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Exploring the Relationship Between Pediatric Trauma Injuries and Symptoms of Acute Stress Disorder

Sydnie Rachel Allen

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EXPLORING THE RELATIONSHIP BETWEEN PEDIATRIC TRAUMA INJURIES
AND SYMPTOMS OF ACUTE STRESS DISORDER

by

Sydnie R. Allen

A Dissertation
Submitted in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Philosophy

Major: Counselor Education and Supervision

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Dedication

This dissertation is dedicated to the children and families who have experienced unprecedented situations, the redirection of life paths, and tremendous adversities. In the face of adversity, you have shown courage beyond the measure of your years and have shown me the profound capacity for the human heart to heal and thrive in the darkest times. May your future be filled with hope, support, and boundless opportunities.
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Abstract

Introduction: Children and adolescents are experiencing traumatic injuries at an alarming rate and are often not being treated for the emotional distress occurring following an injury. Immediate mental health intervention has been shown to mitigate negative outcomes. Collaborative healthcare could be leveraged to increase access to immediate mental health interventions following a traumatic injury. There are significant barriers to collaborative care that lead to underutilization. Purpose: The purpose of this study is to explore the relationship between traumatic injury type and acute stress symptoms while controlling for other factors to create targeted interventions. Method: Mental health counselors provided counseling consultations at the sole level 1 trauma center in the Midsouth as a new standard of care. Counseling consultations consisted of collecting demographics information, acute stress disorder screening, and psychoeducation for all trauma patients admitted to the hospital and at the outpatient trauma clinic. Results: Several significant positive and negative relationships were found between the independent and dependent variables as well as the control variables. Conclusion: Several factors may influence the acute stress symptomology that pediatric patients may experience immediately following a traumatic injury.

Keywords: adolescents, traumatic injury, pediatric mental health, integrated behavioral healthcare
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Exploring the Relationship Between Pediatric Trauma Injuries and Symptoms of Acute Stress Disorder

Chapter 1: Introduction

Overview

Pediatric trauma impacts millions of children and families each year and can have mental and emotional impacts. Within the United States, traumatic injuries disproportionately impact children and adolescents (Goldstick et al., 2022). Over 25% of children experience at least one traumatic event by their 16\textsuperscript{th} birthday, and they often have repeat traumatic experiences throughout their lives (Wong, 2007). Motor vehicle accidents and firearms account for a large number of deaths that occur in children and adolescents (Cunningham et al., 2018).

One of the major impacts that occur following a traumatic injury is the development of acute stress disorder. ASD is categorized within the DSM-V-TR as an anxiety disorder that is accompanied by symptoms such as hypervigilance, somatic symptoms, avoidance, and negative mood (American Psychiatric Association, 2022). Multiple studies have found that a large percentage of children who have experienced traumatic injuries develop acute stress disorder symptoms, and some explore how children may eventually go on to develop PTSD (Daviss et al., 2000; Meiser-Stedman et al., 2005; Mazo et al., 2021). These studies have shown a link between traumatic injuries such as motor vehicle collisions, burn, and assaults with the development of acute stress disorder and later, the development of post-traumatic stress disorder. The largest and most recent study to date conducted by the BRAIN Center Memphis found that 65% of all patients surveyed met the criteria for ASD (Schauss et al., 2021). Researchers found that patients who have experienced motor vehicle collisions, firearm injuries, and females have higher scores overall.
A way to potentially mitigate long term negative emotional impacts is the integration of mental health care within hospital settings to address the immediate aftereffects of traumatic injuries and provide extremely important early intervention (Miller-Matero et al., 2016; Njoroge et al., 2016; Schauss et al., 2023). There are many key barriers to integrated healthcare such as resources that are available, insurance coverage, lack of reimbursement, time management, and the integration of the two systems (Bipartisan Policy Center, 2019; Diamond & Parker, 2022).

One way to streamline the process of this was to gain a better understanding of the relationship between specific traumatic injuries and the symptoms of acute stress disorder, a relationship that has not been explored within research previously. This could allow counselors to be able to create specific treatment plans for physical injuries to streamline the process, utilize targeted interventions, and promote patient wellness.

**Statement of the Problem**

Pediatric patients suffer from traumatic injuries that often result in mental and emotional suffering. Collaborative care has shown to be effective, provides a space for early intervention, but has several barriers. Understanding the relationship between injury types and specific acute stress symptoms could assist in streamlining the process of collaborative care and improve patient outcomes.

**Purpose, Research Questions, Hypotheses**

**Purpose**

The purpose of this study was to gain an understanding of the potential relationship between physical injury type and acute stress symptomology within a pediatric population.
Research Questions and Hypotheses

1. Is there a relationship between pediatric traumatic injury type and acute stress symptomatology?

2. The age of the pediatric patient will impact the relationship between traumatic injury type and acute stress symptomology.

3. The gender of the pediatric patient will impact the relationship between traumatic injury type and acute stress symptomology.

4. The race of the pediatric patient will impact the relationship between traumatic injury type and acute stress symptomology.

5. The traumatic injury type will impact the overall number of acute stress disorder symptoms reported.

6. The gender of the patient will impact the overall number of acute stress disorder symptoms reported.

7. The age of the patient will impact the overall number of acute stress disorder symptoms reported.

8. The race of the patient will impact the overall number of acute stress disorder symptoms reported.

Statement of Potential Significance

It is significant to understand the relationship between traumatic injury type and acute stress disorder symptoms because of the implications of tailored treatments, early intervention, maximization of resources, and research implications. Having knowledge of how a pediatric patient with a specific injury may react emotionally could assist with creating and cultivating more effective and efficient tailored interventions. The creation of immediate tailored treatment
planning for pediatric patients will provide more access to early interventions and maximize the counselor’s limited time within collaborative care settings. This approach would align with the precision medical model that emphasizes treating a person more holistically based on a variety of their individual factors (Khoury et al., 2012). Overall, this should lead to positive patient outcomes and an improved collaborative process. Furthermore, this research enhances the understanding of collaborative care and inform the need for more holistic approaches to physical and mental health issues.

**Conceptual and Theoretical Frameworks**

A Correlational field study was utilized within this current study. Correlational field studies seek to understand the relationship between two or more variables that are existing within their natural environments (Heath, 2017). Correlations are statistical analyses that explore the variables’ relationships and are categorized by a lack of correlation, a positive correlation, or a negative correlation (Urdan, 2017). The purpose of the study was to understand the relationship between pediatric trauma injury types and the symptoms of acute stress disorder while controlling for other variables. It was necessary to explore the genuine relationship between the main variables and how the control variables impact their relationship. This was due to the expectation of generalizability to other groups and to gain a deeper understanding of the phenomenon occurring.

**Summary of Methodology**

**IRB**

IRB approval was obtained from University of Tennessee Health Science Center as well as from The University of Memphis; The IRB approval numbers are 21-08356-XP UM and PRO-FY2024-205 respectively. If any modifications needed to be made to the current study, the
primary investigator would have promptly communicated with the IRBs and waited for approval. All IRB guidelines were upheld.

**Participants**

Participants were children and adolescents served within the trauma services division of a level 1 trauma center within the southeastern region of the US. Participants were between the ages of 2-18 years old and had experienced a traumatic injury no later than one week of the time that data was collected.

**Procedures and Data Collection**

Data collection occurred during the dates of 2/1/2021 and 1/1/2024 for the current study. The collection of data occurred as a part of universal mental health screening services for trauma patients. Patients who were admitted into trauma services within the hospital typically received mental health consultation 24-48 hours following a traumatic injury. Patients serviced within the trauma outpatient clinic would receive a mental health consultation no later than a week following a traumatic injury. Mental health screening and further counseling services were provided by advanced standing master and doctoral level students who were supervised by licensed professional counselors.

**Instruments**

All participants’ demographic information was collected via hospital records or patient and caregiver reports. Information collected from hospital records consist of basic information such as gender, age, race, zip code, type of insurance, and type of traumatic injury. Counselors had to collect information on the patients’ previous mental health experiences and the mental health screening tool. The tool used to determine qualifications for acute stress disorder was the child stress disorder checklist short form (CSDC-SF). The CSDC-SF is a four-item measurement
that uses a Likert scale for symptom severity and relies on direct reports from pediatric patients and their caregivers (Bosquet Enlow et al., 2010). This measure is normed for children between the ages of 2-18; younger children’s caregivers were asked about the child’s mental health when appropriate. The four questions mirror the symptoms for acute stress disorder; being upset when reminded about the event, avoiding things that remind the patient of the event, physical symptoms when thinking of the event, and feelings of hypervigilance (Bosquet Enlow et al., 2010).

**Data analysis**

**Measures**

CSDC-SF data was encoded as binary variables for the presence or non-presence of the four acute stress symptoms (0 for No Symptoms, 1 for Symptoms). Symptom labels included physical, startle, avoid, and mood to reflect each question on the measurement. Three control variables were examined: age, gender, and race. Age was a continuous variable from 2-18 but developmental categories are provided in table 1. Gender was a binary variable that is labeled as female (0=Male, 1= Female). The variable race was broken down into a dichotomous variable of person with a minority background and white (0=Person with a minority background; 1=White).

