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Predicting Post Traumatic Stress Disorder in Children with Prior Mental Health Diagnoses

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Abstract

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MA, Our Lady of Holy Cross College, New Orleans, LA, 2004

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Hurricane Katrina devastated the U.S. Gulf Coast and subjected the city of New Orleans to disastrous flooding, which resulted in numerous after effects that impacted the children and adolescents of the city. The disaster contributed to high levels of stress, increased risk of psychological disorders, and was associated with an increased percentage of New Orleans children presenting symptoms of post traumatic stress disorder (PTSD). To help address these problems associated with hurricanes and other disasters, the current study investigated how age, gender, race, and pre-existing conditions increased or decreased the likelihood of a child being diagnosed with PTSD following Hurricane Katrina. A binary logistical regression was utilized in this study. Bronfenbrenner's ecological systems theory formed the framework of the study, based on the functionality of an individual's life and development in his or her environment. The findings revealed age to be a significant predictor on PTSD. As children's ages increase, the likelihood of having PTSD increases. The result can promote positive social change by providing mental healthcare professionals with comprehensive information regarding possible health risk of developing PTSD and the possibilities of getting treatment with evidence-based therapeutic support, medicine, and psychotherapy.

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Dedication

This dissertation is dedicated to my beloved mom and dad who nurtured and taught me the values of life. Unfortunately, they departed this life without reaping the fruit of their labor. I will forever remember their loving, kindness and relentless struggles they had while in this world. May their souls rest in Peace.

Acknowledgments

The journey of a thousand miles begins with a step, so was my journey in fulfilling this milestone. The completion of this milestone was a joint effort of so many individuals to whom I am indebted. I cannot thank these individuals enough for their unwavering support throughout this journey.

First and foremost, my sincere gratitude and thanks goes to the members of my dissertation committee. I express my unconditional gratitude to my chairperson Dr. Donna Sheperis for her commitment and the leadership role she played in guidance this dissertation process. Dr. Sheperis dedication, unwavering support and perseverance led me to this point, for that I am sincerely grateful to her. Additionally, I thank Gregory Hickman, my methodologist whose expertise in statistical analysis helped shape this research study. Also, I thank Dr. Jason Patton for serving as my University Research Reviewer by ensuring that my study represented excellence and quality assurance. More so, I want to extend my gratitude to Dr. Carl Sheperis who is my mentor. Dr. Carl Sheperis supported my efforts and guided me on several aspects no matter how busy he is. My questions in all facets of life are answered in an absolute genuine and timely fashion.

Lastly, I want to give all the credit to my wife (Sari Airhia) who without doubt stood for me since I met and married her in Europe until present day. According to Sari, “since I met Earnest, he has been in school, I am glad to see him finished up.” Sari has worked tirelessly to keep our family intact. She is one of the hardest working people and the most extraordinary things that happen to me, for that I am indebted to her.

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Chapter 1: Introduction

The Study

The American Psychiatric Association's (APA) *Diagnostic and Statistical Manual – 5th edition (DSM-5, 2013)* described Posttraumatic Stress Disorder (PTSD) as the result of an individual experiencing or being exposed to one or more direct or indirect severe traumatic events that are life threatening, causes death or serious injuries, or poses a threat to oneself or to others. To meet the criteria for PTSD, an individual must exhibit symptoms from four clusters: intrusion, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity (APA, 2013). Disruptive behavior such as anger, impulsivity, recklessness, and self-destructive symptoms are common (APA, 2013). In addition to the four criteria mentioned, the APA also specified the duration of symptoms; a requirement of significant distress or functional impairment; and an exclusion which stipulates that the affected person is traumatized but not due to medication, substance use, and other illness to fully meet criteria for PTSD.

Consequently, in the recent *DSM -5* (APA, 2013), PTSD is no longer classified as an anxiety disorder; rather, it is now characterized as a trauma and stress related disorder in which an exposure to traumatic event played a critical role on environmental factors. This role may be through a direct or indirect adverse environment event on an individual with PTSD symptoms (Friedman, 2013).

PTSD is found across the gender and age groups. The prevalence of PTSD in the United States among men is about 5%, while that of women is 10%, and the life time prevalence rate for adults in general is 8% (APA, 2000). Specific to children, the National Center for PTSD (Gradus, 2007) estimated that prevalence rates of PTSD ranged between 3% and 6% in children who had experienced a traumatic event. However, following a specific event, that number may be higher.

In 2005, Hurricane Katrina devastated the U.S. Gulf Coast and subjected the city of New Orleans to disastrous flooding. Many survivors and those who left New Orleans from Hurricane Katrina have been shown to exhibit after effects of that traumatic event through today (LaJoie, Sprang, & McKinney, 2010; Weems et al., 2010). The disaster contributed to high levels of stress, the increased risk of psychological disorders (Osofsky, Osofsky, Kronenberg, & Tonya, 2010) and caused 46% of the children in New Orleans to develop PTSD symptomology (Moore & Varela, 2010). This event, like other natural disasters, has been shown to have significant correlations with the prevalence of PTSD diagnoses in children and adolescents among the city's population (Whaley, 2009). Fan, Zhang, Yang, Mo, and Liu (2011) argued that children and adolescents are more susceptible to PTSD symptoms than the adult population. In the field of trauma, researchers supported that children and adolescents have been diagnosed with PTSD as a direct effect of Hurricane Katrina, resulting in their need for special Mental Health care (Silverman, Allen, & Ortiz, 2010).

Background

PTSD symptoms appear in children within 3 months following a traumatic event; a traumatic situation involves intense fear and helplessness or horror (APA, 2000). These criteria (intense fear, helplessness, and horror) are no longer a part of Criterion A in the *DSM-5*; instead, individual fear based re-experiencing emotional and behavioral symptoms are predominant (APA, 2013 p. 274). According to APA (2000), the symptoms of PTSD can also be delayed for some months and reappear in subsequent years due to re-experiencing hyperarousal and avoidance symptoms respectively. Delayed expression occurs when the symptoms of PTSD is delayed for some period of time before developing to a full blown PTSD (Smid et al., 2012).

However, the new edition of the *DSM-5* featured a new developmental subtype of PTSD. This addition includes PTSD in preschool children, ranging from ages 3-6 years old, which brought a significant milestone to the taxonomy of the *DSM-5* (Scheeringa, 2013). Scheeringa noted that when young children experience severely traumatic events, it exposes them to a high risk of developing PTSD- including witnessing interpersonal violence, abuses, motor vehicle accidents, dog bites, invasive medical procedures, and natural disaster.

When children experience traumatic events at an early age, the National Child Traumatic Stress Network (NCTSN, 2010) asserted that the traumatic situation hinders their ability to cope and results in symptoms such as intense distress, withdrawal, difficulty in sleeping, difficulty in paying attention, anger, agitation, and irritability. These symptoms are exacerbated when they remember anything that reminded them of such a situation. While some children bounce back more quickly from a traumatic situation, others experience prolonged long term consequences that can affect their brain and nervous system (NCTSN, 2010).

The NCTSN (2009) estimated that before they reach the age of 16, one in every four children experience traumatic events that could lead to PTSD. While many children experience trauma, not all develop PTSD. As such, it becomes important to investigate factors that may predict the development of PTSD among children who have experienced such natural disasters. In adults, demographic variables such as socioeconomics, race/ethnicity, and marital status have been shown to act as primary determinants of PTSD (Tracy, Norris, & Galea, 2011). Weems et al. (2010) revealed that ethnic minority children who have witnessed hurricanes tend to experience behavioral disruption and are likely to exhibit psychological symptoms over time. Weems et al. also indicated that those children have shown a high rate of PTSD symptoms as

much as 24 to 30 months following exposure to natural disaster, resulting in an atypical pattern of PTSD.

Researchers have documented a relationship between pre-existing mental health diagnosis and the development of PTSD in adult population (Constans et al., 2012). In one study, people with prior diagnoses of mental illness showed significantly higher levels of negative cognitions, a situation characteristic of PTSD (CITE). These negative cognitions and a pre-existing mental illness showed a weak but significant interaction with regard to their relationship to PTSD symptom severity (Constans et al., 2012).

Nasky, Hines, and Simmer (2009) argued that mental health pre-existing conditions played a vital role in determining the development of PTSD and depression among service members who witnessed or experienced a traumatic event and not comorbidity alone. Nasky et al. added that demographic factors such as age, marital status, military ranks are protective and predicting factors for higher rank members of the military who develop PTSD and depression symptomatology following a traumatic event. Gender was found significant with PTSD symptoms showing more frequently in women in this study (Nasky et al., 2009). Following the Wenchuan earthquake in China, 15.8% of children and adolescents reported severe clinical symptoms of PTSD, 40.5% reported the symptoms of anxiety, while 24.5% reported depression symptoms respectively, in which female gender, older age, and the experience of an earthquake constitute risk factors 6 months after the disaster (Fan et al., 2011).

Problem Statement

Research exists on the role that demographic variables such as socioeconomics, race/ethnicity, marital status, and gender played in predicting PTSD in adults (Tracy et al., 2011). Trauma, such as hurricanes and man-made disasters, exacerbates PTSD symptoms in a

significant number of children and adolescents (Merikangas et al., 2010). There is a link between delayed onset (18-27 months) and PTSD symptomatology in children and adolescents following Hurricane Katrina (Mclaughlin et al., 2009). Additional empirical research exists that gender differences in such trauma reactions exist indicating 15-43% of girls and 14-43% of boys experience the symptoms of PTSD, while the actual percentage of those who develop PTSD ranges from 3-15% of girls and 1-6% of boys (Merikangas et al., 2010).

There is a relationship between pre-existing mental health conditions and the development of PTSD in adult population (Constans,et al., 2012). Forty-six percent of children developed PTSD following Hurricane Katrina (Moore & Varela, 2010). It is not known to what extent age, gender, race, and type of pre-existing mental health conditions impact the onset of PTSD in children, specifically, how these variables prior to Hurricane Katrina increased or decreased the likelihood of a child being diagnosed with PTSD following the event. Consequently, the lack of research regarding the relationship of such variables creates a gap that if filled, could help counselors develop and implement targeted interventions for children who may be predisposed to PTSD following a specific trauma. In the interests of promoting greater effectiveness in individualized treatment planning, it behooves the mental health professional community to acquire additional data on the role of pre-existing mental health conditions in the development of PTSD in children.

The identification of individuals with prior mental health conditions before Hurricane Katrina would help influence social change and gain insight in identifying the need for a more focused response by first responders following a traumatic event such as hurricanes and other natural disasters. This study would also help to provide recovery efforts and treatment direction for vulnerable youths who developed PTSD symptoms following a hurricane. This study would

also support the need for policy makers to develop appropriate interventions following natural disasters and assist in improving the ability of mental health professionals who serve children, adolescents and their family after disasters.

Purpose of the Study

The purpose of this binary logistic regression quantitative study was to examine the prediction of PTSD in children with pre-existing mental health conditions following Hurricane Katrina. This research study will help to determine whether age, gender, race, and pre-existing mental health conditions are likely to increase or decrease the likelihood of PTSD in children following Hurricane Katrina. Since this research study was geared towards examining the prediction with a dichotomous dependent variable to predict the outcome, the use of binary logistic regression best served the purpose as many of the assumptions of using multiple linear regressions cannot be met. In addition, I utilized archival records in the current literature to address PTSD conditions found in current literature that supports the validity of archival documentations in clinical settings rather than participants self-report (Baumeister, Balke, & Harter, 2005).

Variables

This study is a quantitative analysis utilizing binary logistic regression. Fields (2009) noted that by using a binary logistic regression in a quantitative research methodology, a dependent dichotomous variable, criterion variable, several categorical or continuous independent variables, as well as predictor variables must be present. The criteria set by Fields fit this study because the purpose of this research study was to determine whether age, gender, race, and pre-existing conditions are likely to increase or decrease the likelihood of predicting PTSD in children following hurricane Katrina. There are many variables that predict

the development of PTSD in children and adolescents as identified by existing literature. However, this study identifies the predictor by current literature, as well as anecdotal information from my own experience running an agency as a mental health professional. The following includes the four predictor variables used:

- Age
- Gender
- Race; and
- Pre-existing mental health

Research Questions and Hypotheses

RQ1: To what extent does children's age prior to Hurricane Katrina increase or decrease the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina?

$H1_0$: ß1(age) = ß2(gender) = ß3(race)= ß4(prior diagnosis) = 0 in the population, the logistic regression coefficients for all the terms, except the constant, equals zero.

H_0: ßK = 0 In the population, the odds of the independent variable, children age prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, equals zero.

H_1: ßK ≠ 0, In the population, the odds of the independent variable, children age prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, does not equals zero.

RQ2: To what extent does children's gender prior to Hurricane Katrina increase or decrease the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina?

H_0: ßK = 0 In the population, the odds of the independent variable, children gender prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, equals zero.

H_1: ßk ≠ 0 In the population, the odds of the independent variable, children gender prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, does not equals zero.

RQ3: To what extent does children's race prior to hurricane Katrina increases or decreases the likelihood of being diagnosed of PTSD symptoms after hurricane Katrina?

H_0: ßk = 0 In the population, the odds of the independent variable, children race prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, equals zero.

H_1: ßk ≠ 0 In the population, the odds of the independent variable, children gender prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, does not equal zero.

RQ4: To what extent does children's pre-diagnoses prior to hurricane Katrina increases or decreases the likelihood of being diagnosed of PTSD symptoms after hurricane Katrina?

H_0: ßK = 0 In the population, the odds of the independent variable, children pre-diagnoses with PTSD prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, equals zero.

H_1: ßK ≠ 0 In the population, the odds of the independent variable, children pre-diagnoses prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, does not equal zero.

Conceptual Framework

There are numerous identifiable theories in the literature that address the development of children and adolescents as it relates to psychological and environmental conditions. This study was informed by the ecological systems theory of Bronfenbrenner (1979). Brofenbrenner posited that functionality of individuals emanates from the various contexts of the individual's life and development in their environment. Because the individuals are impacted by the various elements in their environments, it is essential to examine their experiences from all angles. In Brofenbrenner's theory, it is vital to understand the ecological perspective which deals with the impact of the child's social, environmental, and developmental experiences. These experiences occur at the microsystem, mesosystem, macrosystem, and chronosystems levels respectively. Because trauma occurs at the micro and meso system level, it is pertinent to draw inferences from these areas of Bronfenbrenner's theoretical framework (Weems et al., 2009).

Bronfenbrenner (1979) would view the child as being influenced by microsystems such as family and school, as well as the mesosystem which is the interaction of two microsystems in action. Weems et al. (2009) stated that the ecological needs based theory of Brofenbrenner is integral to studies such as this because "disasters may affect child adaptation by increasing risk in these contexts" (p. 50). Brofenbrenner's five ecological systems (the microsystem, macrosystem, mesosystem, exossytem, and chrosystem levels) as they relate to children and adolescents will be fully described in Chapter 2.

Nature of the Study

The nature of this study was a binary logistic regression research design to examine the prediction of PTSD in children with prior mental health conditions following Hurricane Katrina. Because residents of New Orleans remained in transition for multiple years, it was important to

look at a mental health center's data prior to hurricane Katrina and also following Katrina over a multiyear period rather than only examining data directly after the hurricane. Because the onset of PTSD can occur up 37 months after an event, it was further important to examine data over a multiyear period. Logistic regression analyses were conducted to determine the prediction of PTSD in children with prior mental health diagnoses following Hurricane Katrina.

Binary logistic regression was utilized because it allowed researchers to determine which independent variables (age, gender, race, and preexisting conditions) were likely to increase or decrease the likelihood of predicting PTSD in children following hurricane Katrina. A quantitative focus via logistic regression was consistent with the development of predictive models. Because research designs are based on the research problems, purpose, researcher experiences, and the audience (Creswell, 2009), this study was consistent with quantitative research inquiry standards.

To address the gap in literature, archival data from an existing agency was used to test the hypotheses. The independent variables were age, gender, race and pre-existing conditions of children receiving treatment prior Hurricane Katrina. The dependent variable consisted of the existence or nonexistence of PTSD. All data was analyzed using the Statistical Package for the Social Sciences (SPSS) software.

Definitions

Trauma: This term is described as an event and experiences that severely affects individuals and group of individuals such as natural or manmade disasters, hurricanes, terrorist attack, earthquakes, wars, and genocides among others (Wieling & Mittal, 2008).

Microsystem: The microsystem refers to the relationships and interaction closest to the child's development in which he or she has direct contact with entities such as family, school and/or childcare environments, neighborhood, and peers (Berk, 2000).

Mesosystem: This term refers to the connection or the relation in which the child, parents, and the family live. It provides a formidable connections or relation between the child experiences with the family, the family experiences with the school, and experiences with the church as well as the family experiences with peers (Berk, 2000).

Macrosystem: This system is composed of the child's developing world view as influenced by culture, customs, values and societal expectations which the child lives. It also involved the child cultural group norms or societal group norms relevant to social class, ethnicity, common identity, as well as his or her overall ideology (Berk, 2000).

Exosystem: The exosytem is referred to the linkage in which the child is not directly involved with his parents in the larger social context and not have a direct role in the immediate context (Berk, 2000).

Chronosystem: This system encompasses the transition of the child's internal (psychological occurrences) and external environmental life courses (timing of parent death) as well as historical contexts (environmental circumstances) (Bronfenbrenner, 1989; Berk, 2000).

Delayed expression: Formally known as delayed onset *s*ignifies when the symptoms of PTSD are delayed for some period of time before developing to a full blown PTSD (APA, 2013; Smid et al., 2012).

Classical Conditioning: (CC): This is a behavior modification process that elicits response in a particular way to a stimulus for a desired response (Mowrer, 1960).

Operant conditioning (OC): This is referred to behavioral modification process that if strengthened or weakened due to consequences it would result to negative or positive reinforcement for an individual (Mowrer, 1960).

Hyper-arousal: This term is used to described PTSD clusters symptoms such as high anxiety, anger and irritabilities, difficulties in concentration, difficulty falling asleep, always on dark looking for danger (Beck & Coffey, 2005)

Re-experiencing: This is term used to describe the recurrence of a prior experience of a trauma (Beck & Coffey, 2005).

Negative alterations in cognitions and mood associated with traumatic event: This term is used to describe the inability to remember the trauma that the individual had and the persistence of the individual emotional state of mind such as fear, horror, anger and guilt or shame (APA, 2013).

Age: Age is used in this study at the time of Hurricane Katrina as the length of an existence extending from the beginning from 6 years to 17 years (Heuristic, n.d.).

Gender: This term referred to the behavioral, cultural, or psychological traits typically associated with one sex such as male or female (Heuristic, n.d.).

Race: Race is used to described the social demographic designation which identifies human beings by class that share some physical characteristics of history, culture, languages, ethnicity, climatic, religion, social tradition, and anatomical affiliations (Heuristic, n.d.).

Preexisting conditions: This term is described as mental health conditions that are most common diagnoses for children prior Hurricane Katrina. This mental health condition includes attention-deficit/hyperactivity disorder (ADHD), mood disorders, major depressive disorder, conduct disorder; dysthymia/anxiety disorders (Merikangas et al., 2010).

Assumptions

Without addressing a researcher's assumptions in a study, Field (2009) argued that it will lead to an inconsistent or incorrect conclusion from data analysis. Because I used a binary logistical regression, it was imperative to address this research assumption from the stand point of Fields. In doing so, the variables that were used in this study including age, gender, race, and preexisting conditions satisfied the logistical assumptions enumerated by Fields.

According to Patton (2005) a researcher's role includes gaining understanding and insight as well as interpreting meanings of his or her findings. I examined the extent to which age, gender, race and preexisting mental health conditions prior to Hurricane Katrina increased or decreased the likelihood of a child being diagnosed with PTSD following this disaster. PTSD and other health conditions were exhibited by children before and following Hurricane Katrina. A focus on variables conducive to increasing the likelihood of PTSD was maintained throughout the study.

Limitations

Accessing mental health agencies existing in New Orleans, Louisiana prior to and after Hurricane Katrina proved a significant limitation in this study. This is particularly important because several agencies that were in operation before Katrina either did not reopen in New Orleans or shut down soon after the disaster occurred. Another limitation was minimal access to archival records, because some of the agencies existent before Katrina lost their archival records to the devastation of the hurricane.

