing

Frequency distribution is "A table that shows the distribution of cases into the categories of one variable, that is, the number or percent of cases in each category" (Neuman, 2014, p. 396). Frequency distributions were used in this study to indicate the number of cases observed at each score rate (Neuman, 2014).

Central tendency

In the study, SPSS was utilized to estimate the following central tendency measures: mean and standard deviation.

Inferential Statistics

Hypothesis testing

A hypothesis is a proposition that a researcher formulates for empirical testing (Cooper & Schindler, 2013). In the present research, I tested one hypothesis to make predictions about the outcomes of the associations between the independent variable and the dependent variable (Flannelly et al., 2014).

I used inferential statistics to answer the guiding research question. In other words, I used the results of the Jonckheere-Terpstra test (Campbell & Lele, 2014; Laerd & Laerd, 2018) to determine whether acupuncture has a positive effect on the treatment of PTSD in Ghana.

Decision errors

Two types of error in the rejection or the acceptance of the hypothesis is based on an educated guess, the decision to accept or reject the hypothesis. The first type of error involves of the result to decline the null hypothesis when the result is correct. Accepting the null hypothesis when false is the second type of error.

A good statistical test "of a hypothesis ought to reject a null hypothesis when it is false" (Aaker et al., 2007, p. 458). The power of a statistical test of a null hypothesis is the probability that the test will end up to the decision to decline the null hypothesis when it is indeed not true (Aaker et al.). Granted the power of a statistical test cannot be estimated with accuracy, the probability of the estimation rises as the substantial level represented by α, increases, and as the sample size rises (Aakeret et al.).

I made attempts to decrease decision errors in the study. First, I leaned towards the reliability of the research information. Second, "hypothesis tests will be performed at a significant level of 0.05 rather than 0.10. A 95 percent confidence level is often used because it is a reasonable compromise between confidence and precision" (Doane & Seward, 2009, p. 316). Third, I utilized a sample size of 80 cases estimated by G*Power (Faul et al., 2007) in the study.

Threats to Validity

Overview

In this section, I provide insight into the threats to validity. The following sections include internal and external validity.

Validity pertains to the consistency and dependability of a research data collection instrument over time (Campbell & Lele, 2014). The quality of measurement, suitable use of instrument procedures, and generalization of research results are key components to the validity of a study (Campbell & Lele, 2014).

However, threats to the data may occur because changes with the PTSD clients may happen during the study such as patients may be dishonest or refused to take the study seriously (Baldwin, 2018; Campbell & Stanley, 1963). In addition, a possible threat to internal validity because of the selection and assignment of participants into groups due to language barriers. I collected data from two groups. As this was a causal-comparative research design in the sampling strategy, I aimed to analyze any timing bias as the duration of the study may affect the outcomes of the two groups (Baldwin, 2018; Campbell & Stanley, 1963). Cultural diversity by the researcher recognizing the target

audience of PTSD clients could affect the independent or dependent variables when comparing two groups (Flannelly et al., 2014).

Validity is the truthfulness of the measured data as compared to reality (Campbell & Lele, 2014). The validity of the data depends on the reliability of the instruments used in the study; in other words, it depends on the extent to which the DTS scale captures data it is intended to capture (McDaniel & Gates, 2007).

The nature of this research study could present internal threats to validity. In the first type of error, the decision to decline the null hypothesis when correct (Aakeret al. 2007). The second type of error is accepting of null hypothesis when incorrect (Aakeret al. 2007).

Internal Validity

The nature of this research study might present internal threats to internal validity. According to Baldwin (2018), internal validity is the scope to which the research design allows a researcher to make a determination as to whether or not the experimental treatments, as applied in a particular piece of research, with a particular group of participants, affected the criterion (dependent variable), as measured in the research in question. Although I chose an objective criterion for selecting participants, the internal validity could be threatened if the selection and the assignment of participants are not done randomly.

In other words, internal validity provides accuracy for a research study that offers the research design results about cause-and-effect and other connotations within the information are accurate (Campbell & Lele, 2014). Possible threats to internal validity

could be a barrier in the study. The participants based in Ghana and their assignment groups may be a primary threat to internal validity for the study. The possible inclusion for the unintentional introduction of bias in the research places the integrity of the outcomes into consideration and is a critical question for researchers (Baldwin, 2018; Campbell & Stanley, 1963). Internal validity was used to synthesize the sample effect of the population and measure differences comparing the two groups (Baldwin, 2018; Campbell & Stanley, 1963).

In causal-comparative research designs, there is a comparison between two or more groups of subjects (Baldwin, 2018; Campbell & Stanley, 1963). The problem is that different levels of independent variables define those groups. When the selection of participants and their placement into groups is not randomly done, internal validity is threatened (Baldwin, 2018; Campbell & Stanley, 1963).

To reinforce the research design and counter threats to internal validity, it was crucial to impose the selection of three techniques. Those techniques consisted of matching and using homogeneous subgroups. In this study, not only I utilized matching, I also strived to compare homogeneous groups.

External Validity

The term “external validity” is used to refer to the degree to which a study’s discoveries generalize beyond the specifics of the experimental situation (Baldwin, 2018; Campbell & Stanley, 1963). External validity provides the study’s findings to implement in general to other contexts (Baldwin, 2018; Campbell & Stanley, 1963).

If the internal threats are not identified, they limit the generalization of the study. The replication of the present research will be possible especially when studying acupuncture for treating PTSD in other African countries.

The primary threat of external validity comes from the information gathered from the selected groups, and not being applicable to the wider population. It is therefore crucial that both internal and external threats be clearly communicated to people who will consume this research findings (Baldwin, 2018). Possible members of the present research findings include policymakers and scholarly practitioners (World Health Organization, 2017).