Other demographic information included consist of patients’ previous counseling experience which was coded as a binary variable of no previous experience and having previous experience (0=No Previous Counseling Experience; 1= Previous Counseling Experience). As well as the type of insurance a patient has which was a continuous variable consisting of private insurance, Medicaid coverage, or no insurance coverage (1=Private Insurance, 2=Medicaid, 3= Uninsured). Lastly, the top five injury types served as the primary independent variable, and were coded
nominally (Burns, Motor Vehicle Collisions, Falls, Violent Injuries, and ATV). Injury types outside of the top 5 were coded as other and used as a comparison group.

**Bivariate Correlations, Logistic Regression, and Linear Regression**

A correlation matrix was utilized to examine the relationship between the primary independent variable (Injury Type), the dependent variable (Symptoms), and the control variables (Age, Gender, Race). This was used to determine if multicollinearity would be an issue amongst the regression models. Although many of the correlations were statistically significant, the correlations were weak in nature and therefore the regression models would not have issues of multicollinearity. Four logistic regression models were utilized to examine the predictive relationship of the variables of interest while controlling potential confounders. A linear regression model was also used to examine the relationship between the total CSDC-SF score and all the variables of interest.

**Limitations**

Limitations of this study include lack of consistency with data reporting and limitations of the measurement utilized. Lack of consistency with reporting data elements from various cohorts of mental health students could have resulted in missing data. Missing data could have also occurred due to patients’ injuries being too severe, resulting in patients being unable to communicate. Parent reporting has the potential to have skewed the results of younger patients’ screeners. The CSDC-SF is a short four item screening tool, though clinically useful, has potentially limited research potential.
Key Terms:

**Pediatrics**: “A branch of medicine dealing with the development, care, and diseases of infants, children, and adolescents” (Merriam-Webster, n.d.)

**Traumatic Injury**: A physical injury that is sudden in nature, often requiring immediate medical attention. Injuries may occur from blunt force, penetration from various items, burns, or other impacts. Types of injuries may include motor vehicle collisions, falls, various injuries from sports related activities, natural disasters, and falls. (University of Florida Health, n.d.)

**Collaborative Healthcare**: An approach that includes the intertwinement of mental and physical healthcare for patients (Agency for Healthcare Research and Quality, nd).

**Acute Stress Disorder**: A mental health condition classified within the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM V-TR) as an anxiety disorder (American Psychiatric Association, 2022). Acute stress disorder symptoms may include hyperarousal, feelings of avoidance, intrusive thoughts and feelings, and negative cognition. Hyperarousal symptoms may include sleep disturbances, restlessness, or nightmares as well as hypervigilance with an abnormal startle response.

**REDCap**: An acronym that stands for “Research Electronic Data Capture”. REDCap is a database that is used to collect and store data through a fully customizable interface (Vanderbilt, n.d.).

**Level One Trauma Center**: Level one trauma centers have the highest level of care of all trauma centers which includes the treatment of the most complex and severe traumatic injuries. Level one trauma centers often serve a larger number of patients, have the ability to provide immediate and long-term care, and provide care to patients in the region or state as a whole (American Trauma Society, n.d.).
**Level Two Trauma Center:** Level two trauma centers manage a large number of trauma cases but are often less severe or complex than cases seen at a level one center. Often can only provide definitive care to those within the local region (American Trauma Society, n.d.).
Chapter 2: Literature Review

Overview of Pediatric Trauma Injuries

*Prevalence and Demographics*

Pediatric trauma is a severe issue that impacts millions of children and their families each day, at times altering the trajectory of their lives. Pediatric trauma injuries consist of a wide variety of conditions that impact children and adolescents. These injuries result from a range of causes such as motor vehicle collisions, firearm injuries, burns, and falls. Within the United States, over 25% of children experience at least one traumatic event by their 16th birthday, and they often have repeat traumatic experiences throughout their lives (Wong, 2007). The US Census Bureau (n.d.) states that children under the age of 18 encompass approximately 22% of the United States' population but are leaders in injury-related deaths (Goldstick et al., 2022). Despite the prevalence and severity of this trauma, which has been shown to be a leading cause of childhood injury and death, only 7% of trauma centers in the US are classified as pediatric trauma centers (Definitive Healthcare, 2023). According to the literature, this is due to an insufficiency of pediatric medical supplies, varied ways to practice medical care for children, and lack of coordinated care within medical institutions. This could be due to the low number of pediatric patients that are seen within general hospitals and lack of physicians specializing in pediatric care especially in rural areas (Definitive Healthcare, 2023). The placement of these centers also reflects significant disparity in access to care, with regions of high population density more likely to have pediatric trauma centers, while rural communities often lack the necessary resources for pediatric trauma care (Jarman et. al., 2018). Jarman and colleagues (2018) examined geographic and socioeconomic disparities within trauma patients and found that patients with higher incomes and closer proximities to Level one and two trauma centers had
the lowest likelihood of death; in contrast, patients living in rural and low-income urban settings have the highest odds of death.

**Injuries**

Motor vehicle collisions and firearm-related injuries accounted for greater than 60% of the deaths of those under the age of 15 in 2016 (Cunningham et al., 2018). Since the onset of the COVID-19 pandemic, there has been a major rise in the number of firearm-related deaths in children under the age of 18 (Donnelly et al., 2021). For example, between April 2020 and July 2020, there was a 27% increase from the prior year in firearm injuries and deaths within the United States (Schleimer et al., 2021). The first six months of the pandemic also gave way to a significant increase of firearm injuries in children younger than twelve, and during the period from March to December 2020 a 30% increase in accidental firearm death occurred (Cohen et al., 2021; Schaechter, 2021). The impact of these firearm injuries led to the CDC declaring community violence as an urgent public health concern (CDC, 2022).

Motor vehicle collisions play a significant role in trauma injuries and fatalities in children and adolescents. In 2020, the CDC (n.d.) reported that more than 63,000 children were injured in motor vehicle collisions within the United States. Motor vehicle collisions and falls are some of the most common mechanisms of injury and can lead to traumatic brain injuries (TBIs) in patients ages 15-24 (CDC, n.d.). TBIs in children can lead to significant impacts on long-term growth and development which may in turn lead to many negative outcomes (Babikian et al., 2015). Orthopedic injuries, the most common pediatric injury, can also occur during a motor vehicle collision or fall.

The CDC (n.d.) postulates that injuries from burns were the sixth most common non-fatal injury in children and adolescents in the United States during 2020. Children experience burns at
a rate far higher than adults, and children under the age of five are at an increased risk of experiencing a non-fatal burn (Drago, 2005). Children between the ages 0-2 often experience burns most commonly in the form of scald or thermal burns from hot liquids (Drago, 2005). Younger children are usually very curious and can often unintentionally harm themselves by pulling hot liquids on themselves or touching a surface that is too hot. Burns and other traumatic injuries can be difficult for patients and families physically, mentally, and financially.

**Traumatic Injury and Mental Health**

**Acute Stress Disorder**

The relationship between traumatic injury and mental well-being in pediatric trauma patients has been studied less frequently than those experiencing long-term chronic illnesses. One area of interest for researchers has been the incidence of acute stress disorder amongst pediatric patients. Acute stress disorder is a mental health condition classified within the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM V-TR) as an anxiety disorder (American Psychiatric Association, 2022). To qualify for diagnosis, a person must be directly or indirectly exposed to a traumatic event of which “involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others,” and subsequently has a strong fearful response to said event (American Psychiatric Association, 2022). Acute stress disorder shares symptomology with post-traumatic stress disorder but is typically diagnosed within a one-month period following a traumatic event (American Psychiatric Association, 2022). According to the DSM V-TR, acute stress disorder symptoms may include hyperarousal, feelings of avoidance, intrusive thoughts and feelings, and negative cognition. Hyperarousal symptoms may include sleep disturbances, restlessness, or nightmares as well as hypervigilance with an abnormal startle response. Avoidance often involves avoiding any reminders surrounding
the event such as people, places, feelings, and talking about the event. Intrusive thoughts and feelings manifest as negative thought patterns, nightmares, flashbacks, or somatic symptoms such as stomach aches, headaches, and difficulty breathing. Negative cognitions may lead to persistent negative moods, difficulty experiencing positive emotions, and distorted thought patterns surrounding the event (American Psychiatric Association, 2022). Acute stress disorder symptoms can significantly impair a person’s life functioning and can cause significant emotional distress.

**Prevalence of Acute Stress Disorder Following Pediatric Injuries**

Although there have been a large number of studies which suggest the connection between physical and mental health, there has been a small yet powerful amount of information surrounding the relationship between acute stress disorder and pediatric injuries. The paucity of information that is available on the connection between acute stress disorder and pediatric injuries highlights their interconnectedness. Daviss et al. (2000) conducted assessments on fifty-four hospitalized children who had experienced traumatic injuries aged 7-17. Both children and their caregivers were interviewed to examine the children’s emotional wellbeing following a traumatic injury leading to hospitalization. They found that 92.6% of the patients felt their current situation met the criteria for acute stress disorder. When the parents of the hospitalized children were interviewed, approximately 65% felt that their child met the criteria for acute stress disorder. Daviss et al. (2000) found that parental distress and child’s previous psychopathology were highly correlated with the acute stress disorder symptomology as reported by the caregivers.