Another limitation of the study was that some of the agencies discarded or shredded their records before this study in accordance with Louisiana law regarding record keeping. Louisiana law requires companies to keep their records for a period of 5 years, after which they are allowed

to shred or destroy clients' records. However, I looked at cases open before and after Hurricane Katrina. Another limitation is that the sampled population consists of only the children from one agency representing the entire New Orleans sample.

I used a nonprobability, purposive sample for data collection; this can be difficult because of the time and coded information that was used. For example, because there were no face-to-face participants, whereby I could have randomly selected individuals for the research purpose, instead I had to go through a rigorous selection of files through the archival records of the agency that I utilized. Lastly, a limitation of this study was the issue of not using an experimental or quasi-experimental design, which would have allowed me to manipulate the independent variable instead I used a categorical dependent variable of yes/no as an outcome.

Delimitation

This study was delimited for generalizability purposes. Due to the inability for random selection of participants from multiple agencies population sample the result was constraint. Only children and adolescents between the ages of 6 to 17 years old at the time of Hurricane were used, this resulted that the study was generalized to the whole population of New Orleans. The amount of individuals used in this study is quite small compared to the general population of children residing in New Orleans.

Significance of the Study

The purpose of this binary logistic regression design study was to examine the prediction of PTSD in children with pre-existing mental health diagnoses following Hurricane Katrina. By identifying individual prior mental health conditions before Hurricane Katrina, this study could help influence social change and gain insight in identifying the need for a more focused response by first responders following a traumatic event such as hurricanes and other natural disasters.

This study would also help to provide recovery efforts and treatment direction for vulnerable youths who developed PTSD symptoms following a hurricane.

This study would support the need for policy makers to develop appropriate interventions following natural disasters. In addition, it will assist in improving the ability of mental health professionals who serve children, adolescents and their family after disasters. The results of this study will provide a much needed insight of the adverse effect of PTSD in children and adolescents in New Orleans and the gulf coast region.

Summary

PTSD is described as an result of an "individual experiencing or being exposed to one or more direct or indirect severe traumatic events that are life threatening, causes death or serious injuries, or poses a threat to oneself or to others" (APA, 2013, p. 271). I examined the prediction of PTSD in children with pre-existing mental health conditions following Hurricane Katrina in 2005. Chapter 1 of this research study included the background of the problem, the problem statement, the purpose of the study, the variables of the study, research question and hypotheses, the conceptual framework, the nature of the study, definitions, assumptions, limitations, delimitations, and the significance of the study.

I examined the extent to which age, gender, race, and type of pre-existing Mental Health conditions impacts the onset of PTSD in children, specifically, how these variables prior to Hurricane Katrina increased or decreased the likelihood of a child being diagnosed with PTSD following the event. While there are no research theories that identify the aforementioned variable, the conceptual framework of this research is quite extensive in describing it. PTSD, the development, history, diagnosis, onset, prevalence rates, associated risk, variable impacting

PTSD and other information are all extensively addressed under the literature review of Chapter 2.

Chapter 2: Literature Review

Introduction

The purpose of this research was to examine the prediction of PTSD in children with pre-existing mental health conditions following Hurricane Katrina in 2005. The hurricane devastated the U.S. Gulf Coast and subjected the city of New Orleans to catastrophic flooding (Mclaughlin et al., 2009; Rosenbaum, 2006). The disaster contributed to high levels of stress, the increased risk of psychological disorders (Osofsky, Osofsky, Kronenberg, & Tonya, 2010), and caused 46% of the children in New Orleans to develop PTSD symptomology (Moore & Varela, 2010). This event, like other natural disasters, has been shown to be significantly correlated with the prevalence of PTSD diagnoses among the city's children and adolescents (Whaley, 2009). In the field of trauma, researchers asserted that children and adolescents have been diagnosed with PTSD as a direct effect of Hurricane Katrina, resulting in their need for special mental health care (Silverman, Allen, & Ortiz, 2010). The literature review consists of the following sections: The Development of PTSD, Diagnosis of PTSD, The Onset of PTSD, PTSD in Children and Adult, Causes of PTSD, The prevalence rate of PTSD, Impact of PTSD, Variables Impacting PTSD, and Issues Impacting the Prevention and Treatment of PTSD.

Literature Research Strategy

The following databases were used in carrying out an exhaustive search: PsycINFO, PsycARTICLES, SocINDEX, ProQuest Central including dissertation and thesis, PsycBOOKS, Academic Search Premier, and Google Scholar. Information from the following websites and regulatory bodies was also important: APA, American Counseling Association (ACA), U. S. Department of Veterans Affairs (VA), NCTSN, the National Center for PTSD, and the Louisiana Department of Health and Hospital/Office of Mental Health for archival statistical data. The

literature reviewed in this study stretches from the mid-1980s until the present day, that is, from the time PTSD was first included in *DSM-III-R* until the latest version, *DSM-5* in 2013.

Theoretical Framework

Bronfenbrenner's (1979) ecological systems theory, which grounded this study, posited that children's development and their interactions with one another are influenced by multiple layers of ecology—the micro, macro, and the meso levels (Neuman, 2000). Psychological and emotional impairment must be understood within this framework, this is because of the emphasis it placed on helping children and adolescents deal with the daily challenges resulting from psychological impairments (Kessler et al., 2008).

Bronfenbrenner's ecological systems theory

Bronfenbrenner's (1979) ecological theory comes out of human development and posits that emotional disturbances among youth, such as PTSD, are challenges faced by youth. As such, they need physical safety, self-worth, and self-efficacy as well as social relatedness to deal with conditions (Kessler et al., 2008). The ecological theory indirectly helps disaster survivors to find a stable condition after undergoing a traumatic stress, especially by understanding the different layers of the contextual effect of the ecological levels (microsystem, mesosystem, exossystem, macrosystem and chronosystem) for Mental Health support (Kessler et al., 2008). The ecological theory of Bronfenbrenner provides a framework in which psychologists, family practice workers, and child care community workers can assess a child and help her or him deal with the challenges for many years to come (Kessler et al., 2008).

Some researchers have argued that the theoretical factors behind PTSD can be traced back to classical and operant conditioning (Kring, Davison, Neale, & Johnson, 2007; Mowrer, 1960). From a classical conditioning perspective, the PTSD sufferer re-experiences trauma,

while from an operant conditioning perspective, the sufferer experiences negative reinforcement of the trauma experience which leads to symptoms of PTSD. According to Bronfenbrenner's ecological theory, negative reinforcement can affect a person's ability to successfully interact with their family, the environment, and society. From a recovery or a rehabilitation standpoint, those suffering from PTSD would be able to reexamine the effect of such experiences and learn to use successful coping skills, which would eventually lead to a less overwhelming experience (Kring et al.,, 2007; Mowrer, 1960).

By understanding the importance of utilizing the ecological framework of Bronfenbrenner (1979) in assisting children increasing their functioning in the micro, macro, and meso levels, it is therefore undeniable that the ecological framework of Bronfenbrenner can help researchers understand the lived experiences of individuals affected by PTSD. Use of the ecological theory and what is learnt can also help clinicians understand and answer the questions posed by this study: To what extent do age, gender, race, and pre-existing mental health diagnoses predict the onset of PTSD in children and adolescents?

Posttraumatic Stress Disorder

DSM-5 (2013) described PTSD as the result of an individual experiencing or being exposed to one or more direct or indirect severe traumatic events, as well as meeting four symptom clusters: intrusion, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity (p.271). In addition to the four criteria mentioned, the *DSM-5 (2013)* also specifies the duration of symptoms; a requirement of significant distress or functional impairment; and an exclusion which stipulates that the affected person is traumatized but not due to medication, substance use, and other illness to fully meet criteria for PTSD.

The Development of PTSD

The development, length, and the severity of individual experiences to a trauma are dependent on a multitude of factors. Mental health status prior to the trauma may be important. Research has demonstrated that mental health preexisting conditions play a vital role in determining the development of PTSD and depression among service members who witnessed or experienced a traumatic event (Nasky et al., 2009). Nasky et al. added that demographic factors such as age, marital status, and higher military ranks may serve as predictors for the development of depressive symptomology and PTSD. Gender was found significant, with PTSD symptoms evident more frequently in women (Nasky, Hines, & Simmer, 2009). Peterson, Wong, Haynes, Bush, and Schillerstrom (2010) argued that the nature of trauma, earlier traumatic exposures, as well as the support received early in the traumatic event are determining factors of PTSD in the military circle.

PTSD may look different following man-made events, such as violent crime, and natural disasters, such as hurricanes. Tracy, Norris, and Galea (2011) studied PTSD and depression following Hurricane Ike in September 2008 in Galveston, Texas, and found that many of the same factors studies by Peterson et al. (2010) were significant predictors of PTSD. However, Tracy et al. also argued that a challenge in determining PTSD and depression symptoms following a natural disaster was understanding the specific experiences suffered by the victims.

History of PTSD

The symptoms of posttraumatic stress have been apparent for many centuries, but it was not until the 1980 when a PTSD diagnosis was added to the *DSM-III* in 1980. At that time, PTSD was defined as a fear-based illness due to the need for a trauma to occur to precede the diagnosis (APA, 2000). The history of PTSD started with wars and the dehumanizing effect of war on

soldiers. For example, soldiers exhibiting battle fatigue following World War II were regarded as cowardly, lacking discipline, and weak (Bentley, 2005; Rae, 2007). During the war, many soldiers who were exposed to mass slaughter and the ravages of combat started experiencing psychological and emotional trauma (Bentley, 2005; Rae, 2007). Back home, they experienced depression, aggression towards self and others, as well as anxiety (Bentley, 2005; Rae, 2007)

In an attempt to address this ongoing problem in the battle field, psychiatrists were dispatched from the United States to several countries and began to realize that these soldiers were not only suffering from war-related fatigue, but were suffering from psychiatric concerns greater than shell shock as well. As a result of several incidents after World War II and the Korean War, public attention gave birth to the recognition of PTSD as a legitimate mental illness by the military and the medical community. The APA recognized that individuals who suffered from PTSD must have experienced a traumatic event that was harmful and terrifying and resulted in serious injuries or posed a threat to themselves or others.

Diagnosing PTSD

The identification of PTSD has made it clear that the diagnosis is the result of a catastrophic stressors (traumatic event), rather than individual weaknesses. According to Friedman (2013), the types of a traumatic events experienced by an individual can include torture, war, atomic bombs, and natural disasters (hurricanes earthquakes, and volcanic eruptions). Others sources include manmade disasters such as explosions, airplane crashes, and motor vehicle accidents. In contrast, normal life stressors such as serious illness, divorce, life failure, rejections, and financial problems are regarded as adjustment disorders rather than PTSD (Friedman, 2013). However, in the adult population, PTSD symptoms include family and financial problems, anxiety, weight loss and weight gain, avoidance behavior, depression,

isolation, the inability to perform a duty, inability to enjoy sex, as well as the inability to care for immediate and extended family (APA, 2000; 2013*;* Cyders, Burris, & Carlson, 2011).

PTSD first appeared in the *APA* in 1980, where it was defined as an etiological agent outside the range of usual human experiences which was characterized as an Anxiety and Adjustment Disorder instead of PTSD, per se. In 1987, the *DSM* was revised, but the symptoms of PTSD remained similar to those described in the original manual. However, in 2000, the *Diagnostic Statistical Manual (DSM-III)* was changed to *Diagnostic Statistical Manual (DSM-IV-TR)* and PTSD was clearly described as an anxiety disorder where by an individual is exposed to a trauma resulting a in physical harm or fear, such as child and domestic abuse, motor vehicle accident, terrorist attack or war, and crimes. To meet the criteria for PTSD in the *DSM IV-TR*, an individual will have a history of a trauma in each of the three symptoms cluster such as intrusive recollections, avoidance numbing and hyper-arousal symptoms respectively must be met. The fifth and the sixth criterion are concerned with the duration of the symptoms while the latter must cause a significant functional impairment to the individual.

With the initial appearance and definitions of PTSD in the *DSM- III-R* in 1987 and the *DSM IV-TR* in 2000, the recent revision the *DSM-5* in 2013 has expanded the criteria of PTSD diagnosis to include an anhedonic/dysphoric presentation which is marked by negative cognition and mood. In addition, disruptive behavior such as anger, impulsivity, recklessness and self - destruction symptoms are common (APA, 2013*).* Furthermore, in the recent *DSM-5*, PTSD is no longer classified as an anxiety disorder rather is now characterized as a trauma and stress related disorder in which an exposure to traumatic event played a critical role on environmental factors. This role may be through a direct or indirect adverse environment event on individuals with PTSD symptoms (Friedman, 2013).

The *DSM-5* has further refined the criteria for PTSD; it now includes the development of certain characteristics following one or more traumatic incidents. These characteristics come from four symptom clusters including intrusion, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity (APA, 2013). The explanations for all the criteria for PTSD in *DSM-5* are as follows:

- Criteria A is called the stressor symptoms which required that the individual must has directly or indirectly being exposed to death, threatened death, actual or serious injury as well as actual or threatened sexual violence in one or several ways (APA, 2013). The ways includes, witnessing an event occurring with others, learning that the traumatic event occurred with family or a friend and repeated exposure to aversive events such as collecting human remains from first responders and the exposures of details of neglect by police officers (APA, 2013, p271).
- Criteria B is called the intrusion symptoms which stipulate that a person must be re-experiencing involuntary, recurrent and intrusive memories, night mares, dissociative reaction such as flashbacks, intense or prolong distress as well as physiologic reaction to trauma related stimuli (APA, 2013).
- Criterion C constitutes the avoidance symptoms which requires that the person affected with traumatic event stubbornly avoid stimuli associated with the trauma related thoughts or feelings as well as remembering people, places, things, activities or situation associated with such thoughts or feelings.
- Criterion D is the negative alteration in cognitions and mood. This criterion entails the affected person's inability to recall core features to the traumatic

situation, often having negative beliefs, frequently distorted, and feelings of fear, horror, anger, guilt, shame apathy and alienation as well as his or her inability to become positive.

- Criterion E is the alteration of arousal and reactivity meaning that the affected person becomes irritable, self-destructive, hyper vigilant, gives inflated responses, experiences poor concentration and suffers sleep disturbance (APA, 2013; Friedman 2013).
- Criterion F is the combination of (criteria B, C, D, and E) duration of disturbances which last for more than I month.
- Criterion G is the disturbance that causes significant distress to the affected individual socially, occupational impairment as well as other areas of the individual functioning (APA, 2013).
- Criteria H is exclusion which stipulates that the affected person is traumatized but not due to medication, substance use and other illness (APA, 2013).

Criteria A-E are required for a PTSD diagnosis (Friedman, 2013).

The Onset of PTSD

The APA (2013) classified PTSD as a mental disorder in which the onset is preceded by an individual witnessing or experiencing a trauma or adverse environmental event in childhood or adulthood. The APA (2013) described the onset of PTSD symptoms which can appear as early as 30 days after an individual experiences a trauma. However, the incidence of PTSD is not just limited to 30 days as some individual's experience the symptoms of PTSD differently than others; thus can be delayed for some months. Symptoms of hyperarousal and avoidance may reappear in subsequent years (APA, 2013). However, when PTSD is acute, individuals

experience such symptoms for less than 3 months, but when the symptoms are chronic, they usually last for more than 3 months (Olff, Sijbrandij, Opmeer, Carlier, & Gersons, 2009).

Researchers have found variables that impact symptom presentation in individuals with PTSD. For example, PTSD symptoms usually last for more than 90 days from the onset of a trauma in individuals with family financial hardships (Brooks et al., 2008). The symptom of hyper vigilance may be exacerbated when individuals avoid all situations reminding them of the trauma (Olff et al., 2009). Similarly, those individuals who may have experienced the same traumatic situation with higher levels of resilience may experience other related stress disorders as well as anxiety (Bonanno, Galen, Buchiarelli, & Vlahov, 2007; Hood & Carter, 2008).

Symptoms of PTSD present differently in children and in adults. When children experience traumatic events at an early age, the traumatic situation hinders their abilities to cope and results in symptoms such as intense distress, withdrawal, difficulty in sleeping, difficulty in paying attention, anger, agitation, and irritability (NCTSN, 2010). These symptoms are exacerbated when children recall anything reminding them of the original traumatic event or events. While some children bounce back more quickly from a traumatic situation, others experience prolonged long term consequences that can affect their brains and nervous systems (NCTSN, 2010).

PTSD in Children and Adults

In addition to the changes made to the *DSM-5,* a new developmental subtype of PTSD was added. This addition include PTSD in preschool children, ranging from ages 3–6 years old, which brought a significant milestone to the taxonomy of the *DSM-5* (Scheeringa, 2013). When young children experience severe traumatic events, including witnessing interpersonal violence, abuses, motor vehicle accident, dog bites, invasive medical procedures and natural disasters

(Cohen & Mannarino, 1996; De Young, Kenardy & Cobham, 2011; Laor et al., 1999; Lieberman, Ippen, & Van Horn, 2006; Meiser-Stedman, Smith, Glucksman, Yule, & Dalgleish, 2008; Scheeringa, 2013; Scheeringa & Zeanah, 2008).

Over the past decades, researchers have attempted to determine the factors that cause or exacerbate PTSD symptoms in children and adolescents. In doing so, they found that about 30% of children with PTSD come out of abuse; 5.5 million cases of abuse are reported every year (U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau 2012). Of them, 65% are due to neglect, 18% are due to physical abuse, 10% are due to sexual abuse and 7% are due to psychological/mental abuse (Children's Bureau, 2012). Researchers have also found that trauma, such as hurricanes and man-made disasters exacerbate PTSD symptoms to a significant number of children and adolescents (Merikangas et al., 2010). The gender differences in such trauma are reported as follows: 15-43% of girls and 14-43% of boys experience the symptoms of PTSD while the actual percentage of those who develop PTSD ranges from 3-15% of girls and 1-6% of boys (Merikangas et al., 2010).

Research has also shown that different trauma affects the psychological wellbeing of children differently. For example, Pynoos et al. (1987) claimed that if a child sees his/her parent being killed or witnesses someone being sexually assaulted, about 100% of children will develop PTSD. On the other hand, close to 77% of children will develop PTSD following a school shooting, while about 35% of children develop PTSD if they see violence in their communities or neighborhoods. The *DSM -5* also addressed the symptoms of PTSD to include intense distress, withdrawal, flashbacks, and difficulty in sleeping, difficulty in paying attention, anger, agitation, and irritability due to any traumatic event.

Causes of PTSD

A thorough understanding of the phenomenon of PTSD requires a grasp of basic neuroscience. Research into the experience of fear, anxiety, and stress has linked PTSD to the amygdala region of the brain, which is responsible for fear of events, emotions, learning, and memory (Amat et al., 2005; Milad & Quirk, 2002). In a person suffering PTSD, the prefrontal cortex (PFC) of the brain is responsible for decision making, problem solving, making judgments, as well as the dampening of fear related to PTSD. Amat et al. (2005) argued that since the PFC is large, one of its functions is to help sustain these long term fear memories in a person with PTSD. In addition, Chesney, Neilands, Chambers,Taylor, and Folkman (2006) claimed that if an individual tries to avoid the memories of anything that reminded them of the trauma they witnessed or experienced, such a person may be prone to other psychological impairment such as depression, low self-esteem, loss of appetite, as well as relationship stressors creating an inability for an individual to adequately cope and resolve his or her PTSD symptomology. In addition to memories, fear reactions may be triggered by senses such as sight, smell, and sound. In other words, these triggers can activate the brain to heighten the experience of PTSD (Olff et al., 2009).