As recommended by Cooper and Schindler (2013), the instrument used in this study was therefore robust and suitable to work effectively in changing times and conditions. In this study, I utilized the DTS questionnaire (Levine, 1997) to collect research data. The DTS scale was appropriate for this study because regardless of the participants and their cultural characteristics, it has very good internal consistency and test–retest reliability (Leiva-Bianchi & Araneda, 2013). The work of Villafañe et al. (2003), for instance, indicated that DTS had very high reliability ($\alpha = 0.890$). The same study suggested that DTS had a structure composed of four factors (Villafañe et al.). Those findings were very consistent with the original structure and other previous validity studies (Villafañe et al.).

Ethical Procedures

In this section, I provide an overview of ethical procedures. I also provide information on informed consent and confidentiality.

Overview

To promote that the benefits expected from the study to reduce any potential risks, and possible issues to human subjects. Research data will remain my property because I collected them. In addition, research data will be kept safe and confidential. Research data will be held for a period required by the law of the land, and then destroyed. Acupuncture was available for participants in the study in Ghana.

Informed Consent

The population used in this research study comprised of patients with PTSD who volunteered to participate in the study. As an investigator, I was concerned about the potential harm that research participants may experience so I can protect the privacy and confidentiality of participants.

Prior to the beginning of the study, I informed each participant in the study of the purpose of the research. Details of the person conducting the research and the research methodology were described in the informed consent form. In addition, participants were informed of potential benefits to the individual and the health care industry. Furthermore, participants were informed of an assurance that research results would be confidential, there were no foreseeable risks to the participants, and that participating in the study was voluntary. The procedure for contacting the researcher should the participant have any questions or concerns during or following the study was included in the informed consent form.

Confidentiality

It was critical that the confidentiality of the study participants be maintained by assigning a unique identifier to each DTS instrument. To assure confidentiality and anonymity to each participant, no names were used that could be associated with participants' responses. The aim was to make participants feel comfortable expressing themselves about private information in a safe environment to talk without worry of that information leaving the assigned group. The mental health facility had acupuncture treatment as a service for the study participants.

Summary

In the research study, design as well as the appropriateness of the research design were provided in this chapter. I chose to use a causal-comparative research design because the study was an attempt to identify the causes of differences, if any, in a nonexperimental setting. By comparing two homogeneous groups, I was able to identify the impact of the acupuncture treatment on patients with PTSD in Ghana. The purpose of this causal-comparative research study was to explore the effect of acupuncture treatment on patients with PTSD in Ghana.

In Chapter 3, I provided (a) population and the source of research data, (b) the concepts of internal and external validity, (c) analysis of data, and (d) the identification and appropriateness of data analysis. In addition, I discussed the appropriateness of the instrument I used for the data gathering. The DTS was used in the study because of its reliability and the validity.

In Chapter 4, I provide (a) the results of data collection; (b) data analysis to understand if the independent variable, acupuncture treatment, has efficacy for treating the dependent variable, self-reported stress levels among people with PTSD; and (c) the research findings. The process used for reviewing and analyzing the data are outlined.

Chapter 4: Results

The purpose of this causal-comparative study was to examine the effects of acupuncture treatment on patients with PTSD in Ghana. and used SPSS Version 27 for descriptive and inferential data analyses. In Chapter 3, I provided the details regarding the appropriateness of the research design and the source of data used in the study. In addition, I addressed the validity and reliability of research data.

I conducted this causal-comparative study to address the following research question:

> Is there a statistically significant relationship in self-reported stress levels among people with PTSD who do or do not participate in acupuncture treatment?

Hypotheses are propositions developed for empirical testing (Cooper & Schindler, 2013). In this study, I used the hypotheses to make a prediction about the outcome of the relationship among variables (see Campbell & Lele, 2014). The null and alternative hypotheses were:

> H_0: There is no significant statistical difference between the stress levels of people with PTSD who participate in acupuncture treatment and people with PTSD who do not.
>
> H_a: There is a significant statistical difference between the stress levels of people with PTSD who participate in acupuncture treatment and people with PTSD who do not.

In this chapter, I provide a complete analysis of the present research study. I describe the way research data were collected, organized, and analyzed. The study

findings are also presented, including descriptive and inferential statistics, before concluding the chapter with a summary.

Data Collection

I received IRB approval (Approval No. 12-07-20-0299509) for this study on December 7, 2020. Following the IRB approval, I administered a self-reported survey to participants to gather primary data. Between December 8, 2020 and January 5, 2021, data were collected at the mental health facility from 80 individuals with PTSD. As the number of individuals suffering from PTSD in the study site region amounted to 10,012, I used G*Power (Faul et al., 2007) to estimate a sample size of 80, with an effect size of 0.10. The acupuncture treatment was administered as planned and described in Chapter 3.

Data Organization

. For each of the 17 questions of the DTS instrument, participants indicated the frequency and the severity of their symptoms. I designed the Microsoft Excel workbook to record those two data points. In addition, I organized the research data in the Excel workbook to show the three clusters used in the DTS form. The first cluster contains Questions 1 through 5. This is the *intrusion* cluster of PTSD symptoms. The second cluster comprises Questions 6 through 12. This is the *avoidance* and *numbing* cluster of PTSD symptoms. The third cluster includes Questions 13 through 17 and is the *hyperarousal* cluster of PTSD symptoms.

I used the *Sum* function of Microsoft Excel to sum the scores for *frequency* and *severity* entries within each cluster. I summed the frequency subtotal and the severity subtotal to generate the intrusion cluster total, the avoidance and numbing total, and the

hyperarousal total. I then summed those three totals to generate the DTS total. I entered those four aggregates into SPSS Version 27 and used them in inferential analysis.