Meiser-Stedman and colleagues (2005) interviewed children and adolescents who experienced motor vehicle collisions or assaults which resulted in emergency room visits. A total
of ninety-three patients aged 10-16 years old were interviewed during the four weeks following their traumatic incident. They subsequently reinterviewed 64 of the patients at the six-months post-injury to assess if they met the criteria for PTSD. They found that 19.4% of patients met all criteria for acute stress disorder while 24.7% experienced all criteria (hypervigilance, somatic symptoms, avoidance) except for dissociation. Six months following their initial interview, 12.5% of patients who experienced acute stress disorder symptoms later qualified for a diagnosis of PTSD. They found no difference in the prevalence of acute stress disorder between children who experienced motor vehicle collisions and those who experienced assaults (Meisser-Stedman et. al., 2005).

In a more recent study, Mazo et al. (2021) enrolled pediatric patients who sustained significant physical injuries resulting in hospital admission and either pediatric trauma surgery, orthopedic surgery, or neurosurgery. A total of fifty-two patients were enrolled in their study ranging in age from 7-17 years old. The patients were contacted thirty, sixty, and ninety days following their discharge from the hospital to evaluate symptomology longitudinally. Mazo et al. (2021) found that 41% of the patients surveyed tested positively for acute stress disorder and 31% tested positively for PTSD.

In the largest and most recent study to date, Schauss et al. (2022) surveyed six hundred and seventeen children who were admitted to a level one trauma center due to a traumatic injury. Mental health counselors provided universal screening for all trauma patients admitted to inpatient trauma hospital services as well as the outpatient clinic post discharge from the hospital or emergency department. Patient age ranged from 2-18 years and consultation sessions with screening occurred at the hospital bedside or clinic room. They found that 64% of patients met the criteria for acute stress disorder when utilizing the child stress disorder checklist short form.
(CSDC-SF) (Schauss et al., 2022). Higher scores on the CSDC-SF screener were seen in patients who identified as female, older in age, those in motor vehicle collisions, and those who experienced weapon related injuries (i.e., firearms, stabbings).

Although there is no literature that explores the relationship between race, acute stress disorder, and traumatic injury specifically, there is a plethora of literature that supports children of color may experience higher levels of stress than white children. People of color experience more instances of traumatic injury than white persons do (Pumariega et al., 2022). People of color also have less access to both mental and physical healthcare than their white counterparts (Garland et al., 2005; Kataoka et al., 2002), while having poorer health outcomes (O'Brien et al., 2020). In addition, children from minority backgrounds are disproportionately impacted by life stressors such as lowered socioeconomic status, higher school drop out rates, and violence that could lead to increased mental health issues (Wolchik & Sandler, 2011). It is vital to understand how a traumatic injury might emotionally impact children from minority backgrounds as they are at a higher risk for being underserved.

**Collaborative Healthcare**

Although the literature is limited in both amount and date, there has been a relationship shown between traumatic injuries within pediatric populations and the development of acute stress disorder. A plethora of research has emerged over the last decade regarding the relationship between physical health, mental wellness, and best practices surrounding both. Integrated Behavioral Health (IBH), also known as collaborative healthcare, is an approach that includes the intertwinement of mental and physical healthcare for patients (Agency for Healthcare Research and Quality, nd). IBH often includes a team of professionals ranging from physicians, nurses, social workers, and other mental health professionals collaborating on various
client cases and providing care for a variety of areas of life. There has been a large push for more access to mental health services and the inclusion of mental health. An example of this push would be the required coverage of mental health assessments through Medicaid’s Early and Periodic, Screening, Diagnosis, and Testing (EPSDT) for all children enrolled (Semansky et al., 2003). Utilizing a collaborative care approach is extremely important, as research has shown that there is a comorbid relationship between physical illness and overall emotional wellbeing (Aarons et al., 2008). Those who suffer with chronic illness are likely to experience symptoms of clinical depression (Bazargan & Hamm-Baugh, 1995; Warner et al., 2017). Gürhan and colleagues (2019) found chronic illness to be a risk factor which could produce depressive symptoms coupled with suicidal ideation that have the potential to lead to suicide attempts. There are a variety of external factors which may also exacerbate mental illness symptoms within chronically ill patients including loneliness, a lack of social support, and financial strain (Bazargan & Hamm-Baugh, 1995; Gürhan et al., 2019; Warner et al., 2017). In addition, Hansen et al. (2001) found that women and adolescents are more likely to be impacted by poor mental health during an illness.

**Benefits of Collaborative Healthcare**

Collaborative healthcare models have been shown to be effective for promoting better physical and mental health outcomes and increasing access to mental health services (Miller-Matero et al., 2016; Njoroge et al., 2016; Schauss et al., 2023). Miller-Matero and colleagues (2016) surveyed primary care physicians on their experiences regarding the benefits of integrated behavioral health care for themselves and their patients. Nineteen primary care physicians and ninety-one medical residents within an urban hospital participated within the study by completing an online or physical survey. The medical professionals utilized a “warm hand off”
with mental health services; meaning if a patient attended a visit with the primary care provider, they would immediately introduce the mental health professional and be given an evaluation for mental health needs (Miller-Matero et al., 2016) The researchers found that physicians reported high levels of satisfaction (97.4%) with the mental health professionals and 93.8% felt that having a mental health professional directly linked to their primary care appointment improved patient care. 80.9% of physicians felt that having a mental health professional integrated assisted the physician in providing improved care for their patients (Miller-Matero et al., 2016). In addition, 90.1% of physicians cited lower levels of personal stress surrounding having a mental health professional near and 90.3% felt that the mental health services that were provided are important (Miller-Matero et al., 2016).

Schauss and colleagues (2023) at the BRAIN Center Memphis found similar results with pediatric patients and their caregivers who received mental health care at a Level-one trauma center following a traumatic injury. As a part of standardized care, a team of counselors provided universal screening and mental health services to all patients admitted to trauma services. Patients and caregivers were given satisfaction surveys upon discharge from the hospital to gauge their knowledge, openness to counseling, and helpfulness of the counseling services provided (Schauss et al., 2023). 61.2% of caregivers expressed that the mental health counseling that was provided at the bedside was helpful to cope with their child’s injury. 76.9% agreed that having access to a mental health counselor at the hospital bedside was helpful (Schauss et al., 2023). 64.8% of patients and caregivers surveyed expressed that they felt they were more aware of the link between mental and physical health after receiving mental health counseling (Schauss et al., 2023). Lastly, 76.9% of caregivers reported an openness to seeking mental health counseling in the future. These two studies highlight that both medical professionals and patients
feel that collaborative healthcare is vital to promoting patient well-being, is helpful, and is very much needed.

Collaborative healthcare allows patients to be seen holistically, receive treatment that they might otherwise not seek, and have a team of healthcare professionals who bring together their expertise for the client’s best interest (Njoroge et al., 2016). Njoroge et al. (2016) conducted a meta-analysis of a variety of psychology, pediatric primary care, psychiatry, and collaborative/integrated healthcare research articles to examine the benefits of collaborative healthcare models. The meta-analysis uncovered that there is a lack of access to mental healthcare services for children and adolescents, but collaborative healthcare models provided some relief. They found that collaborative care models reduce barriers to seeking mental health services by increasing accessibility and increasing the number of patients a provider can access (Njoroge et al., 2016). The decrease in barriers and increase in access resulted in better overall outcomes for patients’ physical and mental health demonstrating the benefits of collaborative healthcare models (Njoroge et al., 2016).

**Barriers to Collaborative Care**

Although there is an extensive amount of literature in support of IBH, there remains many reported barriers to collaborative healthcare approaches in application. A phenomenological study conducted by Diamond and Parker (2022) found that both mental health providers and medical practitioners identified major barriers to collaborative care. The first barrier identified was time and resources needed to participate in a collaborative care approach. Many medical professionals identified that the time needed to successfully collaborate with the mental health professionals often clashed with their extremely demanding schedules. Medical professionals felt that they could not allocate the time needed to properly engage with the mental
health professional and improve patient outcomes. The medical professionals also felt that the mental health professionals were not able to keep up with the demand of the referrals they were given, leading to many patients being referred out or waitlisted. Medical professionals felt that they would benefit from having more mental health professionals on their collaborative team to handle the volume of patients. Diamond and Parker (2022) also identified a lack of proximity and access to mental health professionals as a potential barrier for patients. Medical professionals relayed that when a mental health professional was not physically present within the same office space, they found it more difficult to offer comprehensive treatment. Patients were more likely to follow-up with mental health treatment when introduced to the mental health professionals, when mental health professionals offered immediate treatment, and when they were in close physical proximity. Diamond and Parker (2022) found that medical professionals were open to collaborating with mental health professionals but found it difficult to adjust their schedules, compete for mental health practitioners time, and find space for them to best serve patients.

A report conducted by the Bipartisan Policy Center (2019) overviewed barriers to collaborative care and highlighted the inadequacy of insurance coverage for mental health services. Although the last decade has produced powerful movement towards the inclusion of mental health services, a lack of coverage and reimbursement of mental health care services has been a major barrier to those seeking care since the 1960s (Bipartisan Policy Center, 2019). The Bipartisan Policy Center (2019) credits the lack of consistent guidelines across private and federally funded insurance policies for a deficit of consistent coverage for mental health needs. This is likely due to the stigmatization of mental health and lack of recognition of mental illness as a physical disease in turn, there has been a consistent divide in the ways mental and physical illnesses have been treated and reimbursed. Furthermore, some insurance policies choose to have
“carve outs” for mental health services in which those policies require patients to pay a fee per each service received (Bipartisan Policy Center, 2019). These kinds of policies can lead to huge financial burdens, especially for patients within a lower socioeconomic status. The utilization of a collaborative team approach has been shown to be vital for patients, but some billing options are highly restrictive as to how these hours may be billed. In “incident to” billing, a physician must be physically present within an office and providing “direct supervision” for other health professionals to bill for the services provided (Bipartisan Policy Center, 2019). This is extremely restrictive and imposes a large barrier for mental health services, especially for those in underserved areas. As previous research has stated (Diamond & Parker, 2022) one of the consistent barriers to collaboration is lack of time and resources; “incident to” billing can create scheduling conflicts, impose more demand and stress, and restrict mental health care in the community.