All diagnoses of PTSD are rooted in the experience of a trauma. However, the traumas and their manifestations as symptoms, differ from person to person. One single traumatic event can cause PTSD, while other individuals may experience several traumas before developing PTSD (Olff, Langeland, & Gersons, 2005). Research has also shown that individuals who have experienced prior psychological impairment such as depression and anxiety disorders from a trauma are more likely to have PTSD (Vavia et al., 2003). In addition, individuals with delayed expressions of PTSD are not symptom free during the interim between trauma and ultimate

diagnosis (Smid, Van Der Velden, Gersons, & Kleber, 2012). According to Smid et al. (2012), delayed expression signifies when the symptoms of PTSD is delayed for some period of time before developing to a full blown PTSD. More so, such individuals with delayed expression are likely to have experienced significant symptom presentation prior to the diagnosis and may have sought mental health services for such symptoms. Also, individual stressful life events and perceived lack of social support may contribute to delayed expression of PTSD symptom progression (Smid et al., 2012).

Norman et al. (2011) claimed that both PTSD and major depressive disorder (MDD) symptoms often occur simultaneously with one another following a traumatic event. As importantly, the symptoms decrease together as well. The fact that PTSD and MDD symptoms increase and diminish together is present in both long term and short term sufferers of PTSD. Relatedly, evacuees who returned home earlier following Hurricane Katrina were found to have lesser PTSD symptoms than those who returned much later or not all (LaJoie, Sprang, & McKinney, 2010).

The experience of a trauma is the key causative factor in PTSD, with additional variables having been found to contribute to or mitigate the potential for the development of PTSD. The types of traumas experienced by adults and children often differ. Adults may experience exposure to war or combat, physical assault, such as (robbery, childhood physical abuse, mugging), actual sexual violence, being kidnapped, being taken hostage, terrorist attack, severe motor vehicle accident, experiencing a natural disaster such as hurricanes or tornadoes, or a manmade disaster, torture as well as other events. By and large, children may develop PTSD with the exposure to direct or indirect experience, personal assault, suicide, serious accident, or

natural disaster such as a hurricane. Others include negative alterations in cognitions and mood, impulsivity, recklessness, and self-destructive behaviors (APA, 2013).

The Prevalence Rate of PTSD

The *DSM-5* documented that the prevalence rate of PTSD in the United States is 8.7% in child populations over the last 75 years while the adult population in general is about 3.5%. Interestingly, the prevalence rate in other continents such as Europe, Asia, Africa, and Latin America are around 0.5 to 1.0% (APA, 2013). Specific to African American men and women, recent data from the National Comorbidity Survey Replication indicated lifetime PTSD prevalence of 6% and 9.7% respectively (Friedman, 2013).

In addition to documented differences in the prevalence of PTSD among cultures, nationalities, and ethnic groups, prevalence varies tremendously due to differences in the way the person is exposed to a trauma (APA, 2013). For example, PTSD is much higher in people who experience vocational exposure, such as police, firefighters, and emergency medical personnel. The highest prevalence is found among people who have survived rape, military combat, and captivity, as well as people who survived genocides (APA, 2013) Not surprisingly, PTSD symptomology are much higher in post-conflict settings, such as Algeria (37%), Cambodia (28%), Ethiopia (16%), and Gaza 18% (Friedman, 2013)

Gender is also a factor in prevalence rates. PTSD is found across gender with the prevalence of PTSD in the United States among men is about 5%, while that of women is 10% (APA, 2013). However, the prevalence rates in major trauma and disorders are different from trauma to trauma, as well as from disorders to disorders (Haagsma, et al., 2012). For example, Haagsma et al., (2012) reported the prevalence rate of PTSD after major trauma in women is higher than in men in the United States. Prevalence rates of disorders on a twelve month period

for anxiety reveal 18.1%; mood, 9.5%; impulse control, 8.9%; substance, 3.8%; and any disorder, 26.2% respectively (APA, 2004). The increase in the prevalence rate of women is generally considered to be due to the endangerment of women being exposed to rape and other interpersonal violence (APA, 2004).

Prevalence rates among children exposed to trauma are different than among adults. Prevalence rates in children and adolescents are significantly lower because children have not developmentally met the previous criteria for PTSD (APA, 2013). Researchers have reported that 20% of the overall sample conducted on the prevalent rates of children has suffered from at least one mental health problem which has negatively impacted their daily lives (Merikangas, et al., 2010). This number reported indicated that about 1 in every 4 to 5 children4-5 children experience a mental disorder in their lives. The enumerated mental health disorders suffered by children who witnessed a trauma are depression or bipolar with 11%, attention deficit hyperactive disorder and conduct disorder with 10% and 8% with anxiety disorder (Merikangas, et al., 2010).

However, Kessler et al. (2012) argued that the overall percentage of PTSD in children in the recent month is 3.9% in their life time. In addition, research has documented that PTSD prevalence rates among female children and adolescents are higher than males, with 12% of females and 5% of males meeting the full criteria of PTSD symptom (Shannon, Lonigan, Finch & Taylor, 1994; Yule, Bolton, Udwin, Boyle, O'Ryan, & Nurrish, 2000). When disasters impact entire communities, rather than the child or child's family in isolation, the prevalence rates for PTSD are found to be higher. In their research of 4th-12th graders in New York City following the World Trade Center attack, Hoven, Duarte, Lucas, Wu, Mandell, and Goodwin (2005) found the prevalence rate of PTSD to be 10.6% regardless of gender.

In the same vein, the prevalence rate of PTSD in 800 Australian children who were exposed to a major brush fire was estimated to 52.8% at 8 months and 57.2% at 26 months following the trauma regardless of gender (McFarlane, 1987) Vernberg, La Greca, Silverman and Prinstein (1996) estimated the prevalence of PTSD in children following Hurricane Andrew at more than 55% of the entire sample of 500 elementary school children. More so, following an earthquake in Armenia, Goenjian et al. (1995) found a 95% rate of PTSD and a 75% rate of PTSD plus depression in one of the hardest hit areas of Armenia in children about 18 months following the disaster. Conversely, researchers studying the earthquake that struck Taiwan and the Tsunami in Thailand in 2004 recorded a very low rate of PTSD and depression in children following those natural disasters (Hsu et al., 2002 & Thienkrua et al., 2006). To add to the challenges in understanding PTSD in children, Kessler et al. (2008) found that unresolved hurricane-related stresses accounted for large proportions of increases in prevalence rates for children with PTSD and other mental health concerns. Clearly, different disasters affect different cultures, groups, and ages in different ways.

Risk Factors Associated with PTSD

This section of the literature review focuses on the risk factors associated with PTSD. The APA (2013) divided the risk factors associated with PTSD into three categories; pretraumatic factors, peritraumatic factors, and posttraumatic factors. Pretraumatic factors include temperamental and environmental issues such as childhood emotional issues, earlier traumatic exposures, lower education, socioeconomic status and family problems. Peritraumatic factors include environmental issue such as the severity of the injuries, personal injuries, life threat, interpersonal violence and military personnel. Finally, posttraumatic factors are those such as environmental and temperamental factors including inappropriate coping strategies,

negative evaluation that may plague a person after the initial traumatic event (APA, 2013). Other contributing factors of PTSD include female gender, previous trauma exposure, pre-existing psychiatric disorders, parental psychopathology, and low social support (Pynoos et al., 1987).

All of these factors impact the development or experience of PTSD. According to Neria, DiGrande, and Adams (2011), loss of lives of significant others, injuries, and immediate risk to their lives was seen as predictors of PTSD following the World Trade Center attack. Due to the predictors mentioned above, those individuals who were directly affected and those who survived the attacks showed greater risk of developing PTSD symptomology than those who did not directly witness or experience threat to their own lives during the attack (Neria, DiGrande & Adams, 2011). However, it is important to remember that simply being exposed to a trauma, such as the World Trade Center attack, does not necessarily guarantee a diagnosis of PTSD (Neria, DiGrande, & Adams, 2011).

Risk Factors in Children

In children and adolescents, Pynoos et al. (1987) reported multiple risk factors in children developing PTSD. The distance between the child and the trauma was noted as being important in that the closer the trauma was to the child, the greater the severity of PTSD. Secondly, the severity of the trauma and the support which the child gets from his or her parent also determines the severity of PTSD. Children with more family support experience less severe symptoms. Lastly, the severity of the actual trauma is important. Children who witness rage or experience sexual assault have a higher chance of developing PTSD than children who experience other types of trauma (Pynoos et al., 1987).

Hurricane Related Trauma and PTSD

As previously discussed, PTSD is caused by several factors including traumatic events associated with natural or manmade disasters. PTSD affects individuals differently ranging from moderate to severe problems with functioning. Hurricane related traumas have been studied in relation to overall emotional disturbances. Researchers have found that hurricane related exposures are a primary cause of serious emotional problems in children, such as conduct problems, hyperactivity-inattention, emotional symptoms, peer related problems, as well as the development of PTSD (Mclaughlin, et al., 2009). Supporting the above mentioned assertion, Abramson, Redlener, Stehling-Ariza, and Fuller (2007) acknowledged that mental health disorders increased after hurricane Katrina especially in children and adolescents. Abramson et al. (2007) also reported that hurricane Katrina accounted for a 12% increase of mental health disorders in children and adolescents while Mclaughlin et al. (2009) postulated that hurricane Katrina was correlated with an estimate of 20% increase in serious emotional disturbances and behavior problems.

Mclaughlin et al. (2009) argued that the hurricane itself was not the only predictor of serious emotional disturbances in children and adolescents post-Katrina. Children who also experienced what the researchers termed a high stress exposure (e.g. death of loved one, loss of property, having to live in a shelter, lack of social support) following hurricane Katrina accounted for an even larger increase in serious emotional disturbances in children and adolescents. Of these high stress exposures, death of a loved one was found to be the most impactful on the child's mental health. Further, the research conducted by Mclaughlin et al. (2009) attributed the serious emotional disturbances among children and adolescents to sociodemographics and family factors. They found that children affected by hurricane Katrina

who have a history of family psychopathology and low family income have a greater risk of long-term psychiatric impairment.

In another study involving the impact of PTSD on children and Hurricane Katrina, Moore and Varela (2010) correlated long-term posttraumatic stress symptoms following hurricane Katrina to events such as lack of social support, life threatening events, loss of a loved one, and disruption in housing. Their findings indicated that loss of a loved one, disruptions in housing, and lack of social supports correlated most strongly with children still experiencing PTSD symptoms 33 months following hurricane Katrina. In fact, they found that 46% of children still experienced PTSD symptoms at 33 months following hurricane Katrina. In addition, Moore and Varela found that boys were more likely to still exhibit these symptoms than girls. Supporting the work of McLaughlin et al. (2009), Moore and Varela found that environmental conditions such as disruptive and other life threatening events following the hurricane were contributory factors to the overall mental health of children. In addition, the authors remarked that these subsequent environmental experiences have more effect on children's symptoms of PTSD than the initial exposure to the hurricane.

Variables Impacting PTSD

Age and PTSD

Age has also been found to be correlated with the development of PTSD. This section will address studies of PTSD across a spectrum of ages.

Adult. In the literature, the prevalence of PTSD in the general adult population is about 8%, while that of the older adult population (60 years and above) is between 1.5-4% (Norris, 1992; Kessler et al., 2005). Although the prevalence rate is lower in older adults, and they may

not meet the full criteria for PTSD, older adults do exhibit symptoms of PTSD such as sleep disturbances, memory problems, and loss of appetite (Norris, 1992; Kessler et al., 2005).

Research has also documented the prevalence rate of PTSD in women 70 years and older is under reported. However, recent literature has taken into consideration the life course consequences of the impact of their interpersonal traumas. Higgins and Follette (2002) reported that approximately 72% of older women of average age of 70 years have experienced at least one interpersonal trauma, such as childhood physical or sexual abuse or rape in their life time. Because these interpersonal traumas are closely related to the development of PTSD, it is likely that the prevalence rates for the diagnosis have also been under reported (Higgins & Follette, 2002).

There are clear distinctions in prevalence rates among men and women, older adults and younger adults, and between veterans and non-veterans. Specific to adults in the military, Richardson et al. (2010) reported that there is a higher overall prevalence rate of PTSD, which ranges from 2-17%. However, in veterans who have experienced combat, the prevalence rate across their lifetime can be as high as 85%. Clearly, the experience of war related trauma has a strong correlation to the development of PTSD. In addition, Hankin et al. (1999) and Frueh et al. (2004) reported that younger veterans have a higher prevalence rate of PTSD symptoms than older veterans. Similar to the general older adult population, older adult veterans complained more of arousal and numbing symptoms such as memory loss, lack of sleep, and appetite problems. In the same light, Hankin et al. (1999) and Frueh et al. (2004) stated that the younger veterans tended to experience more hostility, depression, and guilt problems than the older adult veterans. Studying the older adult veteran with PTSD is more difficult, as many of these veterans

died before reaching older age because of the severe symptoms of PTSD (Hyer, Walker, Swanson, & Sperr, 1992).

Teens. Researchers Hamblen and Barnett (2012) surmised that teens between the ages of 12-18 years do experience PTSD differently than younger school age children, and the adults. The authors remarked that teens in this age group with PTSD usually exhibit impulsive and aggressive behavior because they reenact their traumatic experiences by incorporating the situation into their daily lives. The authors also claimed that because teens are closer to adult age, they tend to experience symptomatology of PTSD in a similar manner as the adult population.

School -Age Children. School-age children (5-12 years) experience PTSD differently than older children and adults. For example, Burnham (2008) found that younger children were more fearful than older children or adolescents. Hamblen and Barnett (2012) stated that school age group do not experience flashbacks or even always remember what the trauma was compared to the teen or adult age group. The authors remarked that school age children feel "time skew and omen formation." Time skew simply means that children cannot always recall the order of traumatic events while *omen formation* means that young children may develop a belief system following a trauma that causes them to believe they can predict trauma (Hamblen & Barnett, 2012).

By and large, school age children believed that they would have been able to avoid a traumatic situation if they were alert enough. Again, these experiences or belief systems are not found in adults with PTSD. Similarly, some of the children in this age group may only demonstrate signs of PTSD in play. For example, the school age child would exhibit a behavior of shooting his or her gun in a play-like situation just because he or she has witnessed a school

shooting in a real life situation, thus exacerbating their anxiety and stress level (Hamblen & Barnett, 2012).

Preschool children. Preschool age children (3-5 years) experience traumatic events differently than school aged children, teens, and adults with PTSD. According to the APA (2000), children of this age may experience distressing dreams or nightmares such as monster fights, rescuing others, and other threats to self. The APA (2000) noted that the experiences of children mentioned above are due to the fact that younger children lack the ability to relive past trauma; instead, they would reenact their experiences through playing with toys i.e., reenacting car crashes if they were in or witnessed an automobile accident. In addition to the aforementioned, the younger children also lack the ability to report any meaningful activities affecting their cognitions making the diagnosis of PTSD more challenging (APA, 2000).

Gender and PTSD

Gender plays a crucial role in the prevalence and determination of PTSD. According to APA (2013), PTSD is found across gender lines with a prevalence rate of 5% in men and 10% in women in their lifespan. It is noted that PTSD lasts longer in duration in female than male sufferers (APA, 2013). This is likely due to women being exposed to ongoing interpersonal violence and other major traumatic events such as rape, sexual abuse, childhood physical abuse and molestation (APA, 2013; Haagsma et al, 2012). Similarly, Breslau (2001); Flett, Kazantis, Long, MacDonald and Millar (2004); Kessler et al. (1995) and McGruder et al.,(2000) added that the presence of interpersonal trauma prior to the development of PTSD is greater in women than men and includes such events as sexual assault, molestation, and partner violence both in adulthood and as a child. These differ from the typical types of interpersonal trauma men are exposed to which include such traumas as combat, disaster, accident, fire, and physical assault.

Luxton, Skopp and Maguen (2010) found that differences do exist in gender specifically in the prediction of PTSD and depression following a combat exposure. After studying almost 7,000 soldiers who were deployed to Afghanistan and Iraq, the researchers found an increase in prevalence of both PTSD and depression in men and women. However, the increase was higher in women.

Research on gender differences was also extended to incarcerated inmates who may have witnessed one or more traumas in their lifetime. Komarovskaya, Booker, Warren and Jackson (2011) conducted a study using 266 male and female inmates who have experienced or been exposed to one or more trauma and were diagnosed with PTSD. Women were found to have more severe symptoms of PTSD than men in this study. The authors postulated that the severity difference is due to the fact that the women reported more traumas occurring during childhood and adolescence than men (Komarovskaya et al., 2011).

Research has demonstrated that gender and age are related to the experience of fear following a natural disaster which impacts the development or exacerbation of PTSD in children and adolescent (Burnham, 1995, 2005; Bumham & Gullone, 1997). However, Burnham et al. (2008) found that fear and loss of property were critical factors in the development of PTSD following hurricane Katrina. Studying children in both Louisiana and Mississippi post-Katrina, Burnham et al. (2008) found that girls reported significantly higher levels of fear than boys. Fear is directly linked to the experience of PTSD symptoms.

Race and PTSD

Race is defined as a social demographic designation which identifies human beings by class that share some physical characteristics of history, culture, languages, ethnicity, climatic, religion, social tradition, and anatomical affiliations (Heuristic, n.d.) Researchers have described

various factors such as race/ethnicity, demographic variables, and mental health diagnostic symptoms as part of the trajectory of PTSD. For example, (White 2006) studied a cultural group of minority women from Africa, the Middle East, and Hispanic descents are often under-diagnosed by their physicians. This under-reporting was also found to exist in the African Canadian population (McGruder-Johnson, Davidson, Gleaves, Stock, & Finch, 2000). Some researchers argued that there are no differences in determining the incidences of PTSD among African Americans and European Americans in regards to race (Pole, Gone & Kulkarni, 2008). However, McGrubber-Johnson et al. (2000) and White (2006) disagreed, saying that rates of PTSD diagnoses are higher among African Americans than European Americans. Race is also a factor in the military. Davis et al. (2012) confirmed that Black veterans are more likely to develop PTSD versus of White veterans.

Following a different traumatic exposure, such as the terrorist attack on the World Trade Center, Pole, Gone, and Kulkarni (2008) postulated that racial differences existed in individuals suffering severe PTSD symptomology, depression, panic attacks, general health, and other mental health issues. In their study results indicated that there were no differences in PTSD symptoms among the Non-Hispanic White, Non-Hispanic African Americans, Dominicans, Puerto Ricans, and other Hispanics studied. However, African/Americans were less likely to meet the criteria for PTSD than all other races (Pole, Gone & Kulkarni, 2008). Specific to the hurricane experiences in New Orleans, Weems et al. (2010) noted that ethnic minority youth experienced severe PTSD symptoms due to the direct hit from hurricane Katrina. The researchers postulated that because ethnic minorities perceived more discrimination and less social support than the nonminorities living in the Gulf Coast areas post Hurricane Katrina, 39% of ethnic minority youth were in need of treatment.

In another study conducted to evaluate the occurrence of both depression and PTSD following Katrina in relation to race, Jaycox, Cohen, Mannarino, Walker, Langley, Gegenheimer, and Schonlau (2010) found higher rates of PTSD among Blacks (52%) when compared to Whites (42%), Hispanics (4%) and others (2%). Similarly, Weems et al. (2010) found that ethnic minority youth presented with high rates of PTSD symptoms following exposure to a natural disaster also show high rates of symptoms elevation that are disturbing. The results of the study further revealed that youth who experienced disaster would also demonstrate an atypical pattern of PTSD with disturbingly high rates of symptom elevation. However, this ethnic minority group showing high rates of disturbing symptoms elevation could still gain from treatment even after 29 months of being exposed to Hurricane Katrina. Finally, Researchers Sastry and VanLandingham (2009) studied New Orleans residents who evacuated the storm to other parts of the country and those who did not and found disparity in mental illness among Blacks and other minority groups.

Preexisting Mental Health Diagnosis and PTSD

This section of the study is created to help understand the relationship between pre-existing mental health diagnoses and PTSD in adults and children. The Anxiety Disorders Association of America (ADDA) reported that preexisting mental health concerns had an impact on the development of PTSD post Katrina (ADDA, 2011). A pre-existing diagnosis of PTSD was rare, but other pre-existing diagnoses contributed to the development of PTSD following this event. More so, the report suggested that these pre-existing mental health conditions were significantly exacerbated following Hurricane Katrina and were highly correlated with the development of comorbid disorders including PTSD (ADDA, 2011).