Data Capture

Once the organization of the research data in the Microsoft Excel workbook was complete, I imported the workbook into SPSS Version 27. Because errors made during the capture of research data into a computer system have the potential to threaten measures validity and generate false results (Neuman, 2014), I paid careful attention during the recording of data into the Excel workbook. In addition, I meticulously defined each variable in SPSS Version 27.

Statistical Results

Overview

The intended statistical analysis testing described in the proposal was a rank-based, nonparametric test, the Jonckheere-Terpstra test, to compare two groups (see Laerd & Laerd, 2018). I used two kinds of statistics in the data analysis of the present study. First, I used descriptive statistics to explain basic patterns in research data (see Neuman, 2014). Second, I used inferential statistics to test the null hypothesis of this study (see Neuman, 2014). The final step in this data analysis was to present the results in a report. The results of the detailed descriptive and inferential statistical analyses are displayed in both text and tables.

Descriptive Statistics

I used descriptive statistics to summarize the research data at a glance with a percentage frequency. The sample used for this study consisted of 80 male and female

Ghanaians with PTSD. The age of the study participants ranged from 18 to 50 years old. Table 1 shows the descriptive data.

Table 1

Descriptive Statistics

Variables	*M*	*SD*	95 % CI		Sample size
			LL	UL	
Intervention score	.50	.503	0	1	80
Intrusion score	20.69	3.063	13	29	80
Avoidance/numbing score	26.86	3.935	16	36	80
Hyperarousal score	19.67	3.666	6	27	80
DTS total score	67.23	7.715	38	83	80

Note. CI = confidence interval, LL = lower limit, UL = upper limit.

Table 2 shows the composition of the study sample by gender.

Table 2

*Participants Demographics (*N = *80)*

Participants by gender	*N*	%
Males	40	50%
Females	40	50%

Assumptions

Six assumptions needed to be satisfied prior to using a Jonckheere-Terpstra test in the study. Those assumptions included: (a) the type of the dependent variables, (b) the

type and number of independent variable, (c) independence of observations, (d) distribution, (e) prediction a priori, and (f) the direction of the alternative hypothesis.

Dependent Variable Assumption

Dependent variables must be measured at the ordinal or continuous level (Laerd & Laerd, 2018). In the present study, I used an ordinal independent variable and an ordinal dependent variable to compare two groups of participants. The first group was the intervention group, and the second group was the control group. The dependent variable assumption was therefore met.

Independent Variable Assumption

Independent variables should have at least two ordinal, independent groups (Laerd & Laerd, 2018). The independent variable used in this study consisted of two ordinals, and for this reason, the independent variable assumption was met.

Independence of Observations Assumption

There should be no relationship between the observations in each group (Laerd & Laerd, 2018). In addition, there should be no relationship between the groups themselves (Laerd & Laerd). In the present study, there were different participants in each group and no participant was in both groups. The independence of observations assumption was met.

Same Distribution Assumption

The distribution of scores for each group of the independent variable must have the same shape and the same variability (Laerd & Laerd, 2018). The results of the independent-samples Jonckheere-Terpstra test before the administration of the

acupuncture indicated that the distribution of all scores was the same across the two groups under study. The same distribution assumption was therefore met.

A Priori Prediction Assumption

The order of the groups of the independent variable must be predicted before running the Jonckheere-Terpstra test (Laerd & Laerd, 2018). In the present study, I predicted the order of the groups of the independent variable before collecting the research data. I predicted this order when I set the research question and formulated the hypotheses, so the a priori prediction assumption was met.

Direction of the Alternative Hypothesis Assumption

The direction of the alternative hypothesis must be predicted a priori (Laerd & Laerd, 2018). In the present study, I predicted the direction of the alternative hypothesis before looking at the research data; therefore, the direction of the alternative hypothesis assumption was met.

Data Analysis

Overview

The purpose of using inferential statistics was to test the null hypothesis to address the research question. I developed the research question to determine whether there was a statistically significant trend between the ordinal independent variable, acupuncture treatment, and the ordinal dependent variable, level of self-reported stress. I used the results of the rank-based, nonparametric test, the Jonckheere-Terpstra test, to answer the research question.

Data were first analyzed to determine whether a correlation existed between the ordinal independent variable, acupuncture treatment, and the ordinal dependent variable, level of self-reported stress. Second, I used the Jonckheere-Terpstra test to compare two groups. The purpose of comparing the intervention group with the control group was to determine the efficacy of the acupuncture for treating PTSD in Ghana.

Correlation

A correlation analysis or correlation coefficient is used to determine the magnitude of the association between two or more variables (Bennett et al., 2009). Kendall's Tau-b correlation coefficient is a nonparametric measure of the strength and direction of relationship that exists between two variables measured on an ordinal scale (Laerd & Laerd, 2018). Kendall's Tau-b is a nonparametric alternative to the Pearson's product-moment correlation when data failed one or more of the assumptions of Pearson's correlation test (Laerd & Laerd). In addition, when there is a small sample size with many tied ranks, Kendall's Tau-b is an alternative to the nonparametric Spearman rank-order correlation coefficient (Laerd & Laerd).

Kendall's Tau-b correlation coefficient (τ_b) ranges between negative 1 and positive 1 (Laerd & Laerd, 2018). The stronger the positive relationship between the two variables under study, the closer τ_b is to its maximum value of +1. The stronger the negative linear association between the two variables, the closer τ_b is to its minimum value of -1. A value of τ_b equal to zero indicates the absence of a linear relationship between two variables.