**Targeted Early Interventions**

Collaborative care approaches are more effective and assist with treating the patient holistically, but barriers to collaborative care make it difficult to follow this gold standard (Bipartisan Policy Center, 2019; Diamond & Parker, 2022; Miller-Matero et al., 2016; Njoroge et al., 2016; Schauss et al., 2023). One of the key aspects of collaborative care is the immediate access to physical and mental health professionals and their collaborative ability to create targeted treatment interventions for their clients (Miller-Matero et al., 2016). Prevention efforts and early intervention may assist in increasing positive outcomes for patients who have experienced a traumatic event (Roberts et al., 2019). A meta-analysis conducted by Roberts and colleagues (2019) evaluated 61 studies that utilized a variety of early psychological interventions for patients following a traumatic event. They found that there was evidence of effectiveness for
a variety of early psychological interventions especially for those who met diagnostic criteria of acute stress disorder and post-traumatic stress disorder (Roberts et al., 2019).

A lack of resources and time are key factors that prevent early intervention within medical settings such as a hospital (Bipartisan Policy Center, 2019; Diamond & Parker, 2022). One way to possibly optimize the resources available and maximize client care would be to develop a targeted intervention for specific injury types. Research surrounding the individual symptoms of specific traumatic injuries are very limited, as they often focus only on one injury type (Bryant & Harvey, 1999; Meisser-Stedman et. al., 2005) and often focus on meeting criteria for acute stress disorder or post-traumatic stress disorder (Daviss et al., 2000; Meiser-Stedman et al., 2005; Mazo et al., 2021).

In collaborative care settings, it may not always be possible to screen every individual on their criteria or provide overarching interventions that are meant to address several symptoms of acute stress disorder and post-traumatic stress disorder due to time constraints and limited resources. Gaining an understanding of the relationship between specific injuries and acute stress symptoms will allow counselors to develop and utilize a more targeted approach to traumatic injuries, therefore increasing positive outcomes and efficiently utilizing limited resources.

**Purpose of This Study**

The literature highlights the importance of understanding the bilateral relationship between physical and mental health as well as aspects of acute stress disorder in pediatric trauma populations. Traumatic injury is extremely common amongst children and is the leading cause of death in children (Cunningham et al., 2018; Wong, 2007). We know that there are significant mental and emotional impacts for children suffering with chronic and acute illnesses such as acute stress disorder. Acute stress disorder has been found to be prevalent within the pediatric...
trauma population and can have lasting impacts on children (Daviss et al., 2000; Mazo et al., 2021; Meisser-Stedman et. al., 2005; Schauss et al., 2022). Integrated behavioral health can significantly benefit those with physical injuries to cope and recover. However, elements such as time management, resources, and proximity to care can be key barriers to children and families receiving mental health services immediately following their injuries (Bipartisan Policy Center, 2019; Diamond & Parker, 2022).

This study explores if there is a relationship between patient injury type and acute stress symptomatology. This information is imperative to gain a better understanding of how the type of traumatic injury specifically affects pediatric mental health. A salient amount of research exists on the development of acute stress disorder following an injury but there is a lack of research examining the specific symptoms of acute stress disorder in relation to injury type. Gaining an understanding of this relationship will allow mental health professionals to utilize a targeted approach and treat the most likely symptoms of specific traumatic injuries. This could include the development of standardized, evidence-based interventions specific to the patients’ needs based on their injury type and potential symptomology. Developing these standards may reduce the amount of time needed for mental health screening, decrease time needed with each patient, and increase the awareness and need of mental health services following an injury. This may also allow mental health professionals to better streamline the process of integrated mental health care by having a targeted treatment plan that is more accessible to medical professionals. Utilizing a targeted approach is essential to promoting patient well-being, increasing opportunities for collaboration, and maximizing the limited mental health resources available.

Chapter 3: Methodology

Overview of Methodology
**Study Design**

This study utilized a correlational field study design. Correlational field studies examine the relationships between two or more variables that are not manipulated or controlled by the experimenter and in their natural settings (Heath, 2017). A correlation is a statistical measure of the relationship between two variables and typically have three distinct outcomes: positive correlation, negative correlation, or no correlation (Urdan, 2017). Correlation coefficients are the numerical values assigned to correlations ranging from a -1.00, resulting in a negative correlation, to a 1.00, resulting in a positive correlation (Urdan, 2017). When there is a correlation coefficient of 0, there is no correlation between the two variables. A positive correlation means that both independent and dependent variables increase or decrease in unison (Urdan, 2017). While a negative correlation shows that as one variable increases, the other variable is declining, or the inverse is true. If the correlation coefficient is 0, then there is no relationship between the two variables and how they interact (Urdan, 2017). The strength of the correlation is determined by how close to 0 the correlation coefficient is (Urdan, 2017). A strong positive correlation would be +0.4 and above while a strong negative correlation would be -0.4 and below. The threshold for moderate positive correlations is +0.3 and for moderate negative correlations is -0.3. The threshold for weak positive correlations is +0.2 and for moderate negative correlations is -0.2. Negligible positive correlations are at +0.1 and negligible negative correlations are at -0.1 (Urdan, 2017).

Correlational field research studies are often used to understand the association, strength, and direction of the relationship between two variables in their real-life contexts (Heath, 2017). This allows researchers to explore the connections between the variables while identifying potential patterns in their relationship without manipulation (Heath, 2017). It was vital to explore
the genuine relationship for ecological validity and generalizability. This is often done through means of observation, polls, surveys, etc. (Heath, 2017). Although correlational research explores the relationship of these variables, it cannot establish causation amongst the variables (Heath, 2017). Correlational studies may also have an increased number of potential confounding variables that impact the relationship or change the interpretation of the results all together (Heath, 2017).

The correlational field study centers on collecting and interpreting data to explore the relationship between two variables in their natural environment and generalize its findings to groups of people to further understand a phenomenon (Heath, 2017). This method was the best fit for the current study because it effectively analyzed and examined the relationship between traumatic injury type, acute stress disorder symptomology, and other confounding variables. The goal of this study was to lay the foundation for the development of targeted treatment approaches for acute stress symptoms within collaborative health settings using traumatic injury types.

**Institutional Review Board**

The current study received approval from the Institutional Review Board (IRB) at The University of Tennessee Health Sciences prior to the collection of data on 2/1/2021 to run indefinitely. Expedited approval from The University of Memphis was granted on 1/23/2024. The approval from the IRB ensures that proper research protocols are adhered to, and all ethical and legal requirements are met. The studies protocols for participants’ rights, safety, and individual welfare have been thoroughly reviewed and accepted by the IRB. All informed data collection methods, protection measures, and the potential benefits and risks to participants have been specifically evaluated due to the nature of this study. The IRB holds a commitment to
safeguarding the well-being of those who participate in research studies and underscores my commitment to upholding ethical standards. All modifications to this study were promptly communicated to the IRB and waited for approval in compliance with the IRB’s established guidelines.

The IRB approval numbers are 21-08356-XP UM and PRO-FY2024-205.

Research Questions

The following study seeks to answer the following research questions:

1. Is there a relationship between pediatric traumatic injury type and acute stress symptomatology?
2. The age of the pediatric patient will impact the relationship between traumatic injury type and acute stress symptomology.
3. The gender of the pediatric patient will impact the relationship between traumatic injury type and acute stress symptomology.
4. The race of the pediatric patient will impact the relationship between traumatic injury type and acute stress symptomology.
5. The traumatic injury type will impact the overall number of acute stress disorder symptoms reported.
6. The gender of the patient will impact the overall number of acute stress disorder symptoms reported.
7. The age of the patient will impact the overall number of acute stress disorder symptoms reported.
8. The race of the patient will impact the overall number of acute stress disorder symptoms reported.
Participants

Participants consisted of all children and adolescents between 2-18 years of age who were treated within the trauma services division in a large urban pediatric hospital in the southeastern region of the US. Participants were either treated at the outpatient trauma clinic or admitted within the hospital due to the severity of their physical injuries. Participants received services between the dates of 2/1/2021 and 1/1/2024 when data was pulled for analyses. To minimize type 1 error, a minimum of ten cases was needed for every predictor variable present, therefore the minimum sample size would have needed to be 90 participants (Vittinghoff & McCulloch, 2007).

Procedures and Data Collection

Patient data was collected beginning 2/1/2021 at the launch of the program and data was pulled on 1/1/2024 for this study but will continue to be collected as a part of ongoing patient care. Data was collected from universal mental health screenings and counseling consultations of all trauma patients, without consideration of their injury type. Patients were subjected to mental health consultations as a new standard of care within a level one pediatric trauma institution. A team of clinical mental health graduate students and their supervisors conducted counseling consultation sessions for all patients admitted to trauma services. These patients were often seen during the first 24-48 hours of their hospitalization at the bedside or approximately one week after being discharged from medical care at the outpatient clinic. Immediate mental health consultations were given to ensure comprehensive data collection and provide immediate mental health support to patients and families in need.