According the Louisiana Department of Health and Hospital Office of Mental Health (2004), the primary diagnoses of adult clients served by the Office of Mental Health prior to Katrina were as follows: major affective disorders 52%, schizophrenia 21.7%, anxiety disorders 3.5%, depressive disorders 6.8%, substance abuse disorders 1.2%, adjustment disorder 1.0%, personality disorder 0.1% while others was 13.6%. The report from the La DHH/OMH, (2004) also indicated the following pre-existing diagnoses for children: Attention deficit hyperactive disorder 23.1%, major affective disorder as 15.7%, depressive disorder 9.6%, oppositional disorder 6.6 %, anxiety disorder 4.8%, conduct disorder 4.4%, adjustment disorder 3.8% and schizophrenia 0.3% respectively. PTSD may not show immediately in persons with a pre-existing mental health diagnosis. Smid et al. (2009) argued that the development of PTSD is influenced by the type of trauma, the coping skills of the individual, and the pre-existing diagnosis which may mask PTSD symptoms.

In the adult population, Kessler et al (2008) reported that approximately 30% of adults in their survey who were exposed to Hurricane Katrina had PTSD, which is higher than other disasters in the United States. In addition to the higher percentage of PTSD, the authors argued that there were also increased diagnoses in serious mental illness such as anxiety mood disorder with 33.9%, suicidal ideation with 6.4% and suicidal plans with 2.5% post hurricane Katrina. Sastry and VanLandingham (2009) studied New Orleans residents who evacuated the storm to other parts of the country and those who did not and found disparity in mental illness among blacks and other minority groups. However, Kessler et al (2008) reported that mental illness was found to be higher following an exposure to Katrina than prior to Katrina. These numbers, which were significantly lower specifically in New Orleans metropolitan area. Furthermore, the authors

reported that the reason for this higher percentage in PTSD may be due to the magnitude of the devastation in New Orleans metro area compared to other affected areas.

Following Hurricane Katrina, Olteanu, Arnberger, Grant, Davis, Abramson and Asola (2011) found that the most common diagnoses for children were attention deficit hyperactive disorders (ADHD), oppositional defiant disorder (ODD), and conduct disorder, which made up approximately 71% while mood, anxiety PTSD account for 29% of the diagnoses in children. Separation anxiety, domestic violence and divorce were also found to be significant problems, particularly between 2007 and 2009. Because hurricane Katrina caused so many problems for families including property damage and the death of loved ones, Olteanu et al (2011) called for mental health treatment and case management services to be made available to help with the problems caused by Hurricane Katrina.

Researchers have found that gender, age, race, and pre-existing mental health diagnoses played a vital role in the exacerbation or development of PTSD in children and adolescents following a trauma. However, the question left to be answered is, to what extent does gender, age, race, and pre-existing mental health diagnosis impact the onset of PTSD in children following hurricane Katrina? Specifically, to what extent do the aforementioned variables increase or decrease the likelihood of a child being diagnosed with PTSD following hurricane Katrina?

Impact of PTSD

Research on the development of PTSD is important to the practice of mental health counseling because counselors often face multiple challenges posed by their clients who have been impacted by traumatic events. PTSD sufferers face unique challenges and hardships regardless of the type of trauma suffered. In the past decades, researchers have called for the

need for special treatment following a disaster because individuals who are affected by trauma often, but not always, develop PTSD symptoms (Jaycox et al., 2010).

Working with PTSD sufferers is important to the counseling profession because of the impact of this disorder on clients, families, and communities. For example, it has been found essential to work with veterans suffering PTSD to help alleviate the re-emergence of symptoms later in life (Cook, 2001). From an ecological perspective, we know that this re-emergence impacts not only the sufferer but those surrounding the client, as well. Adults who receive treatment for PTSD are better equipped to handle the customary events of aging such as retirement, loss of loved ones, reduced income, and changes to cognitive ability (Cook, 2001). It can be argued that earlier intervention benefits children who suffer from PTSD, as well.

Challenges and Consequences

The functional consequences faced by individual suffering from PTSD are enormous. Individuals with PTSD suffer impairments across social, interpersonal, educational, physical, educational, and occupational domains (APA, 2013). Individuals with PTSD encounter challenges with a need for high medical utilization, which comes with high economic cost, physical disability and occupational issues (APA, 2013). In addition to the functional impairment, the APA (2013) claimed that problems such as being absent from work, poor social and family relationships, lower education, and lower income are all associated with PTSD.

Sufferers of PTSD may face multiple challenges regardless of age, gender, race, and pre-existing mental health conditions following a trauma. Specific to hurricane Katrina, Osofsky, Osofsky, Kronenberg, and Tonya (2010) argued that this hurricane caused a high level of stress which resulted in an increased risk of psychological disorders, as well as behavioral difficulties in children and adolescents.

However, the challenges sufferers of PTSD experience differ in scope and pathology. For example, Luxton, Skopp, and Maguen (2010) argued that depression and PTSD are two major issues faced by female veterans who were deployed for combat. The author also found that women appeared to have PTSD and depression symptoms more than men following combat exposure, while men were found to have high level of combat exposure of previous deployments than women. In light of the above, Tracy et al. (2011) found that after hurricane Ike in Galveston, 2008, individuals that were exposed to the hurricane had more stressors, resulting in diagnoses of both PTSD and depression.

The Hardships

The hardships, economic costs, loss of work, and the of lack medical care associated with the people who witnessed or were exposed to Hurricane Katrina are excruciating. According to the report from the center for Budget and Policy of 2005, Louisiana is one of the three poorest states in the United States. Compounding this data is that New Orleans, Louisiana is rated one of the poorest parishes (US Census Bureau, 2000) and was regarded as the most vulnerable of all the affected parishes in the whole region following Hurricane Katrina.

The 2005 hurricane devastated the United States Gulf coast and subjected the city of New Orleans, Louisiana, to disastrous flooding, killing more than 1000 people, displacing more 500,000 and causing estimated property damage in excess of $100 billion (Rosenbaum 2006; Mclaughlin et al., 2009). The survivors and evacuees of Hurricane Katrina have been shown to exhibit after effects of that traumatic event through time of 2010 (Weems et al., 2010; LaJoie, Sprang, & McKinney, 2010): severe mental health problems, loss of wellbeing, decreased resilience, and decreased hardiness (LaJoie, Sprang, & McKinney, 2010).

Hurricane Katrina impacted people and services when it hit New Orleans in 2005 (Government Accountability Office, 2006). According to the Government Accountability Office (GAO) report in 2006, mental health care infrastructures and services were severely damaged or closed due to Hurricane Katrina causing a severe hardship for the people of New Orleans. Among the mental health care services reported as impacted are trauma centers, hospitals, emergency care, safety nets clinics, as well as individual physicians and mental health workers. The report also indicated out of 90 clinics operated by the Department of Health and Hospitals (DHH) New Orleans, Louisiana, only 19 were open following hurricane Katrina and the cost of the damages to either rebuild or repair the hospitals alone was estimated at a $500 million (GAO, 2006).

Making the situation worse, the police department, whose role is to serve and protect the inhabitants of the New Orleans community, were forced to evacuate their various posts during hurricane Katrina despite receiving over 600 emergency calls (The New Orleans Police Department, n.d). Not only did the police department lack the basic tools to communicate with or shelter those affected by the storm, it also lacked the experience to respond to such a disaster. The result was animosity between the citizens of New Orleans and the police, further traumatizing those involved (The New Orleans Police Department, n.d).

Other challenges faced by the largely ethnic minority population of New Orleans during hurricane Katrina included a lack of awareness of the impact, lack of personal transportation, significant communication barriers, and unclear evacuation orders (Andrulis, Siddiqui, & Gantner, 2007). Researchers found that racial minority citizens, such as the Latinos, Asians, and African Americans were disproportionately affected by the disaster and, in turn, suffered a great deal of destruction, diseases, and death. Andrulis, Siddiqui, and Gantner (2007) postulated that

due to the socio-economic differences, cultural background, language barriers, and a lack of heeding to warning signs, minority communities are more vulnerable to crisis situations. While all who were impacted by this disaster suffered, minority citizens suffered most of all.

Issues Impacting the Prevention and Treatment of PTSD

This section of the study will incorporate Trauma in a general term so that the reader will understand the concept of trauma as it impacts the prevention and treatment of PTSD. In the earlier edition of the American Psychiatric Association in 1987, traumatic event was described as an experience outside the range of human beings marked by distress to anyone. The range as reported by APA (1987) constitutes the experiences faced by the individual, such as threat to life and destruction of home, whereas experiences like divorce and illnesses do not constitute trauma. However, the new *DSM-5* in 2013 described a traumatic event as one or more traumatic exposure that threatens death, serious injuries, and sexual violence to an individual marked by a direct or indirect traumatic event.

In one literature review of trauma, Wieling and Mittal (2008) described trauma as an event and experiences that severely affects individuals and group of individuals. The authors added that trauma includes, but is not limited to, natural or manmade disasters, hurricanes, terrorist attacks, earthquakes, wars, and genocides. Wieling and Mittal argued that due to the severity of traumatic events, individuals and groups of individuals have changed in their psychological, social, economic, and political wellbeing.

With that being said, issues impacting trauma prevention and treatment seem to come from arrays of constructs as indicated above. According to U.S. Department of Veterans Affairs/Department of Defense (2010), some of the critical issues impacting the prevention and treatment of PTSD include but are not limited to cardiac or respiratory problems in older adults,

decline of cognition which may impact the adult memory, learning, attention, as well as concentration. Others include lack of having caregivers and the proper medication for this group, because the older adults are more prone to side effects of medication than the younger ones. More so, loss of love ones, retirements and reduced income are also issues impacting the prevention and treatment for the adult population (Cook, 2001).

Due to the magnitude of Hurricane Katrina, many individuals who were having chronic illnesses and were receiving treatment prior to the hurricane either cut down or terminated their services causing an unprecedented disruption of treatment post Katrina (Kessler, 2007). According to Kessler (2007), about 73% of the survivors of Hurricane Katrina cut down or terminated treatment services due to various reasons. The reasons enumerated by Kessler are as follows; 23.2% of people lacked transportation, 41.1% were unable to access physicians, 32.5% lacked of medications, while those lacking insurances and finances comprise of 29.3% and people competing demands on time with 10.9% while socially isolated individuals, non-elderly, uninsured individuals, and individuals in need of housing are commonly associated with lack of services during Hurricane Katrina.

Some researchers believe that if the proper infrastructures had been in place, proper communications, social networks, shelters, medication, social support system, and other resources would have been resolved or may not have left an indelible mark on, or created such hardship for, the individuals who experienced Hurricane Katrina. For example, had the proper infrastructure been in place, counselors, social workers, therapists, and psychiatrists would have been available to help resolve problems associated with PTSD.

Sijbrandij, Olff, Reitsma, Carlier, de Vries, and Gersons (2007) argued that medication would help individuals suffering from PTSD feel better and, sleep better. Relatedly, Coetzee

(2009); Shad, Suris, and North (2011) cautioned that due to the addictive nature of PTSD drugs precaution should be taking because sufferers of PTSD might overuse PTSD drugs, thus becoming dependent on such drugs. With this in mind, mental health professionals may face difficulties in treating sufferers with PTSD and drug addiction respectively.

Unfortunately, there have been virtually no investigations of early treatment that would help alleviate symptoms in children and adolescents with PTSD symptomatology after a traumatic event (Jaycox et al., 2010). Children have experienced increased exposure to the emotional, psychological, and other pathological effects associated with the development of PTSD. Moreover, evidence has indicated that recognizable symptoms associated with PTSD are more frequently observed among children who have experienced traumatic events. Moore and Varela (2009) estimated that up to 46% of children were exposed PTSD symptomatology following hurricane Katrina. Because such a large number of children develop PTSD symptoms, it is important to identify the effect of early treatment in children after traumatic events. It is also imperative to have adequate treatment models to assist children and adolescents who develop PTSD symptoms or those affected by traumatic events such as hurricane Katrina. One way to examine this process is to define the best and most efficacious practices in achieving positive outcomes among young PTSD children and adolescents.

In addition, Haagsma et al. (2012); Bernardon and Pernice-Duca (2010) postulated that the need for an effective early treatment and prevention is necessary for the children and their families who have experienced traumatic events trauma. The authors then suggested that family plays a crucial role in the maintenance of children and adolescents' psychopathology, hence the need for active family participation in interventions for their children becomes imperative, especially by constructing and facilitating healthy coping mechanisms. Furthermore, researchers

Silverman, Allen, and Ortiz (2010) stressed that since children and adolescents have been diagnosed with PTSD as a direct effect of hurricane Katrina, the need for special care for mental health survival is crucial.

Recovery

Another important aspect of recovery in the children's population is drawn from Whaley (2009), who surmised that many individuals became traumatized as a direct result from experiencing disasters such as Hurricane Katrina and proposed several steps to engage those individuals who experienced traumatic events for quick recovery. The steps that the author proposed include the government taking immediate and appropriate action to the problems that these individuals are experiencing, the second step is to identify the emotions of the survivors during traumatic events, as well as distinguishing their mental health stressors and transforming the traumatic experiences into a more healthier and positive way.

Treatment

Treatment is an integral part of helping sufferers of PTSD reduce or eliminate the symptoms of PTSD as indicated above. Many researchers have called for early treatment, infrastructure/resources, and providers for the recovery of PTSD sufferers, while other researchers called for adequate and efficacious treatment including therapy and medication. For example, Jaycox et al. (2010) noted that following hurricane Katrina, several children in New Orleans developed posttraumatic stress disorder (PTSD) symptoms without adequate mental health resources or early treatment. They argued that these children and the communities affected by disasters often face multiple challenges, due to lack of child mental health treatment resources and the provision of evidence based treatment. The authors suggested that the use of cognitive

behavioral intervention for trauma (CBIT) and trauma focused cognitive behavioral therapy (TF-CBT) improved the treatment of PTSD in children; however, the children's parents should be willing to participate in the CBIT when called upon. With this in mind, Jaycox et al. (2010) noted that triaging children according to severity of need would benefit and help to provide common treatment services to all PTSD sufferers.

Supporting the need for treatment with sufferers of PTSD following any traumatic event, Bisson, Ehlers, Matthews, Pilling, Richards, and Turner (2007) argued that therapeutic methods, such as trauma focused cognitive–behavioral therapy (TFCBT), eye movement desensitization and reprocessing (EMDR), stress management, and group cognitive behavioral therapy actually improved PTSD symptoms more than usual care in a treatment center or in the hospital. Conversely, Stanković, Grbeša, Kostić, Simonović, Milenković, Višnji and Vojnosanitetski (2013) emphasized that by utilizing the TFCBT, EMDR, and Systemic Family Therapy (SFT does not show superiority over other therapeutic techniques in the treatment of PTSD following a car accident.

Remarkably, Foa, Keane, Friedman, and Cohen (2009) argued that CBT and medications are the most successful and adequate treatment for PTSD sufferers. Foa et al (2009) found that the therapeutic approaches involved with CBT, such as PE and CPT, are the most appropriate intervention for females who were victimized during childhood with abuses, such as sexual trauma, veterans with war related trauma, and military personnel, as well as the survivors of motor vehicle accidents. In addition to the therapeutic interventions mentioned above, Foa et al noted that the EMDR Stress Inoculation Therapy (SIT) is also efficacious and adequate in treating PTSD sufferers.

Cognitive Behavioral Therapy

Cognitive behavioral therapy (CBT) is an evidenced based intervention that is very effective in treating sufferers with PTSD (The National Center for PTSD n.d.) No matter the population that is suffering from PTSD, CBT is effective in treating such persons specifically with use of TFCBT. The U.S. Department of Veterans Affairs/Department of Defense (2010) cautioned against the use of TFCBT with adult populations suffering from cardiac or respiratory issues, because utilizing TFCBT with the older adult population may lead them to have increased autonomic arousal and decreased cognitive performance. In this case, the adults should be closely monitored and supervised due to their high risk from developing high arousal (U.S. Department of Veterans Affairs/Department of Defense, 2010). According to the National Center for PTSD (n.d.), TFCBT assists women who received prolonged exposure of treatment with CBT compared to other women who received other types of therapy.

TFCBT helps children to alleviate their traumatic experience specifically reducing the feelings of their anxiety and stress. CBT also help the child to learn how to change his or her thoughts and belief system in regards to trauma, thus increasing the child's self-confidence in dealing with traumatic issues (The National Center for PTSD n.d.). In addition, when TFCBT is used with children to remember their trauma or memories surrounding the trauma, the child would be taught how to relax and not to be afraid of such memory. By and large, parents and caregivers should be involved or participate when treating sufferers with PTSD, because it would help them to learn coping skills when helping their children and other adult sufferers.

Prolonged Exposure Therapy

Prolonged exposure therapy (PE) is another type of CBT that is used to treat both the adult and children population. The use of PE has been documented to be efficacious and feasible

in treating PTSD sufferers (Thorp, Stein, Jeste, & Wetherell, 2012). PE allows the individual to repeat the trauma being experienced to his or her therapist thus reducing the stress and anxiety experienced by the individual (the National Center for PTSD n.d). According to the National Center for PTSD (n.d), one of the coping skills of PE is breathing exercise. Another technique is the desensitization, whereby sufferers of PTSD are instructed to talk about their traumas starting with the lesser ones before talking about the worse ones. This helps the individual to deal with bad memories bit by bit. While flooding is the technique that allows the therapist to ask the individual to talk about a lot of the bad memories at once, addressing past traumatic experiences with current awareness.

Eye Movement Desensitization and Reprocessing

Eye movement desensitization and reprocessing (EMDR) is another type of psychotherapy that is considered successful in treating both children and adult PTSD sufferers (Lee et al., 2006). The National Center for PTSD reported that EMDR helps individuals to change their reaction to trauma through eight phases, such as history and treatment planning, processing, assessment, desensitization, installation, body scan, closure, and reevaluation. Specifically, the client having traumatic thoughts in mind while the therapist initiates some eye movement while the client is to follow along. According to the National Center for PTSD, the phases help the client in dealing with the past, present, and future traumatic memories.

Medication

Beside therapeutic intervention with the treatment of PTSD both in the children and the adult population, research has demonstrated that therapy and medication are efficacious and feasible in treating PTSD (Foa, Keane, Friedman & Cohen, 2009). In addition, Raskind et al. (2013) correlated a study to combat the PTSD related nightmares, sleep quality, and global

functioning by utilizing 67 soldiers in their research. The authors stressed that despite the approval in using selective serotonin reuptake inhibitors(SSRIs) medication such as Paxil and Zoloft by the Federal Drug Agency (FDA), there are other antidepressant drugs like Prazosins which is very effective in treating PTSD specifically for Trauma related nightmares for the active duty soldier's population. Due to their findings, Raskind et al. (2013) called for the combination of Prazosins and other therapeutic interventions to benefit PTSD sufferers.

Despite the existence of literature on the adequacy of medication treatment with adult and children PTSD sufferers, there is still no empirical evidence to substantiate this fact (American Academy of Child and Adolescent Psychiatry [AACAP], 1998). In the latest version of the AACAP (2010), the authors argued that because children and adults experiences similar symptoms of PTSD there are lacking evidenced based randomized trials supporting medication use for PTSD in the children population. Furthermore, the authors noted that there are lots of complications in the studies that identified medication use for children specifically citing Looff, Grimley, Kuiler, Martin and Shunfield (1995) who indicated that if children have up to 10.0 to 11.5 ug/mL of carbamazepine at serum levels it will result in a complete remission of PTSD symptoms. The authors argued that it is not true because the children in Looff et al 1995 studies were already taking medication for other comorbid problems and not just for PTSD.

By and large, AACAP (2010) suggested that although selective serotonin reuptake inhibitors (SSRIs) are an approved drug for treating PTSD, clinicians should use their best judgment to determine their appropriateness for treating children. Furthermore, the AACAP supported the use of psychotherapy, such as CBT, for treating children with PTSD. Hamblen and Barnett (2012) concurred, adding that the SSRI is also used for children and adolescents suffering from OCD and depression. Hamblem and Barnett further stated that SSRI carries risk

factors such as inattention, irritability, and loss of sleep when used for children suffering from PTSD; however, there is insufficient evidence supporting the use of SSRI treatment with children.