In this study, I calculated a Kendall's Tau coefficient to determine the relationship between the ordinal independent variable, acupuncture treatment, and the ordinal dependent variable, level of self-reported stress. The dependent variable data were divided into three clusters of the DTS questions: (a) the intrusion cluster, (b) the avoidance and numbing cluster, (c) the hyperarousal cluster before being added together for the DTS total.

I calculated a Kendall's Tau coefficient to determine the relationship between acupuncture treatment and intrusion among 80 individuals with PTSD. Data analysis indicated that there was a strong, negative correlation between acupuncture treatment and intrusion, which was statistically significant (τ_b = -.205, p = .034). In summary, acupuncture treatment was correlated with decreases in intrusion.

I also calculated a Kendall's Tau coefficient to determine the relationship between acupuncture treatment and avoidance and numbing among 80 individuals with PTSD. Data analysis indicated that there was a strong, negative correlation between acupuncture treatment and avoidance and numbing, which was statistically significant (τ_b = -.314, p = .001). In summary, acupuncture treatment was correlated with decreases in avoidance and numbing.

A Kendall's Tau coefficient was also calculated to determine the relationship between acupuncture treatment and hyperarousal among 80 individuals with PTSD. Data analysis indicated that there was a strong, negative correlation between acupuncture treatment and hyperarousal, which was statistically significant (τ_b = -.211, p = .029). In summary, acupuncture treatment was correlated with decreases in hyperarousal.

Finally, I calculated a Kendall's Tau coefficient to determine the relationship between acupuncture treatment and DTS total among 80 individuals with PTSD. Data analysis indicated that there was a strong, negative correlation between acupuncture treatment and DTS total, which was statistically significant (τ_b = -.330, p = .000). In summary, acupuncture treatment was correlated with decreases in the DTS total score.

Jonckheere-Terpstra Test

Jonckheere-Terpstra test is a rank-based nonparametric test that helps examine variability in scores when studying two or more groups; or when comparing two groups (Laerd & Laerd, 2018). It is used to test a linear trend in the pattern of observations across groups. The Jonckheere-Terpstra test tests for an ordered difference in medians where investigators need to state the direction of this order (Laerd & Laerd, 2018). In the present study, I used the Jonckheere-Terpstra test to determine whether there are statistically significant differences between two groups of an independent variable on an ordinal dependent variable. This analysis comprises two steps.

Step 1 consists of comparing the two groups prior to the administration of the acupuncture to the intervention group. The goal at this stage is to determine if statistically significant differences exist between the two groups before acupuncture treatment. Step 1 in Table 3 shows the results of the independent-samples Jonckheere-Terpstra test before the acupuncture treatment.

Step 2 consists of comparing the two groups after the administration of the acupuncture to the intervention group. The goal is to determine whether statistically significant differences exist between the two groups after the administration of the

acupuncture treatment. Step 2 in Table 3 shows the results of the independent-samples Jonckheere-Terpstra test after the acupuncture treatment.

Table 3

*Independent-Samples, Jonckheere-Terpstra Test (*N = *80)*

Intervention	Test Statistic (*J*-statistic)	Standard Error	Standardized Test Statistic	Asymptotic Sig.(2-sided)
Step 1: Pretest				
Intrusion	797.000	103.009	-.029	.977
Avoidance/numbing	790.000	103.108	-.097	.923
Hyperarousal	709.000	102.998	-.884	.377
DTS total	734.500	103.663	-.632	.527
Step 2 Posttest				
Intrusion	580.500	103.320	-2.124	.034
Avoidance/numbing	459.500	103.528	-3.289	.001
Hyperarousal	575.000	103.068	-2.183	.029
DTS Total	437.000	103.746	-3.499	.000

Step 1: Pretest Results

The distribution of the intrusion score is the same across the two groups under study. The distribution of the avoidance/numbing score is the same across the two groups

under study. The distribution of the hyperarousal score is the same across the two groups under study. The distribution of the DTS total score is the same across the two groups under study.

Step 2: Posttest Results

The distribution of the intrusion score is not the same across the two groups under investigation. The distribution of the avoidance/numbing score is not the same across the two groups under investigation. The distribution of the hyperarousal score is not the same across the two groups under investigation. The distribution of the DTS total score is not the same across the two groups under investigation.

Hypothesis Testing and Decision

Overview

Based on the results of the independent-samples Jonckheere-Terpstra test shown in Table 3, I was able to answer the research question. Table 3 includes the following statistics: (a) the sample size, (b) the Test Statistic (also called the T_{JT} or *J*-statistic), (c) the Standard Error, (d) the Standardized Test Statistic, and (e) the Asymptotic Sig. (2-sided test). Each of these statistics provided valuable information regarding whether accepting or rejecting the null hypothesis. I used the Standardized Test Statistic to ascertain the direction of the relationship.

Concerning intrusion, the analysis provided the value of the Jonckheere-Terpstra test statistics (*J* statistic), which is 580.500, whilst the *p* value is .034. The standardized test statistic was -2.124. This negative value suggested a negative relationship.

Regarding Avoidance/Numbing, the analysis provided the value of the *J* statistic, which is 459.500, whilst the *p* value is .001. The standardized test statistic was -3.289. This negative value suggested a negative relationship.

About hyperarousal, the analysis provided the value of the *J* statistic, which is 575.000, whilst the *p* value is .029. The standardized test statistic was -2.183. This negative value suggested a negative relationship.

With regard to DTS Total, the analysis provided the value of the *J* statistic, which is 437.000, whilst the *p* value is .000. The standardized test statistic was -3.499. This negative value suggested a negative relationship.

Null hypothesis

The Kendall's Tau-b correlation coefficient (τ_b) computed in the data analysis section was used to measure the strength and direction of the association between acupuncture treatment and intrusion. The analysis showed a correlation coefficient (τ_b) of -.205 suggesting a negative correlation between acupuncture treatment and intrusion. This relationship was significant ($p = .034$). I therefore rejected the null hypothesis.