Inpatient Consultations
Those on the clinical mental health team would provide comprehensive mental healthcare services at the patient’s bedside in conjunction with medical professionals. The mental health team would make their initial contact with patients and families at morning rounds where the entire trauma team would come together to discuss patient cases, introduce themselves for the day, and provide any updates on client care. The mental health team would introduce themselves and their roles within the comprehensive care team and return later that day for a counseling consultation. At the time of the consultation, the mental health team would gather demographics data from the patient and caregivers, administer the acute stress disorder screener (CSDC-SF), provide psychoeducation on mental health and acute stress, and provide additional mental health interventions as needed. Patients 5 and above who were physically and cognitively able to engage with the mental health team were asked the acute stress disorder screener and demographics questions directly. Caregivers were asked to complete the demographics questionnaire and acute stress screener for those ages 2-5 or patients who were unable to communicate. The reliability of the CSDC under patients’ caregiver report as well as nurse report has been demonstrated previously with moderate inter-rater reliability (r = .44) (Bosquet Enlow et al., 2010). For patients over the age of 2, interpretations of the acute stress screener were provided with psychoeducation surrounding the short- and long-term impacts of traumatic injury on pediatric mental health. The mental health team would utilize clinical judgement and client report to determine if further mental health intervention would be administered.

**Outpatient Consultations**

Mental health screening services were provided once a week at the trauma clinic and were conducted by the mental health team following the patient’s medical follow-up appointment. A follow-up appointment from medical discharge occurs within a week after the
initial hospitalization or emergency room visit; therefore, the patient is consulted well within the timeframe for a one-month acute stress disorder diagnosis. Outpatient consultations followed the same standardized format as an in-patient consultation but occurred within a restricted timeframe due to space and time constraints.

Regardless of patient screener results, all participants were given a handout with information on acute stress disorder signs and symptoms as well as information on free mental health counseling provided by the mental health team.

**Instruments**

**Demographics Questionnaire**

All participants have a demographic profile that is compiled from both patient hospital records as well as patient and caregiver reports. Demographic questions that are extracted from patient hospital records consist of basic information such as patient name, age, race, gender, zip code, insurance type, and traumatic injury type. Within the consultation session, patients and caregivers are asked if they have ever received counseling prior to this experience and if they would like to continue counseling services during or after their hospitalization. Inquiring about the patients’ and caregivers’ previous experiences in counseling provides insight into their access to mental healthcare, knowledge of mental health, and potential openness to counseling.

**Child Stress Disorder Checklist Short Form (CSDC-SF)**

The Child Stress Disorder Checklist Short Form (CSDC-SF) was adapted from the 36-item Child Stress Disorder Checklist (CSDC) (Saxe et al., 2003) to provide a valid, reliable, and brief measure of acute stress disorder symptomology for children ages 2 to 18 years old (Bosquet Enlow et al., 2010). This four-item measure is a self-report or caregiver report for pediatric populations that have suffered a traumatic medical event such as a burn, motor vehicle collision,
or fail to assess their potential for acute stress disorder (Bosquet Enlow et al., 2010). Each of the four items correspond to a symptom of acute stress disorder such as feelings of avoidance of things that remind them of the event, feelings of hypervigilance, negative mood or emotions surrounding the event, and somatic symptoms such as headaches or stomach when thinking of the event (Bosquet Enlow et al., 2010). Patients and caregivers would utilize a 3-point Likert scale of 0 meaning no symptoms were present, 1 meaning the statement was “somewhat true”, and 2 meaning the statement was “very true”; higher scores indicate higher levels of acute stress. A score of 1 indicates the presence of acute stress and has potential for post-traumatic stress in the following months. The CSDC-SF can be utilized for up to one month following the traumatic event to identify potential for acute stress.

The original 36-item Child Stress Disorder Checklist created by Saxe et al. (2003) was given to 84 children’s parents following either an acute burn or motor vehicle collision. An estimate of interrater reliability was established by administering the CSDC to the child’s principal nurse while in medical care. The measure was given only 2 days after the traumatic event and again at the 3-month mark to assess for potential post-traumatic stress symptoms. They found that higher number of symptoms endorsed 2 days following the traumatic event correlated to higher symptoms reported at the 3-month mark (Saxe et al., 2003). Instruments that have previously shown reliability and validity were utilized for convergent validity with the CSDC by correlating scores on both measures. Saxe et al. (2003) also found good concurrent validity and discriminant validity for the CSDC with other measures and the severity of the trauma, or the percentage of body area burned.

The CSDC-SF was created and validated by Bosquet Enlow and colleagues (2010) to address the need for a quick, reliable measure to identify if a child is struggling mentally after
experiencing a traumatic event. The CSDC-SF was found to have good psychometric properties and shown to be equal to the original, validated CSDC. The 4-item CSDC-SF scale was highly correlated with the short 36-item CSDC scale ($r_s =0.85$, $p<0.001$) and showed comparable predictive validity (.17, .29), concurrent validity (.29, .34), and discriminant validity (.15). Bosquet Enlow and colleagues (2010) found that both the CSDC-SF and CSDC had strong correlations to other validated measures that assess acute stress disorder symptoms and the potential for post-traumatic stress disorder.

Data Analysis

Measures

Data was encoded for the presence or non-presence of the four specific acute stress symptoms, the outcome variable, as binary variables (0 for No Symptoms, 1 for Symptoms). Categories for non-severe and severe experiences of the symptoms of acute stress disorder were collapsed into one variable under presence of symptoms. The symptoms were labeled as physical, startle, avoid, and mood. The control variables that were examined are age, gender, and race. Age is labeled as a continuous variable that ranges from 2-18 years old. Age is broken down further in table 1 into groups based on school levels from 2-10, 11-14, and 15-18. Gender is coded as a dichotomous variable that includes male and female; (0=Male, 1=Female). In previous research, age and gender have been shown to impact the relationship of reported acute stress disorder screener scores in pediatric populations (Schauss et al., 2022). The patient’s racial identity was coded as a binary of a person with a minority background and White/Non-Hispanic; (0= Person with a minority background; 1=White). Patients’ race was coded in this way due to the large discrepancy in proportions of patient races as well as understanding how children from minority backgrounds are impacted by acute stress disorder The breakdown of
racial and ethnic groups were as follows: African American/ Black 541, White 365, Hispanic 52, and Biracial/Multiracial 22. Patients previous counseling experience is coded as a binary of no previous counseling experience and previous counseling experience; (0=No Previous Counseling Experience; 1= Previous Counseling Experience). Due to the low amount of data for this data point, this variable was used for demographic purposes only to gain insight into patient’s needs. There was a total of 660 missing data surrounding the patient’s previous counseling experience.\(^1\) Patient’s insurance type was coded into a continuous variable consisting of private insurance, Medicaid, and uninsured; (1=Private Insurance, 2=Medicaid, 3= Uninsured). Patient’s insurance information was used for demographic purposes and to gain insight into the socioeconomic status and access to healthcare for patients. Patient injury type, the primary independent variable, was be coded as a nominal variable with the top five injuries sustained (Burns, Motor Vehicle Collisions, Falls, Violent Injuries, and ATV) and all other injury types were coded as a reference category.

**Correlation Matrix, Logistic Regressions, and Linear Regression**

The purpose of this study was to examine the relationship between specific symptoms of acute stress disorder (mood, physical, startle, avoid) and injury type within a cohort of pediatric trauma patients. A correlation matrix was utilized as a first step on the variables of interest to examine if there was a meaningful relationship between variables and if any variables have high rates of correlation. A correlation matrix was used to determine that the variables of interest did not have multicollinearity and therefore would not hinder the regression model (Urdan, 2017).

\(^1\) Obtaining information on patients’ previous counseling experience is primarily used for clinical context and not specifically for research purposes. This information is often gathered towards the end of a clinical session and may not be gathered due to time constraints, medical issues arising, or counselor error. This could account for why there is a large number of missing data for this variable.
Multicollinearity occurs when two or more variables of interest within a regression model are moderately or highly correlated (Urdan, 2017). Multicollinearity is detrimental to regression models as it can jeopardize the reliability of the model and interpreting the model accurately may be difficult (Urdan, 2017). Four logistic regression models were run to analyze the relationships further between those variables to assess whether the type of injury the patient sustained increased the probability of experiencing acute stress disorder symptoms. Utilizing a logistic regression on the variables of interest allowed for control of potential confounders that may have impacted the relationship between injury type (primary independent variable) and the outcome variable (symptomology). A logistic regression was used as each outcome variable was measured as a dichotomous variable (0 = No Symptoms, 1 = Symptoms). The relationship of total CSDC-SF score and all variables of interest were examined through a linear regression model. The program SPSS was utilized to analyze all data.