Summary

PTSD is a very serious disorder which affects individuals who are exposed to or have experienced a trauma directly or indirectly; the exposure to a trauma can be caused by internal or an external factor resulting from a catastrophic stressors outside the individual realm of life (traumatic event) rather than an individual weakness. The review of literature provided several valid examples in respect to children diagnosis with PTSD. For example, the symptoms of PTSD in children includes intense distress, withdrawal, flashbacks, and difficulty in sleeping, difficulty in paying attention, anger, agitation, and irritability due to traumatic event (APA, 2013). The onset of PTSD can start as early as 30 days after an individual experiences a trauma.

However, the incidences of PTSD are not just limited to 30 days as some individual's experience the symptoms of PTSD differently than others; thus can be delayed for some months (APA, 2013). The review of literature further revealed that evidenced based treatment such as Cognitive Behavioral Therapy (CBT), Trauma Focused Cognitive Behavioral Therapy (TFCBT), Prolonged Exposure Therapy (PE), Eye Movement Desensitization Reprocessing (EMDR), and Group Therapy are valid and efficacious for the treatment of PTSD in adult and children following a trauma (Bisson et al., 2007).

The review of literature also presents an overview of PTSD in all age group and most of the researches have been found to be consistent with previous studies. The review of literature also presented the theory of PTSD, history of PTSD, diagnosis of PTSD, PTSD in Children, the onset of PTSD, and the development of PTSD. Others are causative effect of PTSD, the

prevalent rate of PTSD, risk factors associated with PTSD, hurricane related trauma and PTSD and the variables in this study impacting PTSD (gender, age, race and pre-existing conditions and PTSD).

A thorough perusing of the literature has promulgated the variable that may predict or increase the likelihood of PTSD in children. What the review of literature fails to ascertain is to what extent age, gender, race, and pre-existing mental health condition impacts the onset of PTSD in children. However, this research study explored whether the aforementioned variables prior to Hurricane Katrina increase or decrease the likelihood of a child being diagnosed with PTSD in children following a disaster. Chapter 3 provides an outline of the qualitative method used, the search design, rationale in the study, the explanations of the process used to obtain a representative sample and the strategy used to analyze the data and ethical consideration. It is hoped that this research will powerfully contribute to social change by helping policy makers, institution of higher learning, behavioral institutions, and children with PTSD with effective treatment that would address the gap in literature.

Chapter 3: Research Methods

Introduction

The purpose of this quantitative binary logistic regression design study was to examine the prediction of PTSD in children with pre-existing mental health diagnoses following Hurricane Katrina. This research study will help to determine whether age, gender, race, and pre-existing mental health conditions are likely to increase or decrease the likelihood of PTSD in children following Hurricane Katrina. Chapter 3 is focused on the methodology used in this current study. The topics that will be covered in this chapter include an Overview of Research Design including Archival Research, Research Rationale, Variables, Research Question and Hypothesis, Methodology, Sampling, Participation and Data Collection, Interpretation, Threat to Validity, and Ethical Procedures.

Overview of the Research Design

In this section of the research study, I explain the rationale of the chosen research design, as well as the archival research methods. I also explain the research questions directing this study and lastly, I explain the variables used in this quantitative study.

Design Rationale

This quantitative research analysis was focused on utilizing binary logistic regression that test the hypothesis presented in this chapter. Given (2008) surmised that quantitative research analysis refers to a researcher utilizing statistics to investigate a phenomena; researchers employ theories or hypothesis to investigate the relationships of such phenomena. Given also maintained that a hypothesis explains the phenomena which goes through rigorous testing by a researcher. However, Tranmer and Elliot (2008) reported that logistical regression is a statistical technique that takes into account a dependent variable to be categorical by predicting an independent

variable; logistical regression also allows researchers to determine which of their independent variables are likely to increase or decrease the probability of the outcome of the dependent variable (Hickman & Wright, 2011). Tranmer and Elliot added that logistical regression is similar to multiple regression, whereby several independent variables are allowed to predict the outcome of the dependent variable. However, in logistical regression the dependent variable is categorical in nature. Since logistic regression does not assume a linear relationship between the dependent and independent variables, the dependent variable should be in categories which are dichotomous in nature.

The research questions that are best answered with logistic regression are can the categories be correctly predicted given a set of predictors? If so, what is the relative importance of each predictor? Finally, logistic regression can also determine if there are any interactions among predictors (King, 2008). Tranmer and Elliot (2008) added that using a logistic regression is perfect in predicting the outcome of the likelihood of categorical variable. Specific to two outcomes, or a binary outcome, binary logistic regression is best used to predict an outcome variable that is categorical from one or more categorical or continuous predictor variables. Typically, the use of this model is supported because having a categorical outcome variable violates the assumption of linearity in normal regression (King, 2008).

Since this quantitative study was based on a categorical dependent variable of "YES or NO" outcome, the use of binary logistic regression best served the purpose as many of the assumptions of utilizing multiple linear regressions couldn't be met. According to Tranmer and Elliot (2008), logistic regression takes into account dependent categorical variables as the option for multiple linear regressions. This is especially true when looking at a dependent structure with a dependent variable in which one or more explanatory variables are used.

The dependent variable in this study fell into two categories that were dichotomous in nature thus having outcomes of "YES or NO". In this case, binary logistic regression was ideal as postulated above because this study predicted the outcome involving four predictor variables. The rationale for utilizing "YES or NO" outcome was to ascertain the presence of a PTSD diagnosis after Hurricane Katrina in children who had a pre-existing diagnosis prior to the hurricane.

Archival Research Methods

Researchers in various fields such as the psychology, medical, behavioral, and technology have in the past employed archival research methodology. Kene-Allampalli, et al. (2010) focused their studies by using archival methodology to work on the suicidal risk factors with a Suicidal Assessment Checklist (SAC) developed by Yufit in 2003 and Rogers in 1990 in a university psychology clinical setting. They found a strong validity and reliability, as well as the internal consistency and interrater reliability investigating patients who are at elevated risk for suicide with the use of a psychometric property SAC. In another archival research study, Baumeister, Balke, and Harter (2005) supported archival over self-report. Specifically, they questioned the validity of some studies that use participants' self-report of psychiatric and medical diagnosis rather than documentation in the clinical settings.

In further support for archival research methodology, Kiecolt-Glaser, McGuire, Robles, and Glaser (2002) also found a lack of validity when pre-clinical and biological information was obtained from participants rather than pre-existing data. My quantitative research design study focused on using this unique and actual archival data from an agency that maintained their records prior to and after Hurricane Katrina. The archival data that were collected was from 2004 to 2008 which captured the information required for the review of the study.

Variables

Tranmer and Elliot (2008) noted that by using a binary logistic regression in a quantitative research methodology, a dependent dichotomous variable, a criterion variable, several categorical or continuous independent variables, as well as predictor variables must be present. The aforementioned criteria set by Tranmer and Elliot fit this study because the purpose of this research study is to determine whether age, gender, race, and pre-existing conditions are likely to increase or decrease the likelihood of predicting PTSD in children following hurricane Katrina. The independent (IV) variables are age, gender, race, and pre-existing mental health diagnosis. The dependent variable (DV) or the outcome variable is the existence or non-existence of a PTSD following Hurricane Katrina. It is imperative to mention here that the selection of the predictor variables (IV) for this study is grounded in existing research that formed the identification of the variables for this quantitative research method.

The first predictor is age: In this research study, age is defined as the onset of illness when the child met the *DSM IV-TR* (2000) criteria for the first time. The ages used in this study was from 6-17 years old at the time of Hurricane Katrina, as 6 is the earliest age for a PTSD diagnosis to be given and anything over 17 falls outside the scope of what is considered childhood (APA, 2013) Age also has been shown to have high internal consistency, inter-rater, test-retest reliability as well as convergent validity to children for the exposure of trauma and the psychological effect of such trauma (Foa, Johnson, Fenny, & Treadwell, 2001; Nixon et al., 2013).

The second predictor is gender; gender is comprised of males and females. The rationale for using only male and female is derived from the agency intake package whereby no other type of gender is listed. With this in mind, I coded male = 0 and female =1. The third predictor is

race: Race is defined as a social demographic designation which identifies human beings by class that share some physical characteristics of history, culture, languages, ethnicity, climatic, religion, social tradition, and anatomical affiliations (Strom, Lee, Trahan, Kaufman, & Pritchett, 2009). In this research study, the following racial linage was used: Blacks, Whites, Hispanics or Latinos and Asians. Again, this data was gathered from the agency's intake package from the child's demographic information session (See table below for clarification).

The fourth predictor is preexisting Mental Health conditions. According to the Centers for Disease Control and Prevention (2013), Merikangas et al. (2010) revealed that 13% of children ages 8-15 have been diagnoses with a mental health disorder, while the most common diagnosis among the age group under investigation is ADHD, mood disorders (MD), major depressive disorder (MDD), conduct disorder (CD), and dysthymia/anxiety disorders (AD). Based on the literature, children in the present study were categorized based on the following pre-existing conditions: ADHD, MD, MDD, CD, AD and other (Anxiety Disorders Association of America, 2011; Louisiana Department of Health and Hospitals Office of Mental Health, 2004). Additionally, pre-existing diagnoses of PTSD were identified.

The table below is a representation on how files were pulled from agencies regarding the variable of children with prior Mental Health conditions from 2004 till 2008. Files consisting of children and adolescents ages 6-17 years at the time of Hurricane Katrina were sorted from the agency archival records, gender consisted of male or female, race was Black, White, Asian, and Latino, corresponding with the agency's intake package, while the preexisting conditions represents the major diagnoses of children given by the psychiatrist at the initial face to face psychiatric evaluation. The dependent variable is whether there is PTSD or no PTSD.

Table 1

Elements identified in Existing Research

	Ages	Gender	Race	Diagnosis	PTSD	No PTSD
Children in Mental Health Services prior to 2005 Hurricane Katrina. ↓ Pull charts from Agency from Oct. 1, 2005 till 2008	6 - 17	Male	Black	ADHD		
			White	Mood D/O		
				MDD		
		Female	Latino	Conduct D/O		
			Asian	Dysthymia/Anxiety		
Coding	-1 to 1	-1 to 1	-1 to 1	-1 to 1		
			IV		**DV**	

At the agency where data were collected, the aforementioned variables (ADHD, MD, MDD, CD, and AD) are defined, measured, scored, scaled, and considered reliable and valid in the following ways: The client's first point of entry into treatment services is done at the agency with the presence of the child and his parents through a structural face to face interview performed by a psychiatrist. The psychiatrist then gives a diagnosis to the child based on the criteria outlined in the *DSM IV-TR (2000)* (APA, 1994). Thereafter, the Licensed Mental Health Professional (LMHP) or the Mental Health Professional (MHP) does a comprehensive biopsychosocial assessment, which is also based on clinical face-to-face interview with the child, his or her legal guardian and other collateral sources where applicable or permitted. Information is only obtained through parents/guardian, teachers, social workers, probation offices, and any other permitted body as required by the State and Federal guidelines.

Information collected during the mental health assessments by the psychiatrist and the Mental Health Professionals during the time of intake and initial psychiatric evaluation covers the following: Client demographics such as age, gender, race/ethnicity, date of birth, address, phone number, Medicaid number, social security number, religious affiliation, primary language, height, and weight. Others are identified strengths and limitations, onset of presenting concerns (signs and symptoms), client and familial mental health history, educational background, medical conditions, psychological and emotional symptoms, and diagnosis. As identified above, all these information are imputed into the Office of Behavioral Health (OBH) and Medicaid data base for records and storage purposes. It is after this point that the LMHP prepares client individual services treatment plans (ISRP) for treatment service workers to follow. The treatment services provided by other service workers to the clients includes but not limited to individual psychotherapy, Community Psychiatric Support Treatment (CPST), Psychosocial Rehabilitation Services (PSR), family therapy, and crisis intervention services.

Using the predictor variables mentioned above, I used logistic regression to examine the prediction of PTSD in children with prior mental health diagnoses following Hurricane Katrina. Because PTSD can have a delayed onset of up to 37 months (Smid, van der Velden, Gersons, & Kleber, 2012), and because some New Orleans residents remained in transition for multiple years, it is important to look at mental health center data prior hurricane Katrina and also following Katrina over a multi-year period, rather than only examining data directly after the hurricane. The data is presumed reliable, as it is based on the clinical diagnosis given the child by the clinical team and meets validity standards for reimbursement by third party payees.

Archival record data from an existing mental health rehabilitation agency was used.

By examining the relationships between the variables, the research design determined whether age, gender, race, and pre-existing condition are likely to increase or decrease the likelihood of PTSD in children following hurricane Katrina. This study contributes to the literature by identifying the predictive relationship of these variables in a vulnerable population and setting the stage for more efficacious treatment strategies.

Research Question and Hypotheses

RQ: To what extent do children's age, gender, race and preexisting conditions prior to Hurricane Katrina increase or decrease the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina?

H_0: ßK = 0 In the population, the odds of the independent variables, including child age, gender, race and preexisting conditions prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, equals zero.

H_1: ßK ≠ 0, In the population, the odds of the independent variable, children age, gender, race and preexisting conditions prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, does not equals zero.

Methodology

Meyer and Wilson (2009) stated that a researcher must first define his or her population before beginning a sample plan because a sample constitutes a subgroup of a population. For this research study, my population was defined as children and adolescents who developed PTSD or are affected by Hurricane Katrina during the most disastrous storm that hit the US coast in 2005. The targeted populations of this study were children and adolescents range from ages 6-17 years old.

Sampling

The process of selecting units of people from a population of interest whereby the result of the unit of people under investigation are being generalized is regarded as sampling (Trochim, 2006). However, sample size is the number of participants and determined by the desired power, the number of predictors in the study, the alpha level and the expected effect size of the sample (Tabachnick & Fidell 2001). Two types of sampling are distinguished as non-probability and probability sampling (Trochim, 2006).

According to Trochim (2006), nonprobability sample strategy comprises of convenient sample, purposive and quota sample. The probability sample strategy comprises of simple random sampling, systematic, stratified, and cluster sampling. The probability sampling allows a researcher to use random selection in the population while the non-probability sampling strategy does not allow for random selections. Because this research was based on archival research methods in which clients were sought through archival files, thus this study utilized purposive sampling.

Trochim (2006) acknowledged that in purposive sampling the researcher has already had a purpose in mind, just as the name implies. According to Trochim, purposive sampling allows researchers to reach a definite or targeted population more quickly than other sampling methods. It is beneficial because the researcher can quickly access group of people that are easily accessible and predefined. For example, in a clinical setting, a researcher can easily predefined group of clients that he or she will be utilizing with in a sampled population (Trochim, 2006). In this quantitative research study, only the children that went through Hurricane Katrina as well as having diagnoses were utilized based on the study's criteria. The criteria in the sample include 6-17 years old children with preexisting mental health diagnosis at the time of Hurricane Katrina

given by the psychiatrist or the mental health practitioner at the agency site that was utilized. The criteria in the sampled population are that all the children must have a diagnosis excluding PTSD given by the psychiatrist based on the criteria outlined in the *DSM IV-TR (2000)* prior commencement to treatment. Every child with prior diagnosis of PTSD was excluded from this study. That was a criterion as well.

I employed binary logistic regression with demographic data that was collected via archival records. The reason for using binary logistic regression was that it was dichotomous in nature and it was categorical specifically naming the dependent variables in two folds such as Yes or No. In this case, my research was based on the outcome variable of whether age, gender, race or pre-existing diagnosis increased the likelihood of PTSD with an answer of Yes or No. My study revealed the extent by which age, gender, race, and pre-existing diagnosis were likely to increase or decrease the likelihood of predicting PTSD in children following Hurricane Katrina. The targeted sample was selected from Absolute Healthcare Inc., one of the largest New Orleans agencies in existence prior to Katrina.

A priori analysis was conducted to determine the sample size. However, to determine an effective and accurate sample size for the study as well as not to make a type one error a G* Power analysis was used to determine if a relationship exist between the variables of the study. As mentioned above, a binary logistic regression was used to see if the predictors could significantly predict PTSD in children while controlling for the main predictor Hurricane Katrina. In this sense, a larger sample size was needed in enhancing the ability to detect relationship effect because smaller sample would decrease the power (Fields, 2009). Also, when conducting a logistic regression analysis using a G*Power in a priori statistics specifically using two or more predictors, researcher should always abide by the guidelines set by Cohen (1992),

whereby a medium effect size would read like (R^2 = .13), with an alpha level of .05 and power at .80, in which the study would require a sample size of at least 77 participants (Balkin and Sheperis, 2011).

With this in mind, to determine the appropriate sample size of my research, I conducted A priori analysis using a G* power utilizing (α) of .05, a large effect size of .50 meaning that there will be a 5% chance a Type I error to occur. I used a larger size of .50 a power of .80 and a 5 degree of freedom to ensure sufficient sample size as well as decreasing the chances of making type 2 errors (Balkin & Sheperis, 2011). Fields (2009) noted that by measuring an effect size, it allows the researcher to see how each variable is related to the other in terms of strength and magnitude. After running the G* power analysis, a preference of lager effect size is needed hence 77 clients will be the minimum sample needed to give me an accurate significant effect in this research study. Balkin and Sheperis (2011) added that statistical power, alpha level, and effect size must first be determined to be able to calculate a sample size of a study. In Chapter 4 the Actual power based on the number of respondents, as well as the x2 tests, and the actual size of each of the participants was reported. Enter method was used to enter them all at once and then see which one is predictive and Exp(B) was explained.

Participation and Data Collection

A letter was sent to Absolute Health Care Inc. for the purpose of using their archival client's records and permission was granted by the Executive Director. Since there was no live participant contact in this study, no informed consent was needed. Absolute Health Care Inc. is one of the largest agencies in New Orleans, Louisiana prior to Hurricane Katrina and had close to 1000 clients throughout the duration of this study. Absolute Health Care Inc. focusses on providing mental health treatment to children, adolescents and adults in New Orleans and its

environs. Absolute Health Care Inc. provides services such as Psychiatric Evaluation, Medication Managements, Crisis Intervention, Community Psychiatric Support Treatment (CPST) and Psychosocial Rehabilitation Services (PSR) to individual suffering from various Mental Health conditions. The Agency services children, adolescents and adult population ranges from ages 6-60 years of age. As a provider of Mental Health rehabilitation here in New Orleans, I was granted permission to utilize the Agency's archival records data.

Upon arrival at the Agency, I sought Archival data record comprising of 77 clients based on the result of the G*Power analysis. The files were gathered in a secured file room of Absolute Health Care Treatment Agency. The records that were gathered were from January 3, 2004 to December 31, 2008. Exclusion criteria includes sample from other Agencies. None of the materials used was removed from the secured file room as all intake records was kept confidential. After data collection on each day, all materials were returned and locked to the original location. Only the staff of Absolute Health Care Inc. had access to the record. No informed consent was needed because the study is based on the use of archival data but the study was performed with the permission by the Executive Director of the company to use the Archival records. Since client's files are not available, I used the data that were stored in the OBH Medicaid data base called the Mental Health Rehabilitation Services Information System (MHRSIS) as earlier indicated.

In order to gain access to the archival records, the researcher agreed to keep all information confidential and not to remove any records from the secured file room. The researcher also agreed not to use participants' names, rather participants were given codes numbers to represent their names for the entry into SPSS statistical data base. The ages of the participants needed for this study ranged from 6-17 years old at the time of Hurricane Katrina.

The archival record that was collected was based on intakes of children and adolescents with pre-existing mental health conditions from an agency existing before Hurricane Katrina between January 3, 2004 and December 31, 2008. As earlier indicated, all personnel files were kept confidential and each client file was assigned with number codes. All information that was gathered were imputed in an excel sheet and was transferred into Statistical Package of the Social Sciences (SPSS, Graduate Pack, version 13.0).