The τ_b computed in the data analysis section was used to measure the strength and direction of the association between acupuncture treatment and avoidance and numbing. The analysis showed a correlation coefficient (τ_b) of -.314 suggesting a negative correlation between acupuncture treatment and avoidance and numbing. This relationship was significant ($p = .001$). I therefore rejected the null hypothesis.

The τ_b computed in the data analysis section was used to measure the strength and direction of the association between acupuncture treatment and hyperarousal. The

analysis showed a correlation coefficient (τ_b) of -.211 suggesting a negative correlation between acupuncture treatment and hyperarousal. This relationship was significant (p = .029). I therefore rejected the null hypothesis.

The τ_b computed in the data analysis section was used to measure the strength and direction of the association between acupuncture treatment and DTS Total. The analysis showed a correlation coefficient (τ_b) of -.330 suggesting a negative correlation between acupuncture treatment and DTS Total. This relationship was significant (p = .000). I therefore rejected the null hypothesis.

the independent-samples Jonckheere-Terpstra Test was run to determine whether a significantly difference existed between the intervention group and the controlled group. I ran the independent-samples Jonckheere-Terpstra Test for all four aggregates. With regard to the intrusion aggregate, the results indicated that there was a statistically significant difference between the two groups, T_{JT} = 580.500, z = -2.124, p = .034. About the avoidance/numbing aggregate, the results indicated that there was a statistically significant difference between the two groups, T_{JT} = 459.500, z = -3.289, p = .001. Regarding the hyperarousal aggregate, the results indicated that there was a statistically significant difference between the two groups, T_{JT} = 575.000, z = -2.183, p = .029. With respect to the DTS Total aggregate, the results indicated that there was a statistically significant difference between the two groups, T_{JT} = 437.000, z = -3.499, p = .000.

Based on these results, I rejected the null hypothesis. These results led to this conclusion*:* There is a significant statistical difference between the stress levels of

people with PTSD who participate in acupuncture treatment and people with PTSD who do not.

Summary

This quantitative causal-comparative study was conducted to compare two groups of participants in order to determine whether acupuncture treatment has efficacy for treating PTSD in Ghana. The first group consisted of people receiving the acupuncture treatment, referred to as intervention group. The second group, referred to as the controlled group, comprised participants not receiving the acupuncture treatment. I used a quasi-experiment design.

The opportunity to investigate the degree, extent, and strength of the relationship between the criterion variable, the stress levels of people with PTSD, and the predictor variable, acupuncture treatment, was realized in the study. The Independent-Samples Jonckheere-Terpstra Test was used in this study in two steps. The first step included pretest data for both intervention and controlled groups. The results from Step 1 analysis allowed me to test the distribution assumption. The distribution was the same across the groups under investigation. Step 2 included posttest data for both intervention and controlled groups. The results from Step 2 analysis provided valuable information regarding whether accepting or rejecting the null hypothesis. Statistical support was found for the research question. There was enough statistical support to reject the null hypothesis.

In Chapter 5, I provide a concise summary of the study purpose, methodology, vital discoveries, and limitations. I then suggest recommendations for further research. Practical and scholarly applications of the research findings are presented.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this causal-comparative research study was to examine the effect of acupuncture treatment on patients with PTSD in Ghana. I conducted this study to fill the gap in the literature on acupuncture treatment for PTSD in Ghana. I used a sample of 80 participants, which met the requirement for the confidence level of 95%.

I calculated descriptive statistics of data to provide a description of basic patterns in the data (see Neuman, 2014). I used bivariate statistics to describe the relationship between acupuncture treatment and self-reported stress levels. Bivariate statistics provided Kendall's Tau-b correlation coefficients that were used to assess the correlation between the independent and dependent variables. The Jonckheere-Terpstra test provided information needed to test the null hypothesis and make an inferential decision.

The study provided the opportunity to understand the degree and strength of the relationships between the criterion–self-reported stress levels–and the predictor–acupuncture treatment. The study findings furthered my insights into the efficacy of the acupuncture treatment for treating PTSD in Ghana.

In the remainder of Chapter 5, I provide a discussion of the results of data reported in Chapter 4. I provide a discussion of the hypothesis results in the Interpretation of the Findings section. The description of the limitations to trustworthiness and generalizability, validity, and reliability that emerged from the execution of the study is discussed in the Limitations of the Study section. In the Recommendations section, I discuss the broader social significance of the present study and identify areas for future research. The Implications section deals with the broader significance and implications of

the data analysis related to three main groups: Ghana's government, Ghana's mental health practice, and the scientific community at large. The takeaway message that captured the key essence of the study is provided in the Conclusion section.

Interpretation of the Findings

Findings in Relation to the Theoretical Framework

The psycho-physiological trauma theory that provided structure for this causal-comparative study is embedded in the DTS. I used the DTS to evaluate PTSD symptoms from 80 participants in the study. The use of the DTS instrument helped measure transformations of self-reported levels of PTSD symptoms and brought findings of foundational levels of PTSD symptoms to an experimental paradigm. The analysis of research data showed significant decreases of the levels of symptoms for PTSD participants who received acupuncture treatments. By contrast, PTSD participants who did not receive acupuncture treatments did not show changes of PTSD symptoms.

The null hypothesis was tested in this quantitative causal-comparative study. I used the Kendall's Tau-b correlation coefficient (τ_b) computed in the data analysis section to measure the strength and direction of the association between acupuncture treatment and the four aggregates of self-reported stress levels, which were (a) intrusion, (b) avoidance and numbing (c) hyperarousal and (d) DTS total. I ran the independent-samples Jonckheere-Terpstra test to determine whether a significantly statistical difference existed between the intervention group and the control group. There was enough statistical support to reject the null hypothesis of: There is no significant

statistical difference between the stress levels of people with PTSD who participate in acupuncture treatment and people with PTSD who do not.