**Data Preparation**

Patient data was extracted from the REDcap data system where the data are stored. In this system, data are stored within the password-protected, online platform RedCap and all data was de-identified to protect patient confidentiality. Prior to conducting the analysis, data was pre-processed which will include cleaning the data and encoding the nominal variable “Injury Type” into the top five injuries reported within the data. The original data set included 5,245 cases that was made up of original patient profiles and duplicates if the patients were seen more than once. Duplicates were then removed which consisted of 2,766 cases, an additional 1,402 cases that did not have a CSDC-SF score, and 27 patients less than 2 years old and over 18; meaning these participants did not meet the criteria for the study. 1,050 cases were determined to be eligible for the current study before removing missing data. 46 cases were removed whose race was missing,
17 cases who were missing the type of injury that was sustained, 2 cases where the gender was missing, and 5 cases were patient’s injury type was “unknown”. The total number of eligible cases were 980 after removing missing data. Data collection has been handled carefully and thoroughly to minimize the absence of any data points and prevent biases. However, there is roughly 6.6% missing data from the eligible 1,050 cases. Previous counseling experience was removed from data analysis because of the large number of missing data which accounted for 660 missing data points for the 980 participants. In addition, insurance type was included as demographic information but not in analyses due to the large number of missing data; 674 out of the total 980 participants were missing insurance information.² The missing data has been analyzed to determine that the assumption of missing completely at random is not entirely satisfied as less than 5% of my total data value (Donner, 1982). Although, when examining the data for skewness, kurtosis, or other abnormalities, there are no issues with the distribution of the data within the analyses. The data set is large enough in number and has no issues with abnormality that utilizing listwise deletion for the small percentage (6.6%) of missing data is satisfactory (Urdan, 2017).

Chapter 4: Results

Participant Characteristics

The current study was comprised of 980 pediatric patients who received mental health services at a Level one trauma center in the Mid-South region of the United States as a new standard of care. Participants were comprised of 415 (42%) females and 565 (58%) males. 618

² Insurance information is collected after the session has occurred. At this time, counselors are finalizing the RedCap profiles and completing their clinical notes within the hospital system’s program. This missing data could be explained due to the hospital charts not being updated with the information or potential counselor error when finalizing the RedCap profile.
(63%) participants were people of color while as 362 (37%) participants were white and non-Hispanic. Participants’ ages ranged from 2 to 18 years old (M=9.92, SD=4.78); 518 (53%) participants were between the ages of 2-10, 222 (23%) were between the ages of 11-14, and 240 participants were between the ages of 15-18 (24%). 301 (31%) participants presented with a burn injury, 201 (21%) presented with traumatic injuries as a result of a motor vehicle collision, 109 (11%) presented with traumatic injuries as a result of a fall, 97 (10%) presented with traumatic injuries as a result of a violent event, 79 (8%) presented with traumatic injuries as a result of an ATV accident, and 193 (20%) presented with traumatic injuries as a result of other mechanisms. 612 (62%) participants endorsed one or more of the symptoms on the CSDC-SF, therefore met criteria to be diagnosed with acute stress disorder while 368 (38%) of participants did not endorse any symptoms. 163 (53%) participants were enrolled in Medicaid, 92 (30%) participants were enrolled in private insurance services, and 51 (17%) participants had no insurance coverage at the time of data collection. Lastly, 273 (85%) participants reported that they had no previous counseling experience prior to this study while 47 (5%) participants reported they have previous experience with counseling services. Please see Table 1 in Appendix for the participant demographics.

**Correlation Matrix**

A correlation matrix was conducted to explore the relationships among the variables of interest. The matrix (Table 2) presents Pearson correlation coefficients along the diagonal. The correlation matrix allowed determined that the variables of interest did not have multicollinearity and therefore would not hinder the regression model (Urdan, 2017). The highest correlated variables of interests are the negative relationship between other injuries and burns ($r = -0.33$) and
the negative relationship between burn and age ($r = -.30$). Both correlations are considered weak (Urdan, 2017). Please see Table 2 in Appendix for the correlation matrix results.

**Regression Models**

Four logistic regression models were conducted on the four outcome variables (CSDC-SF symptoms) and all other control variables (age, race, gender, injury type) with other injury type serving as the comparison group.

A logistic regression model was run to examine the relationship between injury type and reported somatic symptoms. Patients with motor vehicle collision injuries were significantly more likely to report somatic symptoms compared to those with other injury types ($b = .547, p = .045$). Female patients were significantly more likely to report somatic symptoms compared to non-female patients ($b = .587, p = .001$). Please see Table 3 in Appendix for the logistic regression results.

A logistic regression model was run to examine the relationship between injury type and reported avoidance symptoms. Patients with ATV injuries were significantly more likely to report avoidance symptoms compared to those with other injury types ($b = .540, p = .051$). Female patients were significantly more likely to report avoidance symptoms compared to Male patients ($b = .276, p = .041$). White patients were significantly less likely to report avoidance symptoms compared to patients with a minority background ($b = -.287, p = .049$). Please see Table 4 in Appendix for the logistic regression results.

A logistic regression model was run to examine the relationship between injury type and reported startle symptoms. Patients with burn injuries were significantly less likely to report startle symptoms compared to those with other injury types ($b = -.530, p = .034$). Female patients
were significantly more likely to report startle symptoms compared to Male patients \((b = .404, p = .012)\). White patients were significantly less likely to report startle symptoms compared to patients with a minority background \((b = -.375, p = .035)\). Please see Table 5 in Appendix for the logistic regression results.

A logistic regression model was run to examine the relationship between injury type and reported mood symptoms. Older patients were significantly more likely to report negative mood symptoms compared to younger patients \((b = .068, p = <.001)\). Female patients were significantly more likely to report negative mood symptoms compared to Male patients \((b = .468, p = <.001)\). White patients were significantly less likely to report startle symptoms compared to patients with a minority background \((b = -.422, p = .006)\). Please see Table 6 in Appendix for the logistic regression results.

**Linear Regression Model**

A linear regression model was run to examine the relationship between total CSDC-SF score and the control variables. The linear regression model revealed that older patients had significantly higher CSDC-SF total scores than younger patients \((b = .039, p = .002)\). Female patients had significantly higher CSDC-SF total scores than male patients \((b = .502, p = <.001)\). Those with violent injuries had significantly higher CSDC-SF total scores than patients with other injuries \((b = .045, p = .037)\). White patients had significantly lower CSDC-SF total scores than patients with a minority background \((b = -.341, p = .004)\). Please see Table 7 in Appendix for the linear regression results.

**Chapter 5: Discussion**

This study explores the relationship between pediatric trauma injuries and symptoms of acute stress disorder; it contributes to the literature by reporting on the various factors that
contribute to the mental and emotional distress pediatric patients experience following a traumatic injury. This is extremely vital information given the disproportionate number of children who experience traumatic injuries in the US (Goldstick et al., 2022).

Furthermore, this study examines the immediate emotional aftermath of a wide range of traumatic injuries, and it contains the largest number of participants to date in the US. The outcomes suggest that there are significant links between types of traumatic injury, demographics of the patients, and number of reported symptoms.

**Injury Type**

This study examines many research questions and hypotheses surrounding the relationship between pediatric trauma injury type and acute stress symptomology; the first of which is: Is there a relationship between pediatric traumatic injury type and acute stress symptomatology.

A positive significant relationship was found between motor vehicle collisions and patients reporting somatic symptoms ($b = .547, p = .045$); this means that patients who experienced motor vehicle collisions were more likely to report physical symptoms such as stomach aches, headaches, and shortness of breath than patients who have experienced other injuries. Literature has highlighted the major physical and fatal impacts that motor vehicle collisions have on pediatric patients (Cunningham et al., 2018). Although motor vehicle collisions are one of the leading causes of death in children and adolescents (Cunningham et al., 2018), very little research has been conducted on the specific symptoms within the pediatric population. Research has focused on the overall psychological impacts of injuries in this population, and motor vehicle collisions are often correlated with more severe emotional aftermath than other injuries (Daviss et al., 2000; Mazo et al., 2021; Meiser-Stedman et al., 2005;
Schauss et al., 2022). Widespread pain, including pain that impacts the spine, muscles, joints, and bones, and is often the result of many motor vehicle collisions due to the full body nature of the injuries (Bortsov et al., 2013). When adults who suffered a motor vehicle collision were studied, researchers found that musculoskeletal widespread pain had significant associations with depressive and somatic symptoms (Gane et al., 2018). They hypothesized that the presence of stress-induced hyperalgesia may contribute to heightened awareness of pain felt within the body (Gane et al., 2018). Perhaps it is the heightened awareness of the patients’ physical bodies following a widespread injury that led them to report more somatic symptoms than other injury types. In addition, traumatic brain injuries are likely to occur following a motor vehicle collision (CDC, n.d.). TBIs often lead to headaches, nausea, and fatigue that may be misidentified as a mental health symptom rather than a symptom from the TBI.

There was also a significant positive relationship between all-terrain vehicle (ATV) injuries and patients reporting symptoms of avoidance ($b = .540, p = .051$). Patients who experienced injuries from an ATV were more likely to experience feelings of avoidance surrounding things, places, or people when reminded of the incident. Similar to motor vehicle collisions, there is a large gap in information surrounding the specific aftermath of ATV accidents and even more so within pediatric populations. Although not as prevalent as motor vehicle collisions, a significant amount of ATV accidents occur each year and can cause great physical and financial burden on pediatric patients and their families (Ganga et al., 2023). These incidents mostly occur with children between the ages of 14 -17 years old, and injuries range from closed head injuries to more severe intracranial hemorrhages (Ganga et al., 2023). Children 9 and younger often experience these incidents at their home (Ganga et al., 2023). According to the Mississippi State Department of Health (n.d.), many ATV accidents and injuries are the
result of lack of safety precautions, such as not wearing a helmet or other safety gear. Many children will utilize ATVs without proper supervision or use ATVs that are not designed for children and adolescents (Mississippi State Department of Health, n.d.). Patients may be endorsing feelings of avoidance due to initially not understanding the risks that may occur when utilizing an ATV until after an incident occurs. Patients may not realize that safety precautions could have been taken to lessen their chances of an injury occurring and may now feel fearful of attempting to ride again. In addition, ATVs are largely recreation vehicles and may be more easily avoided than other injury types such as motor vehicle collisions.