Interpretation

To ensure a thorough assessment and evaluation of this study, binary logistic regression was used to see the extent and how well the data collected contributed to the prediction to each other (Field, 2009). In this case, the Ward Statiscics, the Nagelkerke's R square, and the Odd ratio sufficed with this research study. According to Fields (2009), the Wards statistics is used by researchers to determine each individual predictor responsibilities in regards to changes in the outcome. In order words, the Ward's statistics enables a researcher to know the significant differences in the outcome variables. Also, Fields acknowledged that the Nagelkerke's R square works best in evaluating significant values when placed side by side with the Wards Statistics otherwise the Nagelkerke's R square will not accurately measure the statistical difference. Lastly, the Odds ratio as it implies means the expectation of the predictor effect of the outcome meaning that the probability of an outcome occurring or not occurring (Fields, 2009). For example, in binary logistic regression, the odds ratio assesses the category of the predictor variables in relation to the changes in the outcome (Tranmer & Elliot, 2008).

The odds ratiois the odds of a predictor having the expected effect on the outcome or not having the expected effect (Field, 2009). For the purpose of utilizing the binary logistic regression, therefore, both the Wald Statistic and the Odds ratio were used to assess and classify

the probability of the outcome occurring for each predictor in the SPSS. The following primary logistical regression were reported, the Odds or Exp(B), classification table and reduction in error. The classification table produces a contingency table that gives researchers the options to observe versus predicted responses for all the combination of predicted variable in binary logistical regression (Fields, 2009). Because I am running a small analysis made up of small number of possible values of predictors, the classification table was ideal because at the end it created a large table due to the use of combination of all applicable variables.

The reduction in error represents the percentage in errors, in other words, it estimated the errors to which the extent of the independent variables reduces the errors associated with the dependent variable (Fields, 2009). In this study, the proportional reduction in error was performed to support the classification table predicting whether age, gender, race, and preexisting Mental Health conditions are likely to increase or decrease the likelihood of PTSD in children following hurricane Katrina.

Threats to Validity

Threats to internal and external validity were presented in this research study. Threats to internal validity of this study include history and maturation. History threats in this study is due to the impact of the dependent variable (PTSD) first and the second time occurrence which may likely be impossible to determine whether the independent variable causes the dependent variable. While maturation is described as a passage of time between when participants were measured first and the subsequent time for future follow up which resulted in participant change during passage of time (Frankfort-Nachmias & Nachmias, 2008)? However, to address the time of occurrence (history and maturation) in this study, client's archival records when they came for the first psychiatric evaluation prior to Hurricane Katrina were used.

The threats to external validity of this study were presented as the interaction of setting which limit the generalizability to other study (Frankfort-Nachmias & Nachmias, 2008). This means that the setting (the rehabilitation agency) where participant's records were collected potentially were not generalized to other settings in the sampled population per se. However, to address this threat, each record in the identified agency was addressed locally (i.e. the archival files represented the entire population).

Ethical Procedure

This study strictly followed the American Code of Ethics (2005) standards in regards to informed consent and ethical behavior. As a requirement of the University, prior to soliciting participants and data collection, I submitted the *Research Ethics Review Plan* to the Institutional Review Board (IRB) for approval, it was approved and they assigned me an approval number including the date of approval. Since my research study is based on retrieving archival records, no informed consent was needed as well as no known risk is envisaged. However, I sent an informal request to the agency that was used for the study with a brief explanation of what the research is about.

Thereafter, I submitted a letter of cooperation with the IRB approval number and date of approval as well as an explanation of the clients file needed for the study. In the cooperation letter, I outlined the rights, confidentiality, procedures, risks and benefits, and my responsibilities. This research study did not include names or any other information that would identify the clients. I also let the agency representative know that all data were locked in a secured room separate from any other research data and that I used for data collected for future presentations and other purposes in respect to research for a period of 5 years.

I used 77 clients' archival charts with the permission from the executive director. After collecting the data from the agency all data were entered into the SPSS for statistical results. Also, I completed the Human Resource Protections Training which enabled me to earn a certificate as part of the requirement from my University in respect to all research studies.

Summary

This quantitative cross-sectional design study that utilized binary logistic regression for its analysis in order to find a correlation between dichotomous dependent variable such as (PTSD or no PTSD) and four IV variable to the extent at which age, gender, race, and pre-existing Mental Health conditions are likely to increase or decrease the likelihood of predicting PTSD in children following hurricane Katrina. Archival records of 77 clients were collected from an agency in New Orleans that was in existence prior to Hurricane Katrina. However, any correlation found between the dependent and independent variables, as well as other statistical results and tables generated from SPSS are presented and discussed in Chapter 4.

Chapter 4: Results

Introduction

I investigated the prediction of PTSD in children with pre-existing mental health diagnoses following Hurricane Katrina. I set out to determine whether age, gender, race, and pre-existing mental health conditions are variables which increase or decrease the likelihood of the development of PTSD in children following Hurricane Katrina. Consequently, the IV in this binary logistic regression study were age, race, gender, and preexisting mental health conditions while the DV consisted of the presence or absence of a PTSD diagnosis following Hurricane Katrina.

This chapter is a description of the summary of the data collected in the study. The research methods consisted of a quantitative, binary logistic regression utilizing archival data from mental health service providers in New Orleans. Data was collected from the electronic medical charts of an agency that provided mental health services both prior to and after Hurricane Katrina. A purposive sampling style was used to select the cases from the agency. The criteria in the sample include 6-17 years old children with preexisting mental health diagnosis at the time of Hurricane Katrina given by the psychiatrist or a mental health practitioner at the agency site that was utilized. The criteria also included that all the children must have a diagnosis, excluding PTSD, given by the psychiatrist based on the criteria outlined in the *DSM IV-TR (2000)*. An a priori analysis using a G* power (α) of .05, a large effect size of .50 and a statistical power of .80, was used to select the adequate numbers needed to meet the criteria for statistical power of the study. The G* power results indicated a sample size of 77 was needed to adequately address the research questions. As a result of the power analysis, 77 records were obtained from the agency, analyzed, and interpreted for this study.

The following power analyses were used to analyze and interpret the data collected from the agency. The three statistical analyses that were performed on the data are as follows: the Wald's Statistic, the Pseudo $R^{2,}$ and the Odds ratio. The Wald's Statistic was used to determine each individual predictor variable's impact in regards to changes in the outcome as well as determining the significant differences in the outcome variables (Fields, 2009). The Pseudo R^2 was employed to evaluate the significance as well as the accuracy of the values of the statistical difference (Fields, 2009). Lastly, the Odds ratio was used to quantify how strongly the presence or absence of a variable predicted the presence or absence of the outcome of PTSD (Fields, 2009). The following sections present results of the descriptive data, research questions and relevant hypotheses, a summary of the relevant statistical procedures, and results for each research question.

Model 1, in all participants age; the odds of PTSD diagnosis post Hurricane Katrina are increased by 42% by holding all other independent variables constant, for one unit increased (*SE* = .136). Whereas in Model 2 age is indicated as having (*SE* = .155) and 55% increased in PTSD diagnosis by holding all other independent variables for one unit increased (see Table 4 for complete summary). Holding all other independent variables constant, for one unit increased (*SE* = .665) in gender, the odds of being diagnosed with PTSD diagnosis are decreased by 19% in Model 1, whereas in Model 2, the odds of being diagnosed with PTSD increased with (*SE* = .704) by 1% see Table 4 for a complete summary. In Model 1 holding all other independent variables constant in race for one unit increased (*SE* = .966) the odds of PTSD diagnosis are increased by 84% whereas in Model 2 it also increased with (*SE* = 1.06) by 263%. Finally, holding all other independent variable constant, for one unit increased (*SE* = .779) in preexisting conditions, the odds of being diagnosed with PTSD post Hurricane Katrina increased by 365%.

Overall the model chi-square was found to be significant ($X^2 = 9.933$, $df = 4$, $p < .05$) in Model 1 and Model 2 is ($X^2 = 14.032$, $df = 4$, $p < .001$) in both models respectively. Moreover, Pseudo R^2 indicated a high goodness of fit as model 1 accounted for 20% and 27% for Model 2 of the variance (See Table 4 for summary of the logistic regression equation variables).

However, this left 80% and 73% of the variance in PTSD diagnosis unaccounted for within the model. By including ADHD into the model, the percentage of participants that were correctly classified by the model increased from 80.5% to 83.1%. See Table 4 for summary of the logistic regression equation variables.

By examining the classification table, the majority of the participants were still classified as not having PTSD, incorrectly scoring 11 of the 14 participants that were actually diagnosed; this means that only three participants were correctly classified as having PTSD by the model. The model was under-representing the actual data see Table 6 for summary of the logistic regression equation variables.

Data Collection and Screening

Upon receiving permission from Walden University's Institutional Review Board (08-04-14-0201988) to collect data, I accessed data from the electronic databases of the identified agency's psychiatric medical records called the MHR/MHS system. This system is employed by every mental health provider in the state falling under the jurisdiction of the Louisiana Office of Behavioral Health (OBH- Medicaid data base).

The document provided on each client by the agency consisted of data from a face to face intake and initial psychiatric evaluation. This intake evaluation contained client demographics, such as age, gender, race/ethnicity, date of birth, address, phone number, Medicaid number, social security number, religious affiliation, primary language, height, and weight. Other

information contained in the initial intake included: identified strengths and limitations, onset of presenting concerns (signs and symptoms), client and familial mental health history, educational background, medical conditions, psychological and emotional symptoms, and initial diagnosis.

The agency agreed to permit review of the cases needed on the condition that no personal identifying information would be transferred from the clients records into the research data set. Therefore, all data was coded and no information regarding client names, social security numbers, home address, telephone number, or other personally identifying information was recorded entered into the research data set. However, for the purpose of tracking the clients and their identification, codes were used to represent the client's names on each case during the data collection and analysis stages of the study. From a purposeful sampling perspective, records were used only if the clients were initially seen prior to Katrina and were seen in treatment again after Katrina. The criteria for selection in the sample included children ages 6-17 with preexisting mental health diagnoses at the time of Hurricane Katrina. These initial diagnoses were given by the Psychiatrist or a mental health practitioner at the agency site that was utilized. Cases were excluded if the child had a pre-existing diagnosis of PTSD prior to Hurricane Katrina. Based on the G* power analysis of the sample, 77 participants were needed to adequately address the research questions. The 77 participants were selected based on alphabetical order of their last names per the agency database from 1-77 falling within the criteria mentioned above.

The first step was recording the assigned code number (1-77) as the first column of the data set. Subsequent columns were created for the variables needed for the study which included the client's age, gender, race, and diagnosis. Each client selected for the study was originally seen by the agency because they met criteria for a diagnosis from the *DSM IV-TR (2000)*. The

last column used for data collection registered the presence or absence of a PTSD diagnosis following Hurricane Katrina. This was entered as a simply *Y* or *N*.

Each predictor variable was selected based on a review of the literature. Data regarding age was gathered to ensure that the client was considered a child when first seen by the agency. Gender was the second predictor variable which comprised of males and females. The third predictor was race. However, the number of males in the sample outnumbering females nearly two to one contributes to a disparity and limits the study insofar as pertains to female patients. For the purposes of this study, categories of race were used to describe the social demographic designation which identifies human beings by class that share some physical characteristics of history, culture, languages, ethnicity, climatic, religion, social tradition, and anatomical affiliations (Krogman, 1945). Based on existing literature, this research used the categories of Black, White, Hispanic or Latino, and Asian. Finally, the fourth predictor was preexisting mental health condition. The diagnostic categories for this variable were derived from research on common DSM diagnoses in children conducted by the Center for Disease Control and Prevention (2013) and Merikangas et al. (2010). Diagnostic categories for this variable consisted of ADHD, MD, MDD, CD, and AD. All data was gathered from the OBH Medicaid data base (MHR/MHS system) which was stored in the agency's database and then was inputted into my coding system whereas ADHD was coded 0 and 1. (See appendix A).

Demographic Characteristics

The archival medical records obtained for this study were from mental health rehabilitation in an outpatient agency located in New Orleans, Louisiana. The population served by this agency includes children and adults, six years and older. Only cases identified as children or adolescents meeting the criteria previously specified were selected. The 77 participants were

selected from all eligible participants based on alphabetical order of their last names per the agency database. More than 60% of the client population of this center identifies racially as Black. The first table and figure can be used to aid in interpreting the data presented throughout the chapter.

Table 2 presents the descriptive statistics of the demographic variable used in this study. Of the 77 files that were utilized 65% (*n*=50) were males and 35% (*n*=27) females. Blacks make up 92% (*n*=71) of the sample and Whites were 8% (*n*=6). In regards to age distributions, ages (5-9) comprised 20% of the total, ages (10-14) made up 50%, while ages (15-19) constituted the remaining 30%. In the case of pre-existing diagnosis, ADHD was most prevalent at 40% (*n*=31), Mood was 5% (*n*=2), Depression was 8% (*n*=5), Conduct was 1% (*n*=1) and other pre-existing mental health conditions such as Dysthymia/Anxiety, bipolar disorder, intermittent disorder, schizoaffective disorder, enuresis disorder and impulsive disorder, schizophrenia made up 49% (*n*=28).

Table 2

Descriptive Summary of Cases of Demographic Variables Pre Hurricane Katrina

Diagnosis/ Preexisting Conditions	n	Ages			Gender		Race				
		5-9	10-14	15-19	Male	Female	Black	White	His/Lat	Asian	Others
		20%	50%	30%	50	27	71	6	0	0	0
ADHD	31	8 (26%)	16 (51%)	7 (23%)	80%	20%	100%	0	0	0	0
Mood	2	0	0	2	100%	0	0	100%	0	0	0
MDD	5	1 (20%)	2 (40%)	2 (40%)	60%	40%	100%	0	0	0	0
Conduct	1	0	0	1 (100%)	100%	0	0	100%	0	0	0
Dysthymia	0	0	0	0	0	0	0	0	0	0	0
Others	38	6 (16%)	16 (42%)	16 (42%)	53%	47%	89%	11%	0	0	0
Participants Additional Diagnosis		77									
PTSD	10		5 (15%)	5 (18%)	7 (14%)	3 (11%)	9 (13%)	1 (17%)	0	0	0

Note. $N = 77$ for the total sample. PTSD accounted for 14 cases indicating 'yes' answers post Hurricane Katrina.

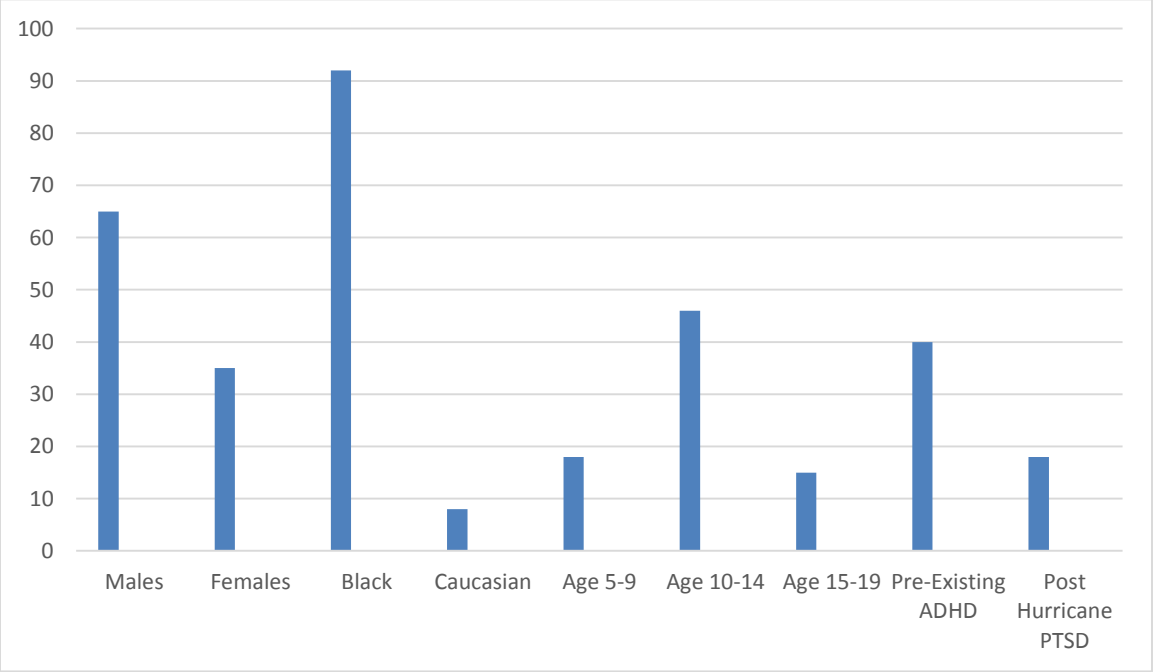

Figure 1. Distribution of major variables by percentage of cases.

Table 3 presents correlation coefficients among variables. Only age has significant correlation with PTSD. Among other variables, we see that ADHD has significant negative correlation coefficients with both race and age. This information is important at the later segment of the discussion when the effects of ADHD are assessed on the diagnosis of PTSD.

Table 3: Correlation Coefficients among Variables

		Pre-existing ADHD	Age by Years	GENDER 0 MALE 1 FEMALE	RACE 1 AA/BLACK 2 CAUCASIAN/ WHITE	PTSD diagnosed post hurricane
Pre-existing ADHD	Pearson Correlation	1	-.238*	-.270*	-.239*	.094
	Sig. (2-tailed)		.037	.017	.037	.418
	N	77	77	77	77	77
Age by Years	Pearson Correlation	-.238*	1	.142	.135	.320**
	Sig. (2-tailed)	.037		.218	.243	.005
	N	77	77	77	77	77
GENDER 0 MALE 1 FEMALE	Pearson Correlation	-.270*	.142	1	-.011	.006
	Sig. (2-tailed)	.017	.218		.927	.956
	N	77	77	77	77	77
RACE 1 AA/BLACK 2 CAUCASIAN/WHITE	Pearson Correlation	-.239*	.135	-.011	1	.114
	Sig. (2-tailed)	.037	.243	.927		.323
	N	77	77	77	77	77

PTSD diagnosed? post hurricane	Pearson Correlation	.094	.320**	.006	.114	1
	Sig. (2-tailed)	.418	.005	.956	.323	
	N	77	77	77	77	77

Table 4 presents the results for Binary Logistic Regressions. The effects of the independent variables on PTSD are compared to the non-PTSD cases. To do so, the results address Model Fit measures first followed by the examination of exponential betas to assess the effects of the predictors so that hypotheses can be effectively tested.

Model Fit Measures

Model 1 examined the extent to which age, gender, and race predicted diagnosis of PTSD after Hurricane Katrina. The results of the model showed an overall significant model, $\chi^2(3) = 9.83$, $p < .050$. The Pseudo R^2 and Cox & Snell R^2 (.20 and .12 respectively), suggest that between 12% and 20% of the variance in diagnosis of PTSD was accounted for by age, gender, and race. This left between 80% and 88% of the variance unaccounted for by the model. Among the predictors in Model 1, only age was significant, $B = 0.35$, $p = .010$, Exp(B) = 1.42. This suggests that for every one year increase in age, the likelihood of being diagnosed with PTSD increased by 42%. Both gender ($B = -0.21$, $p = .753$, Exp(B) = 0.81) and race ($B = 0.61$, $p = .529$, Exp(B) = 1.84) were not significant predictors of PTSD diagnosis in Model 1. Overall, 80.5% of the participants were correctly classified by the model. However, examining classification table in Table 5, the majority of the participants were classified as not having PTSD, incorrectly scoring all 14 of the participants that were diagnosed. Therefore, the model was under-representing the actual data.

Model 2 added ADHD into the model predicting diagnosis of PTSD after Hurricane Katrina. The results of the model were still significant, $\chi^2(4) = 14.03$, $p < .010$. The Pseudo R^2 and Cox & Snell R^2 increased to .27 and .17, respectively. This suggests that adding in ADHD into the model accounted for an additional 5% to 7% of explained variance in the diagnosis of PTSD. This suggests that between 73% and 83% of the variance in PTSD diagnosis is unaccounted for by the model. Among the predictors in Model 2, age was still a significant predictor, $B = 0.44$, $p = .004$, Exp(B) = 1.56, suggesting that for every increment increase in age, the likelihood of being diagnosed with PTSD increased by 56%. Additionally, ADHD diagnosis was also a significant predictor of PTSD diagnosis, $B = 1.54$, $p = .049$, Exp(B) = 4.65, suggesting that if the participant was diagnosed with ADHD, they were 365% more likely to be diagnosed with PTSD compared to those who were not diagnosed with ADHD. Both gender ($B = 0.08$, $p = .915$, Exp(B) = 1.08) and Race ($B = 1.29$, $p = .225$, Exp(B) = 3.63) were not significant predictors of PTSD diagnosis. Overall, 83.1% of the participants were correctly classified by the model, an increase from the first model. However, examining classification table in Table 6, the majority of the participants were still classified as not having PTSD, incorrectly scoring 11 of the 14 participants that were actually diagnosed; this mean that only three participants were correctly classified as having PTSD by the model. Therefore, the model was under-representing the actual data. In both models, race and gender do not have significant effect on PTSD.