I observed a strong, negative correlation between acupuncture treatment and intrusion. The data analysis suggested a statistically significant Kendall's Tau coefficient of -.205. This means that acupuncture treatment was correlated with decreases in intrusion.

A strong, negative correlation was observed between acupuncture treatment and avoidance and numbing. The data analysis suggested a statistically significant Kendall's Tau coefficient of -.314. This means that acupuncture treatment was correlated with decreases in avoidance and numbing.

I also observed a strong, negative correlation between acupuncture treatment and hyperarousal. The data analysis suggested a statistically significant Kendall's Tau coefficient of -.211, which means that acupuncture treatment was correlated with decreases in hyperarousal.

A strong, negative correlation was also observed between acupuncture treatment and DTS total. The data analysis suggested a statistically significant Kendall's Tau coefficient of -.330. This means that acupuncture treatment was correlated with decreases in DTS Total score.

The analysis of data revealed no statistically significant difference between the two groups before the administration of acupuncture treatment. However, I observed a statistically significant difference between the control group and the intervention group

after the administration of the acupuncture treatment. These results led to the rejection of the null hypothesis.

The statistical rejection of the null hypothesis is consistent with the work of LaPaglia et al. (2016) whose findings suggested patients' high satisfaction with a variety of acupuncture treatment benefits. The rejection of the null hypothesis is also in accordance with the view held by Patil et al. (2016) that acupuncture relieves pain, tension, and stress. Furthermore, the rejection of the null hypothesis is in accordance with Bourassa's (2014) opinion that, as an integrative medicine that is used to treat PTSD issues in clinical trials, acupuncture can be effective in treating PTSD.

Limitations of the Study

I identified some limitations to the study. First, the self-administered instrument used to gather research data could be a limitation because of the lack of participants' prior knowledge of PTSD because I was not there while they completed the survey to explain or probe. Therefore, it was possible that study participants who did not understand the meaning of some words or questions provided answers that were far from the reality. Furthermore, it was impossible to know who really completed the questionnaire because I was not present in the room. When research data do not come from the study participants, they affect the quality of the study findings (McDaniel & Gates, 2015). In other words, the source of data and the credibility of the data source have a bearing on the study validity. Moreover, a small sample for study limits the generalizability of the findings.

In addition, the reliance on respondents' understanding of and engagement with questions truthfully may be a limitation to the study. Insufficient information about the quality of research data is a threat to internal and external validity because the research information has significance on the reliability and/or validity of outcomes (Campbell & Lele, 2014). The results derived from laboratory experiments may not generalize to situations outside the laboratory (Holleman et al., 2020). Because a quasi-experimental design was used in this causal-comparative study, the findings may not generalize to other settings in Ghana or beyond the national boundaries of Ghana.

Internal Validity

Internal validity is a critical aspect of social research (Baldwin, 2018). Internal validity is the verification within a research study that validates the effectiveness of the research design at promoting that the conclusions drawn regarding cause-and-effect and other relationships within the data were correct (Baldwin, 2018; Campbell & Lele, 2014). The primary threat to internal validity for this study was the risk of bias due to the selection of the participants and their placement into groups.

As the potential inclusion for the inadvertent introduction of bias in a research study could also place the integrity of the results into question (Baldwin, 2018), it was a crucial consideration in the current study. In causal-comparative research designs, like the one used in this study, there is a comparison between two or more groups of subjects. Two different levels of independent variables defined the groups used in this study. The problem is that when the selection of participants and their placement into groups is not

randomly done, the internal validity is threatened (Baldwin, 2018). Potential threats to internal validity were, thus, an area of concern in the present study.

To reinforce the research design and mitigate threats to internal validity, it was important to use two selection techniques. Those techniques consisted of matching and using homogeneous subgroups in this study.

External Validity

If internal threats are not addressed in an efficient manner, they limit the generalizability of a study. External validity refers to the degree to which a study's findings generalize beyond the specifics of the experimental situation to other contexts (Baldwin, 2018).

It is critical that the investigator clearly communicates both types of threats to individuals who will use findings from the study. Potential consumers of this study's findings include mental health practitioners, mental health policy makers, mental health leaders, and social change agents.

Recommendations

The results from this study indicate that acupuncture treatment decreases stress levels among people with PTSD. Future studies should compare the efficacy of acupuncture treatment on gendered groups to determine whether gender has a significant impact on the efficacy of acupuncture treatment. It is also critical that future causal-comparative research studies examine the effect of acupuncture on other mental diseases to determine the efficacy of acupuncture on mental illnesses in Ghana. Future researchers should replicate this study in other settings, such as in other psychiatric hospitals in rural

regions of Ghana, to determine if they will yield the same results. Prospective cohort studies should also be conducted in Ghana to longitudinally assess how acupuncture treatment affects PTSD-related stress over time.

As an integrative medicine used to treat PTSD issues in clinical trials (Bourassa, 2014), the study results suggest that acupuncture is effective in treating PTSD in Ghana. Ghanaian mental health leadership should promote the use of acupuncture for treating PTSD in Ghana's mental health landscape. In addition, mental health professionals, patients, and government representatives should become aware of and more familiar with the potential efficacy of acupuncture treatment.

Furthermore, in order to improve patients' access to treatment for mental health disorders, such as PTSD, in Ghana, appropriate strategies should be developed. The potential enablers for service users involve, among others, increased decentralization, integration, and existing support services (Badu et al., 2018). Ghanaian mental health leaders could also invest in mobile health technologies to improve the delivery of mental health services to people dwelling in urban and rural regions.