Interestingly, patients who experienced burns were significantly less likely to report feelings of hypervigilance than patients who experienced other injuries ($b = -.530, p = .034$). This finding could be due to factors such as patients’ age and caregivers underreporting patient symptoms. Non-fatal burns typically occur in children under the age of 5 (Drago, 2005); for the current study, caregivers would be the primary report for children between the ages of 2-8. This is similar to the findings of Schauss and colleagues (2022) who found that patients within this age range reported the lowest mean scores of the CSDC-SF out of the three age range groups. Literature such Van Roy et al., (2010) and Kim et al., (2016) have identified that there are many factors that may contribute to parents underreporting mental health symptoms for their children. Van Roy and colleagues (2010) found that children often reported that they experienced more mental health symptoms than their parents reported and that parent-child relationships played a significant role in parents’ reporting. Kim et al., (2016) found that non-white ethnic groups reported high discrepancies of child depression and some reported significant discrepancies of suicidal feelings then their child reported. The researchers found that out of the 33 items on their chosen depression measure, parents underreported symptoms more than 70% of the time (Kim et
Additionally, in the current study, 85% of patients have no previous experience with a mental health counselor and therefore their caregivers may not have the tools to identify symptoms within their children.

A hypothesis the researcher made was that the traumatic injury type will impact the overall number of acute stress disorder symptoms reported. A significant positive relationship was found between the total scores of the CSDC-SF and patients who have experienced violent injuries such as stabbings, firearm injuries, assaults, and abuse ($b = .045, p = .037$). These findings are consistent with the literature that highlights the significant mental and emotional distress experienced following a violent injury (Alarcon et al., 2012; Schauss et al., 2022). Schauss et al. (2022) found that patients who experienced motor vehicle collisions and injuries due to the use of weapons report higher levels of acute stress disorder than those with other injuries. Alarcon et al. (2012) completed PTSD screenings at a trauma clinic and found that patients who had experienced assaults, whether it be blunt force or penetrating, reported the highest levels of PTSD symptoms. Further research explores how simple exposure to community violence can cause substantial emotional damage to children and adolescents (Borg et al., 2021). The researchers found that being exposed to violent situations, hearing gunshots in their community, and witnessing an arrest can lead to increased levels of depression and anxiety. These findings are especially salient within the large metropolitan community of this study; as community and gun violence are steadily increasing each year according to the Memphis Shelby Crime Commission (2023). In a study conducted by the BRAIN Center on pediatric firearm victims, they found that 56% of their injuries were a result of community violence and 37% of patients reported having adverse childhood experiences (Schauss et al., 2023). The increased
number of reported acute stress disorder symptoms surrounding violent injuries may also be compounded with these other environmental factors and exacerbating symptoms.

Although some statistical significance was found in the relationship of different variables, overall, the relationship between injury type and symptomology with the CSDC-SF screener is not predictive. Further research should be conducted to examine the relationship between traumatic injury type and specific symptomology with a more inclusive screening tool.

Age

An additional hypothesis was that the age of the pediatric patient will impact the relationship between traumatic injury type and acute stress symptomology. Older patients were significantly more likely to report feeling upset, sad, or angry following a traumatic event than their younger counterparts ($b = .068, p < .001$). This finding is consistent with previous literature that adolescents report higher levels of acute stress (Saxe et al., 2003; Schauss et al., 2022). Previous literature has found that adolescents are more likely to experience negative mood symptoms than younger children (Kessler et al., 2001). Research has also identified that adolescents are more likely to identify and express their feelings and emotions than younger children (Sharma et al., 2013). Adolescents can understand more abstract feelings surrounding a traumatic event and may experience more negative mood symptoms than their younger counterparts. It is likely that they have a greater understanding of the long-term implications of a traumatic injury than younger children may.

The current study also hypothesized that the age of the patient will impact the overall number of acute stress disorder symptoms reported. A significant positive relationship between patients’ age and CSDC-SF total score was found ($b = .039, p = .002$); patients who were older reported higher levels of acute stress than younger patients. In addition to having a better
understanding and ability to express their feelings (Sharma et al., 2013) adolescents are more likely to be exposed to more traumatic events than younger children (Finkelhor et al., 2008). They found that adolescents more often experience assaults, traumatic injuries, sexual assaults, maltreatment from family, and witnessing traumatic events occur to others outside of their immediate family. Finkelhor and colleagues (2008) also found that poly-victimization increased significantly after ages 6-9 for boys and after ages 10-13 for girls; this compounded victimization of older children may lead to higher levels of emotional distress following an injury. As previously stated, parent reporting may also play a factor in the underreporting of a younger patients’ symptoms as shown in previous research (Kim et al., 2016; Van Roy et al., 2010).

**Gender**

Exploring the next hypothesis, gender was shown to have a significant impact on the relationship between traumatic injury type and acute stress symptomology. Patients who identified as females were significantly more likely to report all four symptoms as opposed to their male counterparts. A significant positive relationship was found with reporting somatic symptoms ($b = .587$, $p = .001$), avoidance symptoms ($b = .276$, $p = .041$), startle symptoms ($b = .404$, $p = .012$), and mood symptoms ($b = .468$, $p = <.001$). In addition, the research hypothesis that the gender of the patient will impact the overall number of acute stress disorder symptoms reported was also found to be true. Patients who identified as female reported higher total acute stress disorder scores overall; a significant positive relationship was found between CSDC-SF score and female patients ($b = .502$, $p = <.001$).

These findings are consistent with previous literature that patients that identify as female report higher levels of acute stress (Saxe et al., 2003; Schauss et al., 2022). Previous literature such as Östberg et al. (2014) found that adolescents girls report overall higher levels of stress.
Östberg et al. utilized a mixed methods approach to examine both the physiological differences between boys’ and girls’ stress levels and self-reported stress levels. Östberg et al. (2014) found that girls had higher levels of cortisol than boys and reported higher levels of stress on the questionnaire used. In the study, both genders were given a semi-structured interview on the topic of “personal stress.” The participants in each group discussed stress similarly, but overall, there was shown to be a large gap in how the patients of each gender experienced stress (Östberg et al., 2014). Female patients are more deeply impacted by stress in everyday life; Östberg et al. (2014) found that during interviews, girls felt more pressure but lacked coping skills to deal with it compared to boys. The current study’s results and the literature suggest that there are differences in the way that patients who identify as female and those that identify as male experience and cope with stress. Female patients are likely experiencing more stress on average then male patients prior to the traumatic injury. This may compound the female patients’ experiences and lead to higher reports of symptoms. Another hypothesis is that female patients may not cope as effectively, and, therefore, they report higher levels of acute stress following an injury. Further research is needed to better understand the relationship between acute stress and gender.

Race

Lastly, the patient’s identification of being white or a patient with a minority background was found to have several significant relationships amongst the variables. White patients were significantly less likely to report avoidance symptoms ($b = -.287, p = .049$), startle symptoms ($b = -.375, p = .035$), and negative mood symptoms ($b = -.422, p = .006$). White patients were also significantly less likely to report higher scores on the CSDC-SF screener than patients with a minority background ($b = -.341, p = .004$).
Patients who identified as a person of color were significantly more likely to report 3 out of the 4 acute stress symptoms than their white counterparts and were significantly more likely to score higher on the total CSDC-SF screen; there are several factors that may contribute to this phenomenon. A plethora of research has identified that there are huge health disparities and disadvantages for patients with a minority background within the United States when seeking healthcare (O'Brien et al., 2020; Smitherman et al., 2021). People of color are less likely to receive mental health treatment than their white counterparts (Garland et al., 2005; Kataoka et al., 2002) and are more likely to experience poorer health outcomes (O'Brien et al., 2020).

Social determinants of health such as socioeconomic status, community environment, access to healthcare, and education are major factors in a person’s physical and mental wellbeing (WHO, 2024). Centuries of systemic racism has led to a variety of resource scarcity in communities of color, such as lack of funding for community services or schools, healthy food scarcity, and lack of transportation in predominately minority neighborhoods (Satcher, 2022). The effects of systemic racism has devastated communities of color and has left people of color at a higher risk for health-related issues. This became especially apparent during the COVID-19 pandemic, when African Americans and Hispanic people had the highest rates of mortality (Smitherman et al., 2021).

It is extremely important to understand the context and community in which this study takes place. In this study, the participants are comprised primarily of people of color (63%). 85% have never experienced counseling, 53% of patients receive TennCare/Medicaid, and 17% have no insurance coverage at all (see Table 1). TennCare is a health insurance program in the state of Tennessee that provides coverage to those with a lower socio-economic status and their children (Tennessee State Government, n.d.). To qualify for TennCare, one must sufficiently meet the
requirements for income and have a limited number of resources as defined by the state of Tennessee. These factors may contribute to this population being vastly underserved due to socioeconomic needs not being met. In addition, as previously stated, the communities within the area experience high levels of community violence (Shelby County Crime Commission, 2023). It is possible that many of the children within this study have experienced previous traumas, poverty, community violence, and systemic racism that leaves them especially susceptible to developing higher levels of emotional distress. These factors may be contributing to the overall mental health distress children of color are facing within this study in comparison to their white counterparts. Further research is needed to better understand the various factors that may contribute to patients with a minority background experiencing higher levels of acute stress.