Table 4: Results of binary regression on Diagnosis of PTSD after Hurricane Katrina

Independent Variables & Fit Statistics	Dependent Variable: Diagnosis of PTSD after Hurricane									
	Model 1					Model 2				
	B or Values	S.E.	Wald	95% CI of Exp. Beta		B or Values	S.E.	Wald	CI of Exp. Beta	
				Lower	Upper				Lower	Upper
Age	.351 [.170] (1.420)**	.136	6.622	1.087	1.856	.441 [.214] (1.555)**	.155	8.014	1.147	2.107
Gender	-.209 [.015] (.811)	.665	.099	.221	2.984	.075 [.005] (1.078)	.704	.011	.271	4.283
Race	.608 [.024] (1.837)	.966	.397	.277	12.194	1.288 [.052] (3.625)	1.062	1.470	.452	29.065
ADHD	-	-	-	-	-	1.536 [.113] (4.648)*	.779	3.892	1.010	21.386
Constant	-6.903 (.001)**	2.232	9.566	-	-	-9.686 (000)**	2.852	11.534	-	-
-2 Loglikihood	63.184	-	-	-	-	58.985	-	-	-	-
Model Chi Square	9.833*	-	-	-	-	14.032**	-	-	-	-
Nagelkarke R-Square	.196	-	-	-	-	.272	-	-	-	-
Cox & Snell R-Square	.120	-	-	-	-	.167	-	-	-	-
Hosmar & Lemeshow Chi Square	9.041	-	-	-	-	6.631	-	-	-	-

p<.001= *; p<.01=**; p<.05=*; p<.10=+**

Table 5

Logistic Regression: Predicting Diagnosis of PTSD after Hurricane Katerina
Logistic Regression Wald

Variables	Coefficient	Wald Statistic	p	Exp(B)[1]
	Model 1			
Age	.351	6.622	.010	1.420
Gender	-.209	.099	.753	.811
Race	.608	3.397	.529	1.837
	Model 2			
Age	.441	8.104	.004	1.555
Gender	.075	.011	.915	1.078
Race	1.288	1.470	.225	3.625
ADHD	1.536	3.892	.049	4.648

[1]Factor by which the odds of getting diagnosed with PTSD after Hurricane Katrina increase or decrease for a one-unit increase in the independent variable.
Model 1: Only demographics; Model Chi-Square = 9.833; df = 3; $p < .05$
Model 2: Demographic Variable and ADHD; Model Chi-Square = 14.032, df = 4, $p < .01$

Table 6

Classification Table: Predicting Diagnosis of PTSD after Hurricane Katrina

Observed	Not Diagnosed	Diagnosed	Percent Correct
		Model 1	
Not Diagnosed	62	1	98.40%
Diagnosed	14	0	0%
Overall % Correct	80.5%		
		Model 2	
Not Diagnosed	61	2	96.80%
Diagnosed	11	3	21.4%
Overall % Correct	80.5%		
Overall % Correct	83.1%		

Table 7 represents the relationship between predicted probability of PTSD and actual diagnosis of PTSD. This table presents the relevant beta weights of age, gender, race (Black and White only), and the diagnosis of PTSD. This information is followed by the predicted probability of a PTSD diagnosis based on statistical factors only. The final column contains information about whether or not the client was actually given the diagnosis of PTSD by the agency.

Table 7: Case by Case Predicted Probability of a PTSD Diagnosis Post-Katrina

Case#	AGE, β= .441	Gender, β= .075 (Male=0, Female=1)	Race, β=1.288 (Black=1, White=2)	ADHD, β= 1.536 (No=0, Yes=1)	Predicted Probability PTSD Diagnosis Post-Katrina	Actual PTSD Diagnosis (1=Yes; 0=No)
1	10	0	1	1	0.07962	0
2	9	0	1	1	0.0527	0
3	16	0	1	1	0.55012	1
4	16	0	1	0	0.2083	0
5	9	1	1	0	0.01274	0
6	15	1	1	0	0.15427	1
7	16	0	1	0	0.2083	0
8	14	0	1	1	0.33588	1
9	11	0	2	0	0.09496	0
10	15	1	1	0	0.15427	0
11	16	0	2	0	0.48817	0
12	12	1	2	0	0.14957	0
13	16	1	2	0	0.50695	1
14	15	0	1	0	0.14472	0
15	12	1	1	0	0.04627	0
16	12	0	1	0	0.04307	0
17	11	0	1	0	0.02813	0
18	10	0	1	1	0.07962	0
19	16	1	1	0	0.22097	0
20	9	0	1	1	0.0527	0
21	17	1	1	0	0.30606	0
22	12	1	1	0	0.04627	0
23	11	1	1	0	0.03026	0
24	15	0	1	0	0.14472	0
25	16	0	1	0	0.2083	0
26	12	1	1	1	0.184	0
27	16	0	1	0	0.2083	1
28	12	1	1	0	0.04627	0
29	14	0	1	0	0.09814	1
30	16	0	1	0	0.2083	0
31	17	0	1	0	0.29034	0
32	12	1	1	0	0.04627	0
33	13	0	1	0	0.06541	0
34	10	0	1	1	0.07962	0
35	19	1	1	0	0.51607	0

36	15	0	2	0	0.38018	0
37	10	0	1	0	0.01827	0
38	14	0	1	0	0.09814	0
39	16	1	1	0	0.22097	0
40	11	0	1	1	0.11857	1
41	9	1	1	0	0.01274	0
42	10	0	1	1	0.07962	0
43	18	1	1	0	0.40682	0
44	12	1	1	0	0.04627	0
45	8	0	1	1	0.03454	0
46	14	0	1	1	0.33588	1
47	15	1	1	1	0.45881	0
48	13	0	1	1	0.24543	0
49	5	0	1	0	0.00204	0
50	8	0	1	1	0.03454	0
51	13	1	1	1	0.25961	0
52	13	0	1	1	0.24543	0
53	13	0	1	0	0.06541	0
54	6	0	1	1	0.01458	0
55	16	1	1	0	0.22097	1
56	10	0	1	1	0.07962	0
57	15	0	1	0	0.14472	0
58	9	1	1	1	0.05658	0
59	15	0	1	1	0.44022	0
60	8	0	1	1	0.03454	0
61	12	0	1	1	0.17299	0
62	13	1	1	1	0.25961	0
63	6	1	1	0	0.00342	0
64	17	0	1	1	0.65535	1
65	17	0	1	1	0.65535	0
66	13	0	1	1	0.24543	0
67	6	0	1	1	0.01458	0
68	15	0	1	1	0.44022	1
69	13	0	1	1	0.24543	0
70	6	0	1	0	0.00317	0
71	12	0	1	0	0.04307	0
72	13	1	1	0	0.07015	0
73	15	0	2	0	0.38018	1
74	15	1	1	1	0.45881	1
75	7	0	1	0	0.00493	0
76	14	0	1	0	0.09814	0
77	14	1	1	0	0.10499	1

The differences between cases who should ultimately develop PTSD and those who should not are depicted in figure 2, in which predicted probabilities of the diagnosis are plotted.

Figure 2: Predicted Probability of PTSD Diagnosis Post Katrina

```
       Step number: 1

       Observed Groups and Predicted Probabilities

  8 +                              +
    I                              I
    I  n                           I
F   I  n                           I
R  6 +  n n                        +
E   I  n n                         I
Q   I n n n    y                   I
U   I n n n    y                   I
E  4 +nn nn n y  n   n  n                  +
N   Inn nn n y  n   n  n                   I
C   Inn nnn n n  n   n y n                 I
Y   Inn nnn n n  n   n y n                 I
  2 +nn nnnnn n  ny  n n nn    y  y   yy        y           +
    Inn nnnnn n  ny  n n nn    y  y   yy        y           I
    Innnnnnnn nyy nn nn n n nn  nn y  n n  nn n yn  y    n            I
    Innnnnnnn nyy nn nn n n nn  nn y  n n  nn n yn  y    n            I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------+----------
 Prob: 0    .1    .2    .3    .4    .5    .6    .7    .8    .9     1
 Group:
nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyy
yyyyyyyyyyyyyyy

     Predicted Probability is of Membership for yes
```

```
The Cut Value is .50
Symbols: n - no
         y - yes
Each Symbol Represents .5 Cases.
```

Research Questions and Analysis

The purpose of this binary logistic regression quantitative study is to examine the prediction of PTSD in children with pre-existing Mental Health conditions following Hurricane Katrina. Additionally, this research study helps to determine whether age, gender, race, and pre-existing mental health conditions increase or decrease the likelihood of PTSD in children following Hurricane Katrina. Four research questions were proposed for this study. The results of the data analysis related to testing the null hypotheses for each question is presented below.

RQ: To what extent do children's age, gender, race and preexisting conditions prior to Hurricane Katrina increase or decrease the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina?

Hypothesis

H_0: ßK = 0 In the population, the odds of the independent variables: age, gender, race and preexisting conditions prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, equals zero.

H_1: ßK ≠ 0, In the population, the odds of the independent variable: age, gender, race and preexisting conditions prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, does not equals zero.

Research Question 1

Question 1: To what extent does children's age prior to Hurricane Katrina increase or decrease the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina?

H_0: ßK = 0 In the population, the odds that the independent variable age prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, equals zero.

H_1: ßK ≠ 0 In the population, the odds that the independent variable age, prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD does not equal zero.

Binary logistic regression was the statistical analysis used to test the hypothesis and the questions presented in this study. Both the Wald's Statistic and the Odds ratio were used to assess and classify the probability of the outcome occurring for each predictor variable. Thus, the Odds or Exp(B) were reported (Fields, 2009). As presented in table 4, results of the logistical regression on age indicated that age is a significant predictor of PTSD, specifically for children between the ages of 10-14 years old and 15-19 years respectively. Age is a significant predictor, while ADHD also affects PTSD significantly. The exponential betas in Table 4 explain the correlation in two models. For example Model 1, each year increase in patient's age increases the likelihood of having PTSD by about 42% whereas the same estimate is 55% in Model 2 where ADHD is added. Clearly, the effects of age increases by the inclusion of ADHD in the model. Compared to other medical conditions, the effect of ADHD in increasing the likelihood of having PTSD is large (almost 365%). p<.001= ***; p<.01=**; p<.05=*; p<.10=+

Research Question 2

Question 2: To what extent does children's gender prior to Hurricane Katrina increase or decrease the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina?

H_0: ßK = 0 In the population, the odds that the independent variable gender prior to Hurricane Katrina increases or decreases the likelihood of being diagnosed with PTSD, equals zero.

H_1: ßK ≠ 0In the population, the odds that the independent variable gender prior to Hurricane Katrina increased or decreased the likelihood of being diagnosed with PTSD, does not equal zero.

Research question 2 was addressed using the same binary logistical regression as the statistical procedures to examine the extent which children's gender prior to Hurricane Katrina increased or decreased the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina. Gender was statistically insignificant as the results revealed Chi Squares, -2 Log Likelihood, Pseudo R^2 and Cox-Snell R^2s were all insignificant predictors of an increased of a child having PTSD post Katrina (see table 4 models). In this case the null hypothesis is rejected

Research Question 3

Question 3: To what extent does children's race prior to Hurricane Katrina increased or decreased the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina?

H_0: ßK = 0 In the population, the odds that the independent variable race prior to Hurricane Katrina increased or decreased the likelihood of being diagnosed with PTSD, equals zero.

H_1: ßK ≠ 0In the population, the odds that the independent variable race prior to Hurricane Katrina increased or decreased the likelihood of being diagnosed with PTSD, does not equal zero.

Research question 3 was addressed using the same binary logistical regression as the statistical procedures to examine the extent which does children's race prior to Hurricane Katrina increased or decreased the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina. Race was statistically insignificant as the results revealed Chi Squares, -2 Log Likelihood, Pseudo R^2 and Cox-Snell R^2s were all insignificant predictors of an increased of a child having PTSD post Katrina (see table 4 models). In this case the null hypothesis is rejected

Research Question 4

Question 4: To what extent does children's preexisting condition prior to Hurricane Katrina increased or decreased the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina?

H_0: ßK = 0 In the population, the odds that the independent variable pre-existing mental health condition prior to Hurricane Katrina increased or decreased the likelihood of being diagnosed with PTSD, equals zero.

H_1: ßK ≠ 0In the population, the odds that the independent variable pre-existing mental health condition prior to Hurricane Katrina increased or decreased the likelihood of being diagnosed with PTSD, does not equal zero.

Binary logistic analysis was the statistical analysis used to answer research question 4. To what extent do children's preexisting conditions prior to hurricane Katrina increased or decreased the likelihood of being diagnosed with PTSD after hurricane Katrina. Upon examination of the various diagnoses recorded in the reviewed records, it was discovered that ADHD (n=31) was the most prevalent preexisting condition diagnosis (see Table 2 for the descriptive statistic).

As we noticed in Table 3, (correlation coefficients table) ADHD is a highly correlated predictor with the diagnosis of PTSD; however, the combination of age and ADHD makes a stronger model for the prediction of PTSD. Thus, a good conclusion about the exponential beta for ADHD may strongly be related to the effects of age. Between age and ADHD, age is much more important predictor as the standardized beta for age is greater than that of ADHD (.214 compared to .113 in Table 4). Also, the descriptive statistic in Table 2 shows that children between the ages of 10-14 years had more cases of ADHD than other age categories. Because

having ADHD in that age variable increases the likelihood of having PTSD by 55%, it is also important to note that with that age group, the combination of age and ADHD makes a stronger representation for the prediction of PTSD.

In summation, the four research questions were analyzed and interpreted. The most unexpected result was from the fourth demographic variable studied, preexisting condition, which revealed that the combination of age and ADHD makes a stronger model for the prediction of PTSD specifically with children between the ages of 10-14 years of age.

Summary

In Chapter 4, the statistical analyses were conducted to address the question associated with Predicting Posttraumatic Stress Disorder in Children with Prior Mental Health Diagnoses Following Hurricane Katrina. The key variables investigated in this study were to what extent children's age, gender; race and preexisting conditions do prior to Hurricane Katrina increase or decrease the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina. The statistical model used to test the prediction was a binary logistic regression model. The analysis for this study found support from the data that certain psychiatric disorders predicts a specific mental health condition investigated in this study.

The first research question asked was to what extent do age increase or decreases the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina. The result from the binary logistic regression revealed that age is a significant predictor increasing PTSD post Hurricane Katrina periods. The increase in age leads to the escalation of the likelihood of getting diagnosed for PTSD by 55%, the upsurge in the same likelihood by ADHD becomes almost 37 times more compared to other mental preconditions.

The second question asked was to what extent do gender increase or decreases the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina. The result of the analysis revealed that gender is not statistically significant; therefore, the null hypothesis was rejected.

The third question asked was to what extent do race increase or decreases the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina. The data revealed that race is statistically insignificant to children being diagnosed as having PTSD following Hurricane Katrina therefore the null hypothesis of the research question 3 was rejected as well.

The fourth question asked was to what extent does preexisting mental health conditions increase or decreases the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina. The result of the data analysis revealed a particular condition ADHD affects PTSD significantly when age is included in the diagnosis, meaning that ADHD increases the likelihood of having PTSD with the inclusion of age; therefore, the null hypothesis is rejected.

The observed frequencies for the preexisting condition demographic variables (ADHD) revealed remarkable information regarding the combination of age and ADHD makes a stronger model for the prediction of PTSD. Chapter 5 will provide a discussion and summary of the study. Recommendations, practical and social change as well as future research will also be presented.

Chapter 5: Summary, Conclusion, and Recommendations

Introduction

In 2005, Hurricane Katrina devastated the U.S. Gulf Coast and subjected the city of New Orleans to catastrophic flooding (Rosenbaum, 2006; McLaughlin et al., 2009). The disaster contributed to high levels of stress, increased risk of psychological disorders (Osofsky, Osofsky, Kronenberg, & Tonya, 2010), and correlated with up to 46% of the children residing in New Orleans developing PTSD (Moore & Varela, 2010).

The purpose of this quantitative binary logistic regression design study was to examine the prediction of PTSD in children who had pre-existing mental health diagnoses following Hurricane Katrina. Previous research has indicated a high correlation between the event of Hurricane Katrina and the development of PTSD in children (see Moore & Valera, 2010), but limited research exists on other factors that may have contributed to the likelihood of developing PTSD. A major premise for this research study was to determine whether age, gender, race, and pre-existing mental health conditions were likely to increase or decrease the diagnosis of PTSD in children following Hurricane Katrina. The research contributes to the limited existing body of knowledge on the role of pre-existing mental health conditions and the development of PTSD in children and adolescents. This research was conducted to add to the professional body of knowledge related to the needs of a vulnerable population; specifically, children with mental health diagnoses, in the event of a hurricane.

Within this study, age, gender, race, and pre-existing mental health conditions were studied as independent variables used as predictors of PTSD. Specifically, I looked at how these independent variables are related to the likelihood of a PTSD diagnosis in children following Hurricane Katrina. This study can contribute to policy making, intervention, and the

development of targeted responses for children with mental health diagnoses in future catastrophes of this nature.

Archival research was conducted to examine client treatment records between 2005 and 2008 from a New Orleans mental health agency. Seventy-seven files of children and adolescents who were 6-17 years old at the time of Hurricane Katrina were sorted from the agency archival records. Data was coded according to age range (5-9, 10-14, 15-19); gender (male or female); and race (Black, White, Asian, and Latino). Data was dummy coded allowing for variables to be of equal weight in the regression model. Of the 77 clients, 65% (*n*=50) were male and 35% (*n*=27) female. Blacks made up 92% (*n*=71) and Whites were 8% (*n*=6). In regards to age, 20% were ages 5-9 (*n*=16), 50% were ages 10-14 (*n*=38), and 30% were ages 15-19 (*n*=23). When looking at pre-existing diagnosis, 40% were diagnosed with ADHD (*n*=31), 5% fell in the category of MD (*n*=2), 8% were diagnosed with MDD (*n*=5), and <1% were categorized as CD (*n*=1). A large portion of the sample, 49%, fell under the diagnostic category of "Other" and carried diagnoses such as such as Dysthymia/Anxiety, Bipolar Disorder, Intermittent Explosive Disorder, Schizoaffective Disorder, Enuresis, Impulse Control Disorder, and Schizophrenia (*n*=28).

This study is rooted in the ecological system theory of Bronfenbrenner (Bronfenbrenner, 1979). Bronfenbrenner's theory provides a way to view the functionality of individuals within the various contexts of their lives as well as their development within their respective environments (Bronfenbrenner, 1979). The ecological perspective addresses the impact of the child's social, environmental, and developmental experiences at four levels: the microsystem, mesosystem, macrosystem, and chronosystems levels. Trauma occurs at the micro and meso system levels within Brofenbrenner's theory. Users of this theory would view the child as being

influenced at the microsystem level by family and school as well as the mesosystem, which is the interaction of two these microsystems (Weems et al, 2009; Bronfenbrenner, 1979).

Previous researchers of trauma have investigated the role which demographic variables such as socioeconomics, race/ethnicity, marital status, and gender played in predicting PTSD in adults (Tracy, Norris, & Galea, 2011). Earlier researchers have indicated that trauma, such as hurricanes and man-made disasters, lead to PTSD symptoms in a significant number of children and adolescents who experience them. (Merikangas et al., 2010). Specific to the trauma of Hurricane Katrina, Moore and Varela found that 46% of children exposed to this trauma developed PTSD. In children and adolescents, the symptoms may have a delayed onset, with researchers finding PTSD symptomology presenting 18-27 months following Hurricane Katrina (McLaughlin et al., 2009).