Implications

The findings of this study can be used by the leaders of Ghana, especially those in the Ghanaian mental health field, to understand the efficacy of acupuncture treatment for people suffering from PTSD. I derived four main implications from data analysis in this study. These implications are discussed in the following subsections.

Social Change and Ghanaian Citizens

The study revealed a significant correlation between acupuncture treatment and the level of PTSD-related stress. The relationship between the two was negative. The study findings indicated that the more a patient with PTSD receives acupuncture treatment, the less likely they experience PTSD-related stress.

The findings of this study indicated that there is a statistically significant trend of lesser median self-reported stress levels with greater acupuncture treatment. Data analysis indicated a *J* statistic of 437.000 and a standard test statistic of -3.499. The analysis also showed a Kendall's Tau coefficient of -.330, suggesting a negative correlation between acupuncture treatment and DTS total. This relationship was significant.

Psychological services alone cannot fully reduce PTSD related stress. Implementing policies that allow the use of acupuncture treatment will improve the welfare people with PTSD in Ghana. As acupuncture treatment reduces PTSD related stress level, it has a positive effect on the welfare of people with PTSD. Thus, developing strategies that focus on incorporating acupuncture in the treatment plan for people who suffer from PTSD will result in improving the mental health of Ghanaian citizens.

Social Change and Policymaking

The analysis of data from the research study suggested that acupuncture treatment led to more reduced PTSD-related stress. The study findings provide policymakers with more information regarding the efficacy of acupuncture treatment in Ghana. The study

discoveries suggest a significant difference between those who received acupuncture treatment and those who did not.

To further improve the mental well-being of Ghanaians suffering from PTSD, policymakers should not only implement policies that permit acupuncture treatment, but they should also strive to implement additional policies that can promote the education of all stakeholders on the benefits of acupuncture treatment. On top of the policies that promote the use of acupuncture in the treatment plan for people with PTSD, policymakers should implement policies that address disparities in the access to mental health services in Ghana.

Practical Implications for Social Change

The efficacy of acupuncture treatment for people with PTSD suggests the need to integrate acupuncture into the local context and current public-health system in Ghana. In the Greater Accra region, people suffering from PTSD amount to 10,012 (Mental Health Society of Ghana, 2017). Psychological distress in Ghana is at 18.7% of the population (Walker, 2015). For those reasons, integrating acupuncture treatment with other traditional complementary and alternative medicines has the potential to sustainably increase access to more effective PTSD treatment in Ghana.

Research Implications

This study helped fill the gap in the literature on the efficacy of acupuncture in the treatment of PTSD in Ghana. The study discoveries indicated that a statistically significant correlation between acupuncture treatment and PTSD-related stress. The

relationship between the two was negative. The negative relationship suggested that the more acupuncture treatment, the lesser PTSD related stress.

Future researchers should conduct prospective cohort studies to longitudinally assess the efficacy of acupuncture in treating PTSD over time. Similar studies should be conducted to compare the efficacy of acupuncture treatment on gendered groups to determine whether gender has a significant impact on the efficacy of acupuncture treatment in Ghana. Future causal-comparative research studies should be conducted using stratified groups to determine whether statistically significant differences exist among those groups.

Conclusion

The use of acupuncture is increasingly becoming an alternative treatment for the symptoms often associated with PTSD around the world. However, the treatment of acupuncture appears to be lacking in Ghana because its potential efficacy is unknown to mental health professionals, patients, and the government representatives. In addition, there appears to be not enough research and clinical trials on mental health in Ghana.

The analysis of data indicated three interesting findings. The first discovery suggested that, prior to the administration of acupuncture treatment, the intervention group and the controlled group were not statistically different. The second finding indicated however, that after the acupuncture treatment, the difference between the two groups were statistically different; the difference was statistically significant. Third, the results from this study yielded data that suggested a strong significant correlation between acupuncture treatment and PTSD-related stress. As the correlation was negative,

it suggests that acupuncture treatment has the potential to reduce PTSD-related stress. That was the revelation of this study.

Three main recommendations emerged from the present study. First, future studies should compare the efficacy of acupuncture treatment on gendered groups to determine whether gender has a significant impact on the efficacy of acupuncture treatment. Second, the use of acupuncture for treating PTSD should be promoted in the Ghanaian mental health landscape through policy formulation and effective strategies application. Third, effective adoption of mobile health technologies is needed to enhance service delivery across the Ghana's mental health landscape.

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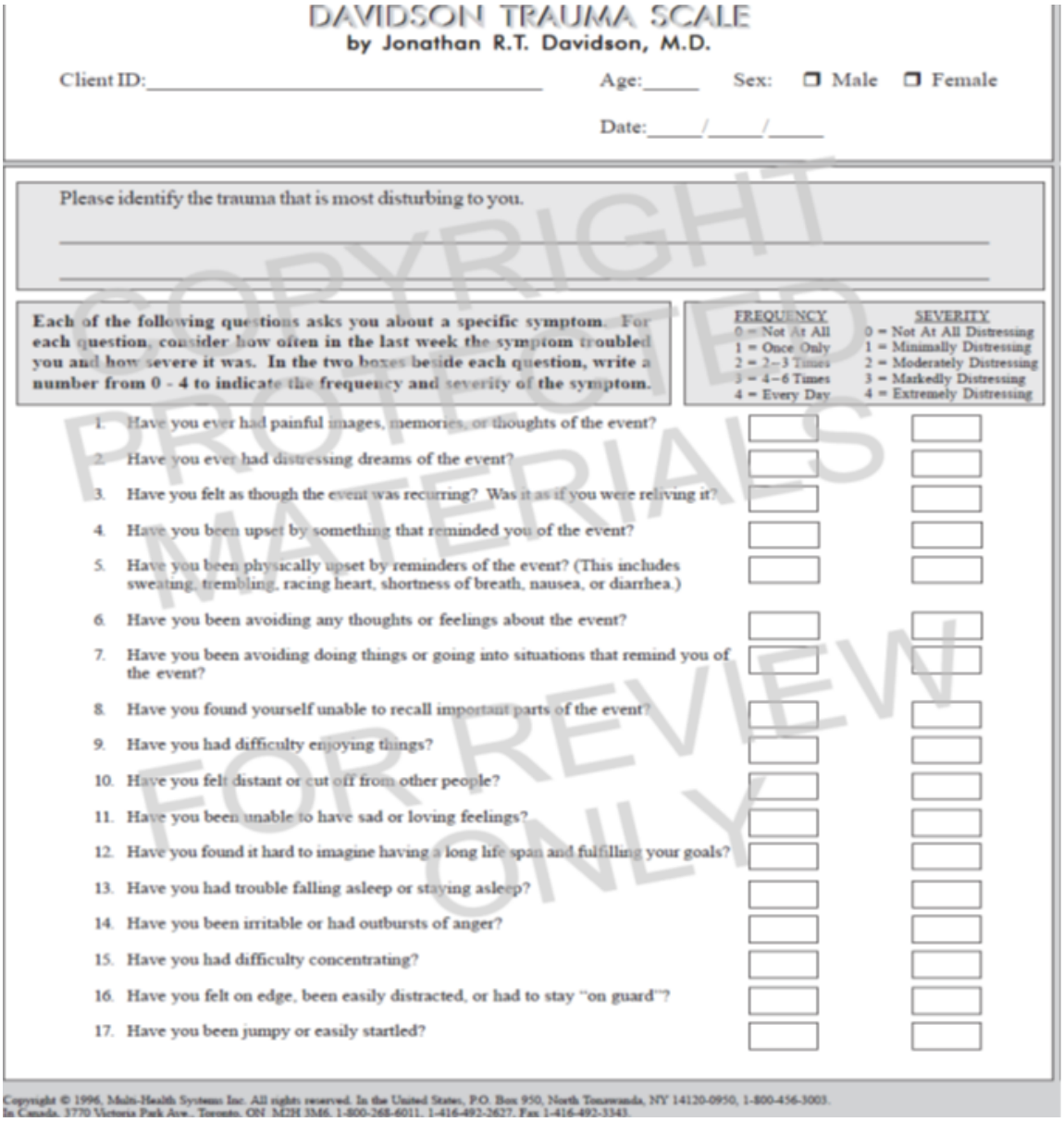
Appendix A: Davidson Trauma Scale



DAVIDSON TRAUMA SCALE

by Jonathan R.T. Davidson, M.D.

Client ID:_____ Age:_____ Sex: ❒ Male ❒ Female

Date:_____/_____/_____

Please identify the trauma that is most disturbing to you.

_____

_____

Each of the following questions asks you about a specific symptom. For each question, consider how often in the last week the symptom troubled you and how severe it was. In the two boxes beside each question, write a number from 0 - 4 to indicate the frequency and severity of the symptom.

	FREQUENCY	SEVERITY
	0 = Not At All	0 = Not At All Distressing
	1 = Once Only	1 = Minimally Distressing
	2 = 2–3 Times	2 = Moderately Distressing
	3 = 4–6 Times	3 = Markedly Distressing
	4 = Every Day	4 = Extremely Distressing
1.	Have you ever had painful images, memories, or thoughts of the event?	
2.	Have you ever had distressing dreams of the event?	
3.	Have you felt as though the event was recurring? Was it as if you were reliving it?	
4.	Have you been upset by something that reminded you of the event?	
5.	Have you been physically upset by reminders of the event? (This includes sweating, trembling, racing heart, shortness of breath, nausea, or diarrhea.)	
6.	Have you been avoiding any thoughts or feelings about the event?	
7.	Have you been avoiding doing things or going into situations that remind you of the event?	
8.	Have you found yourself unable to recall important parts of the event?	
9.	Have you had difficulty enjoying things?	
10.	Have you felt distant or cut off from other people?	
11.	Have you been unable to have sad or loving feelings?	
12.	Have you found it hard to imagine having a long life span and fulfilling your goals?	
13.	Have you had trouble falling asleep or staying asleep?	
14.	Have you been irritable or had outbursts of anger?	
15.	Have you had difficulty concentrating?	
16.	Have you felt on edge, been easily distracted, or had to stay "on guard"?	
17.	Have you been jumpy or easily startled?	

Appendix B: Severity

Severity	**Value**
Not At All Distressing	0
Minimally Distressing	1
Moderately Distressing	2
Markedly Distressing	3
Extremely Distressing	4

From Davidson Trauma Scale

Appendix C: Treatment

Treatment	**Value**
None	0
Acupuncture	1

Appendix D: Permission to Use Davidson Trauma Scale

MHS
Beyond Assessments

October 8, 2020

To Whom it May Concern,

This letter is to confirm that Derrick T. Dicker, MHS, PhDc has been granted permission by Multi-Health Systems Inc, (MHS) to purchase and use the Davidson Trauma Scale™ - DTS™ for use in his research at Walden University.

Derrick also met our Qualifications, which are in accordance with the ethical and professional standards of the American Psychological Association and the Standards for Education and Psychological Testing, to administer this instrument.

Please contact me at any time if you require additional information – r&d@mhs.com

PHONE 800 456 3003
EMAIL info@mhs.com

Thank you,
Betty Mangos

Permissions & Licensing Specialist
Multi Health Systems Inc.