Recent researchers supported the fact that Hurricane Katrina was a significant predictor for PTSD in children and adolescents (Moore & Valera, 2010). However, existing research fails to consider the effect of specific variables of interest (age, gender, race, and preexisting mental health conditions) and their impact on the likelihood of a diagnosis of PTSD. The current study is unique in that is the only study to specifically examine how these variables of interest impact the likelihood of a PTSD diagnosis in children and adolescents following the trauma of Hurricane Katrina.

This chapter elaborates upon the findings of the data analysis presented in Chapter 4. It also discusses the interpretation of the findings as it relates to the literature reviewed in previous chapters. Finally, the purpose of this study, the limitations, the practical and social change implications, and the recommendations for future research are all presented in this chapter.

Interpretation

Contemporary researchers have provided rich insights on the potential for the development of PTSD following exposure to a natural disaster. Specific to the disaster of Hurricane Katrina, Moore and Varela (2010) called attention to the impact of this trauma on children and adolescents finding that 46% of children exposed to the hurricane developed PTSD. They along with McLaughlin et al. (2009), also indicated that children may not show symptoms immediately and that symptoms may develop 18-27 months (McLaughlin et. al, 2009) or up to 33 months (Moore & Valera, 2010) after Hurricane Katrina. This recent research supports earlier findings which indicated that more than 50% of children who are exposed to hurricanes exhibit symptoms of PTSD, disruptive behaviors, or other manifestations of psychological distress 3 to 6 months after thus hurricane (Russoniello et. al, 2002). Thus, studying children immediately after the trauma was not sufficient for this study. As such, this study looked at children up to 33 months after Hurricane Katrina. Earlier research pertaining to the development of PTSD has found that 30% of children experience severe PTSD after a hurricane (La Greca et al., 1996). Overall, the research is clear that children who are exposed to a hurricane will often develop PTSD and that there is the potential for the development of such symptoms to be delayed. Thus, the data for this research was pulled from years 2005-2008.

I used a binary logistic regression model to determine whether age, gender, race, and preexisting mental health condition contributed to the likelihood of a diagnosis of PTSD in children following Hurricane Katrina. Based on a review of the literature, particularly Moore and Valera (2010) who investigated prevalence of PTSD in children following Hurricane Katrina, the results of this study showed a relatively low number of PTSD cases following Hurricane Katrina. Because Moore and Valera found that 46% of children developed PTSD following Hurricane

Katrina, it was expected that a similar or higher number would be found in the population studied for the current research. For this study, using the expected n of 77 cases, it was anticipated that 35 cases would have a PTSD diagnosis. Instead, only 14 of the 77 total cases, or 18%, were diagnosed with PTSD following Hurricane Katrina. Further, age and pre-existing diagnosis were linked to PTSD in the results of this study. Specifically, age and a preexisting diagnosis of ADHD created the strongest relationship for the development of PTSD following Hurricane Katrina. These variables will be discussed individually in later sections of the chapter.

A disaster of the magnitude of Hurricane Katrina has created a debate throughout the world of the vulnerability and helplessness of the people of the Gulf States of the US. Many researchers have come up with concerns and ideas on how to ameliorate the impact of future disasters. However, Hurricane Katrina highlighted a crucial role of treatment in regards to resources that, if addressed, could help alleviate the epidemic of trauma for both children and the adult population. Following Hurricane Katrina, children in New Orleans developed PTSD symptoms without adequate mental health resources or early treatment (Jaycox et al., 2010). Children and communities affected by disasters often face multiple challenges due to lack of mental health treatment resources and providers. However, this study provides interesting evidence that children who are already receiving treatment for a pre-existing mental health condition such as ADHD may have a head start on management of and coping with symptoms of PTSD.

Findings Related to Specific Variables

The IV that were used in this study; age, gender, race and preexisting conditions; were selected based on their uniqueness guided by the limitations and recommendations found in previous research.

Age

Hamblen and Barnett (2012) established age categories that allow for a more useful study of children experiencing trauma. They also noted that age is often a factor in how PTSD presents. Specifically, they found that younger children show symptoms through play activities, while older children often exhibit impulsive and aggressive behavior as a function of their PTSD. Thus, age is an important clinical consideration in the presentation, diagnosis, and treatment of PTSD.

I found age as a significant predictor of PTSD when combined with pre-existing diagnosis. Specifically, the age of the child who was previously diagnosed with ADHD created the strongest relationship to a diagnosis of PTSD. While the pre-existing diagnosis of ADHD alone was a significant correlate, it is clear that having ADHD as an older child is even more related to the ultimate PTSD diagnosis. There are a number of potential rationales for such a correlation, but more study is needed to further determine the depth of the relationship.

One simple explanation has to do with the timing of the release of the *DSM-5* criteria for PTSD. As has been noted, the DSM-5 added specific pediatric criteria to PTSD symptomology. The majority of the cases surveyed would have received their diagnoses based on *DSM-IV-TR* criteria. As such, early childhood manifestations of PTSD may not have been accurately identified in the sample, making the higher correlation present in older children only in this study. Future studies may not show any change related to age as clinicians are better able to identify and diagnose PTSD in younger children following the implementation of the *DSM-5* criteria.

A second rationale for the correlation between increase in age and ADHD predicting a stronger likelihood of PTSD is that as a child ages, his or her ability to fully appreciate the

trauma of a hurricane lends itself to the ability to develop PTSD. The *DSM IV-TR* did not include PTSD in the section related to disorders typically first diagnosed in childhood; rather, PTSD was generally considered a diagnosis first seen in adulthood (APA, 2005). With the *DSM-5* (APA, 2013), the professional community acknowledges the potential for children to qualify for this diagnosis but does not specify it as a childhood diagnosis. As such, it is likely that a level of neurocognitive development is necessary to appreciate trauma in such a way that PTSD can develop and be accurately identified in a clinical presentation. Again, this is only theory and would need further study.

Gender

Gender has been studied in relation to correlation to PTSD. With regards to gender, females have a higher prevalence rate (10%) than males (5%) of developing PTSD across the life span (APA, 2013). Breslau (2001), Flett, Kazantis, Long, MacDonald and Millar (2004), Kessler et al., (1995) and McGruder et al., (2000) investigated the factors that contribute to a greater opportunity for the development of PTSD in females compared to males. These researchers found such factors as events of sexual assault; molestation; and partner violence, both in adulthood and childhood, as integral to this distinction between women and men. Other factors include the fact that women are often exposed to ongoing events rather than single episode events. For example, interpersonal violence and other major traumatic events such as rape, sexual abuse, childhood physical abuse, and molestation are often longer in duration for females than males (APA, 2013). However, these distinctions are less relevant when studying PTSD following a natural disaster.

Further supporting the relationship between gender and PTSD, Shannon, Lonigan, Finch, and Taylor (1994) and Yule et al. (2000) documented that PTSD prevalence rates among female

children and adolescents are higher than males, with 12% of females and 5% of males meeting the full criteria of PTSD symptom. However, in the present study, the cases of PTSD in regards to gender are different from previous studies. In this study, gender was not found to be statistically significant in terms of predicting PTSD. Due to the low sample size of females, no variation between male and female participants could be addressed. Thus, no interpretation related to the significance of gender can be assumed.

Race

Research on race and PTSD has been vastly debated among trauma researchers. Some argued that race and PTSD has been under reported while others indicated that PTSD is higher in ethnic minorities. For example, White (2006) as well as McGruder-Johnson, Davidson, Gleaves, Stock, and Finch (2000) argued that women of African, Middle Eastern, and Hispanic descents as well as women who are African Canadian are often underdiagnosed with PTSD. These researchers also found that PTSD diagnosis are higher among African Americans than the Europeans Americans. Conversely, Pole, Gone and Kulkarni (2008) claimed that the previous assertion is incorrect finding that there are no differences in the incidences of PTSD between African Americans and European Americans Specific to Hurricane Katrina, Jaycox et al. (2010) found higher rates of PTSD within the African American population of New Orleans when compared to Whites.

Following a similar trend, Weems et al. (2010) found that ethnic minority youth presented with higher rates of PTSD symptoms following exposure to a natural disaster than their majority counterparts. Finally, researchers Sastry and VanLandingham (2009) studied two groups of New Orleans residents post-Hurricane Katrina. In their study of residents who evacuated the storm to other parts of the country versus those who stayed in New Orleans, they

found that there were consistently higher rates of PTSD and other diagnoses among Blacks whether they evacuated or not. The results of the study is consistent with the pattern of race studied by Jaycox et al. (2010) and Weems et al. (2010) who found a greater rate of occurrence of PTSD in African Americans than other ethnic minorities.

Pre-Existing Mental Health Conditions

The last predictive variable used in this study was preexisting mental health conditions. Current literature on pre-existing mental health conditions among children in New Orleans was used to guide this study. Based on this literature, children in the present study were categorized based on the following pre-existing conditions: attention deficit hyperactivity disorder, mood disorder, major depressive disorder, conducts disorder, dysthymia/anxiety, and other (Anxiety Disorders Association of America, 2011; Louisiana Department of Health and Hospitals Office of Mental Health, 2004). Additionally, pre-existing diagnoses of PTSD were identified.

For this study, it was important to note pre-existing diagnoses of PTSD and separate those from cases who only developed PTSD after Hurricane Katrina. Current research indicates that when children are diagnosed with PTSD, and suffer a subsequent trauma, the PTSD diagnosis persists and the symptoms are exacerbated. Previous research on the results of multiple trauma incidents on children has largely focused on ongoing episodes of child abuse (see Shonkoff, et. al, 2012; Lupien, McEwen, Gunnar, & Heim, 2009; Springer, Sheridan, Kuao, & Carnes, 2007). However, these studies point to an impact on the child that makes the child more likely to sustain the diagnosis and for symptoms to worsen as a result of additional episodes of trauma.

The results of the present study show a significant relationship between age, ADHD, and the development of PTSD. Compared with other mental health conditions, the effect of ADHD in

increasing the likelihood of having PTSD following the trauma is almost 365%. It is clear that the frequency of overall cases of PTSD was smaller in this study than expected based on existing literature. As a result, there are multiple opportunities to address this discrepancy in future studies. The following section provides a discussion of the social change implications for this study.

Positive Social Change

There are a number of positive social change implications in the present study. The social issue that this study addressed was the opportunity to help improve the quality of life of children and adolescents following a trauma such as Hurricane Katrina. This study identified the fact that children with a pre-existing mental health diagnosis such as ADHD, who were receiving or had received treatment, were more likely to develop PTSD symptomology following Hurricane Katrina. The results of this study could help influence social change and gain insight in identifying the need for a more focused response by first responders following a traumatic event such as hurricanes and other natural disasters. The result of this study would also help to provide direction to recovery efforts and for vulnerable youths who develop PTSD following a hurricane or other natural disaster. Directions that would be geared towards treatment modalities and medicine will help mental health professionals and providers alike to mitigate the development of PTSD in a broader perspective. The result of this study would support the need to develop appropriate interventions for children who were already engaged in mental health treatment prior to the trauma. Continuity of care may be an important factor in ameliorating the impact of the trauma on these children who are already receiving services.

Limitations of the Study

There are several factors that limit the findings of a study whether it is a quantitative, qualitative, or mixed method design. In this study, one such limitation is replication. It may be difficult to replicate this study by researchers who do not have a direct access to existing Mental Health rehabilitation facilities, specifically rehabilitation before Hurricane Katrina. This is particularly important because several agencies that were in operation before Hurricane Katrina either did not come back to New Orleans or shut down soon after. Without replication, it is difficult to know if the results of this study were related to the particular client population of the agency or whether they can be generalized across New Orleans. In addition to the limitations mentioned above, some agencies that existed before Hurricane Katrina destroyed their records in accordance with Louisiana law regarding record keeping. Louisiana law regarding record keeping requires companies to retain their records for a period of five years after which they are allowed to shred or destroy client's records.

There were other factors related to this study that may limit the generalizability of the findings to the overall population. First and foremost, the sampling was limited to a single rehabilitation facility located in New Orleans, Louisiana. Throughout New Orleans, numerous mental health agencies existed in and around New Orleans before Hurricane Katrina, but as previously indicated, many of these agencies closed due to the devastation of Hurricane Katrina.

Another limitation is the generalizability of the results across categories of race, gender, and ethnicity. For example, the number of males in the sample outnumbering females nearly two to one contributes to a disparity and limits the study insofar as pertains to female patients. Because there were so few females in the sample, no assumptions related to gender can be made. However, this study did begin to look at the development of PTSD in black male youth. This

could be regarded as a positive feature in that it extends the literature to a population that has been understudied (Rabalais, Ruggiero, & Scotti, 2002). With the additional study of predominantly black male youth, the research could actually be strengthened as it related to the impact of trauma on mental health. It would behoove future research on studies to include greater diversity of age, race/ethnicity, and gender in the sample studied.

Another limiting factor was the study's inclusion criteria which limited the cases reviewed to only children of 6 to 17 years of age in a particular agency. As such, this study cannot be generalized to adults who may be under care for a pre-existing mental health condition at the time of a trauma.

Finally, two design considerations create limitations. First, the use of non-probability, purposive sampling causes limitations. Through the use of non-probability, purposive sampling, there is no way to be sure the study represents the population well from a statistical perspective. In addition, this study did not utilize an experimental or quasi-experimental design, which would have allowed manipulation of the independent variables and their impact on the dependent variable.

Recommendations

Recommendations for further research are based on the findings of this study and literature on the development of PTSD in children. A quantitative research analysis utilizing binary logistic regression was utilized in this study to identify those clients who were diagnosed with PTSD following the trauma. It would be interesting to determine if a successful completion of mental health treatment was a statistically significant factor in the development of PTSD. In other words, what is the relationship between clients who no longer needed mental health services and the development of PTSD following a disaster? In addition, studies of particular

pre-existing diagnoses could be helpful in determining what factors contribute to or perhaps ameliorate symptoms of PTSD. Because age was found to be a significant demographic factor, future studies should continue to include age and its impact on PTSD development.

Lastly, the availability of archival electronic records was an instrumental resource for this study. It is therefore recommended that researchers should conduct more studies using archival electronic psychiatric records to achieve a wide range of documented clinical data featuring confirmed psychiatric diagnoses. One important fact of note to mention is the manner of diagnosis used in this research. One limitation of Moore and Varela's (2010) research was based on individual self-report whereas the present study used diagnoses given to the patient at the mental health agency and documented in the clinical record. This present study's use of archival electronic records ensures greater diagnostic validity and reliability as espoused by researchers Baumeister, Balke, and Harter (2005) and Kene-Allampalli, et al. (2010). Future use of archival data research is recommended.

Implications

In the study conducted by Olteanu et al. (2011), it was reported that a large number of children were treated four months post Katrina in an outpatient settings using mobile clinics that travelled to medically underserved areas in New Orleans. They found that the most common diagnoses for children were ADHD, followed by oppositional defiant disorder and conduct disorder, then mood disorder, anxiety disorder, and PTSD respectively. Using the mobile clinic model, knowledge of pre-existing condition was not always available. Ideally, all mental healthcare providers would be informed of preexisting conditions when providing treatment to clients. However, in cases of natural disaster, such knowledge is not always possible due to the need for mobile clinics. Based upon the findings of Olteanu et al, (2011) and the present study, it

is recommended that clients with the diagnosis of PTSD, or those who endure a natural disaster, have ongoing evaluation, specifically for ADHD.

For the sake of dissemination of these findings to influence positive social change within a micro system (a single healthcare provider), the rehabilitation agency where this research occurred would be the first agency to approach with findings. A condition of this research was that the researcher would provide these results to the agency upon completion. Based on this condition, is would be reasonable that this agency will be the appropriate venue to introduce a new prevention and treatment approach for innovative, evidenced based treatment in New Orleans following a disaster.

Another problem that needs to be addressed is that of mental health infrastructures. Immediately following Hurricane Katrina, it was reported that mental health services such as trauma centers, hospitals, emergency care centers, mental health providers, and individual physician offices totaling up to 90 clinics were either permanently closed or too severely damaged to operate due to the devastation of the hurricane when it hit New Orleans (Government Accountability Office, 2006). It is quite possible that if the infrastructures listed above were operational immediately after the hurricane, mental health professionals would have been able to sort out immediate treatment for children with pre-existing mental health conditions.

In addition to the inferences highlighted above, it would be of benefit to have trainings for mental health counselors to help respond to the needs of children following a disaster. These professionals are in a unique position to provide individual therapy utilizing a variety of evidence-based techniques with children and adolescents depending on their ages and symptoms following a trauma. It would also be worthwhile to establish evidence-based, culturally

competent interventions that would target the needs of black children based on the findings of this study.

Conclusion

This study was conducted to investigate the prediction of PTSD in children with pre-existing mental health diagnoses following Hurricane Katrina. I found the extent to which age, race, gender, and preexisting mental health conditions increases or decreases the likelihood of being diagnosed with PTSD symptoms after Hurricane Katrina. Upon examination of the various diagnoses recorded in the reviewed records, it was discovered that ADHD was the most prevalent pre-existing diagnosis, while the other diagnoses were not prevalent enough to be considered through statistical analyses. In addition, the observed frequency distribution revealed a strong correlation between ADHD, age, and the development of PTSD following Hurricane Katrina.

ADHD was found to have the largest effect on PTSD when combined with of age. The combination of age and ADHD makes a stronger prediction of PTSD in this study. Each unit increase in age leads to the escalation of the likelihood of getting diagnosed for PTSD by 55%. When combined with ADHD as a pre-existing diagnosis, the upsurge in the same likelihood is almost 37 times more compared to other mental preconditions.

Mental healthcare providers must be informed the relationship between preexisting conditions and the diagnosis of PTSD following a trauma, based upon this finding. In addition, clients identified with these preexisting conditions will need comprehensive information regarding possible risk of developing post-traumatic stress disorders in the event of a disaster.

Based upon the findings of this research, it is suggested that attention be paid to the further study of Blacks (African Americans), perhaps most specifically males, because of the

high rates of other preexisting conditions in that group. The ultimate goal of this research was to offer mental health agencies and professionals insight into the need for prevention and intervention of PTSD following a trauma such as Hurricane Katrina in the children they are already serving.

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Appendix A: Data Based Search Sheet

Participant Data Sheet utilized with DSM-5 Codes

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attention deficit hyperactive disorder (ADHD) [314.01]

mood disorders (MD) [296.90]

major depressive disorder (MDD) [296.3]

conduct disorder (CD)) [312.80]

dysthymia/anxiety disorders (AD) [300.00]

post traumatic stress disorder (PTSD) [309.81]

Appendix B: Coding System for Study Variables

Table 1

Elements Identified in Existing Research

	Ages	Gender	Race	Diagnosis	PTSD	No PTSD
Children in Mental Health Services prior to 2005 Hurricane Katrina. ↓ Pull charts from Agency from Oct. 1, 2005 till 2008	6 - 17	Male	Black	ADHD		
			White	Mood D/O		
				MDD		
		Female	Latino	Conduct D/O		
			Asian	Dysthymia/Anxiety		
Coding	-1 to 1	-1 to 1	-1 to 1	-1 to 1		
			IV		**DV**	

Charts pulled from agency from January 3, 2004 – December 31, 2008

Age

6-17

Gender

Male = 0

Female = 1

Race/ethnicity

Black/African American = 1

White/ Caucasian = 2

Latino/Hispanic = 3

Asian = 4

Other = 5

Pre-existing DX:

ADHD = 1

Mood D/o = 2

MDD = 3

Conduct D/O = 4

Dysthymia/Anxiety = 5

Other = 6

PTSD

No = 0

Yes = 1

Appendix C: Descriptive Summary of Cases of Demographic Variables in Data Base Search

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Cases found for attention deficit hyperactive disorder n31 = 40%

Cases found for mood disorder n2 = 5%

Cases found for major depressive disorder n5 = 8%

Cases found for conduct disorder n1 = 1%

Cases found for dysthymia/anxiety disorder n0 = 0%

Cases found for post-traumatic stress disorder n10 = 20%