**Implications**

**Counselors**

The findings of this study emphasize what previous literature has found; pediatric trauma patients are experiencing emotional distress almost immediately following a traumatic injury. While traumatic injuries disproportionately impact pediatric populations (Goldstick et al., 2022) there are little to no procedures in place to identify and treat children who are experiencing emotional distress. The findings indicate that advocating for integrated behavioral health is vital to providing mental health resources to severely underserved populations. Providing these mental health services immediately following a traumatic injury may reduce emotional distress and promote positive outcomes (Miller-Matero et al., 2016; Njoroge et al., 2016; Schauss et al., 2023). Identifying non-time intensive, adaptable, and culturally appropriate measurements to utilize within these settings should be prioritized as a first step in bridging the gap. Results indicate that there are populations that are more likely to be impacted by a traumatic injury than
others. Trauma patients who identify as female, people of color, and adolescents are at the highest risk for exhibiting high levels of acute stress. Counselors must understand the multicultural and socioeconomic implications that may exacerbate emotional distress following an injury for the patient and caregivers. Accessible evidence-based practices should be utilized to minimize the long-lasting impact of the trauma. Interventions such as mindfulness-based stress reduction (MBSR) and interpersonal social rhythm therapy (IPSRT) may be beneficial to patients who have experienced a physical injury.

Mindfulness based stress reduction (MBSR) is a mental health intervention that incorporates the connection of physical and mental aspects of oneself (Kabat-Zin, 1993). This can be achieved through a present focused approach while simultaneously accepting feelings, sensations, and thoughts in a non-judgmental manner. MBSR has been shown to have a positive impact on patients with mental health concerns (Tsang et al., 2012). The researchers found a significant difference in reported levels of pain between two groups of terminally ill cancer patients. It was found that the group who utilized MBSR reported lower levels of overall pain; it was thought to also be helpful in promoting hope and improving mood (Tsang et al., 2012).

Interpersonal Social Rhythm Therapy (IPSRT) is an evidence-based mental health intervention that was originally developed for patients with mood disorders, specifically bipolar disorder (Nusslock & Frank, 2012). Interventions in IPSRT primarily focus on psychoeducation of the client’s biological dysregulation and the impact of a dysregulated circadian rhythm. It can be used to manage stressful life events that interrupt a person’s normal routines and social rhythms (Goldstein et al., 2018). Due to the short-term and unexpected nature of hospitalizations from traumatic injuries, IPSRT can assist clients in managing mental health issues such as grief over social rhythms, regulating new and difficult routines, and stabilizing mood. Research has
highlighted that IPSRT improves overall functioning, the regulation of client’s moods, and an improvement in mental health related symptoms (Goldstein et al., 2018).

**Counselor educators**

Counselor educators are the linchpin for the advancement and development of the counseling profession. This is highlighted through the CACREP core value “advancing the counseling profession through quality and excellence in counselor education” (CACREP, 2021). As a continuous stream of research surfaces on the importance of collaborative healthcare, counselor educators must advocate for the profession through occupying spaces, preparing future counselors for collaborative care, and promoting scholarship.

It is critical for counselor educators to empower future counselors to occupy healthcare spaces that mental health has been excluded from previously. Counselors rarely occupy positions within healthcare industries such as primary care offices, hospitals, and other outpatient clinics, despite various research promoting collaborative healthcare (Aarons et al., 2008). This begins with training a holistic approach to mental health counseling, understanding the cyclical relationship between physical and mental health, and lobbying for a healthcare identity. Counselor educators should adequately prepare future counselors to work within teams of different professions to best serve their clients. This could entail collaborations with other majors to gain perspective into their process and how counselors could be incorporated. Additionally, counseling programs should integrate physiological aspects of clients’ lives into the classroom experience; understanding a client should not begin and end with their mental health challenges. Interventions that are adaptable should be highlighted and unique settings should be chosen to prepare future counselors to thrive in healthcare environments. Lastly, lobbying for mental health counselors to occupy these spaces and be seen as healthcare professionals by others. Counselor
educators should utilize their voices within the healthcare community to promote the integration of mental health. Training a workforce of mental health counselors who are well equipped to transition into healthcare settings and use adaptive interventions could mean reaching an extremely underserved population. As counselor educators, social justice and leadership values are the core of who we are and what we want to instill in future counselors (CACREP, 2021).

**Limitations and future research**

There are several limitations to the current study. Firstly, the lack of consistency when collecting and reporting data. Data has been collected over the last three years utilizing a variety of mental health counseling students. This could be a potential factor in the inconsistency of demographic questions being asked and entered within the Redcap system. Also, due to the nature of a patient’s injury or physical circumstances, some data may not have been available for the counselors to collect. Some severe injuries, such as one that results in a patient becoming incapacitated, unable to communicate, or not clinically appropriate, resulted in data not being collected for those patients. This could potentially mean missing data collection on groups of patients who are experiencing some of the most severe injuries. In addition, there is a potential for underreporting of symptoms for patients under the age of eight due to caregiver reporting being potentially inaccurate. A major limitation of this study is the measurement used leaves a wide range of symptomology uninvestigated due to the short nature of the screener tool. The use of the four question CSDC-SF is strategic due to the fast-paced nature of inpatient settings but does not account for a variety of symptoms a patient might experience. Despite these limitations, the current study provides insights into the factors that may contribute to acute stress following a pediatric trauma injury.
Future research should focus on the development of measurements and exploring outcomes of pediatric patients who receive mental health counseling. A large barrier of integrating mental health care is the time needed to screen and provide services to patients (Diamond & Parker, 2022), having targeted interventions would likely minimize the time needed for screening and treatment. Time constraints have led to the use of different screening tools such as the CSDC-SF used within this study. Although the CSDC-SF is brief and useful for identifying acute stress, it does not account for many other factors. In addition, it leaves some room for error and personal interpretation from caregivers of children under eight. The development of a measurement that is brief, encompassing, and accessible could change the way collaborative healthcare is conducted. Next, collaborative healthcare in acute trauma settings is extremely rare and little research exists on the potential effects. Future research should focus on tracking both short- and long-term outcomes within the patients’ and caregivers’ mental health. Understanding what interventions and approaches are most beneficial to the patients allows for better training of counselors to work within this unique setting. Research demonstrating the positive outcomes and potential benefits for both patients and healthcare systems may lead to future support for collaborative care.

Conclusion

The focus of this study was to potentially target patients with specific injuries by the mental health symptoms they would most likely be experiencing. Although, the findings of this study did not find a predictive relationship with all injury types, it did support that mental health treatment for pediatric trauma populations are very much needed. The findings highlight the importance of treating each patient holistically and individually. A staggering 62% of patients met the criteria for acute stress disorder and the majority (70%) have limited to no access to
mental health services. Counselors located within places that serve the community, such as hospitals, allows for more accessible mental health to both counselor and client. Female patients, adolescents, and people of color experienced the most mental health distress alongside patients who experienced violent injuries. Counselors need to be prepared to address psychological distress following a traumatic injury alongside medical professionals. Counselor educators should continue to further the scholarship surrounding the benefits of collaborative healthcare and counselors’ roles within the larger system.
References


World Health Organization. (2024). *Social Determinants of Health*. https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1

Appendix

Table 1. Sample Descriptive Statistics \((N = 980)\)

<table>
<thead>
<tr>
<th>Sample Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>415</td>
<td>42%</td>
<td>0-1</td>
</tr>
<tr>
<td>Male</td>
<td>565</td>
<td>58%</td>
<td>0-1</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Person with a minority background</td>
<td>618</td>
<td>63%</td>
<td>0-1</td>
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<tr>
<td>White/Non-Hispanic</td>
<td>362</td>
<td>37%</td>
<td>0-1</td>
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<tr>
<td><strong>Age</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2-10</td>
<td>518</td>
<td>53%</td>
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</tr>
<tr>
<td>11-14</td>
<td>222</td>
<td>23%</td>
<td>0-1</td>
</tr>
<tr>
<td>15-18</td>
<td>240</td>
<td>24%</td>
<td>0-1</td>
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<tr>
<td><strong>Injury Type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burn</td>
<td>301</td>
<td>31%</td>
<td>0-1</td>
</tr>
<tr>
<td>Motor Vehicle Collision</td>
<td>201</td>
<td>21%</td>
<td>0-1</td>
</tr>
<tr>
<td>Fall</td>
<td>109</td>
<td>11%</td>
<td>0-1</td>
</tr>
<tr>
<td>Violent Injury</td>
<td>97</td>
<td>10%</td>
<td>0-1</td>
</tr>
<tr>
<td>ATV</td>
<td>79</td>
<td>8%</td>
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</tr>
<tr>
<td>Other Injuries</td>
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</tr>
<tr>
<td><strong>CSDC-SF Score</strong></td>
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<td></td>
</tr>
<tr>
<td>Did Not Meet Diagnostic Criteria</td>
<td>368</td>
<td>38%</td>
<td>0-1</td>
</tr>
<tr>
<td>Meets Diagnostic Criteria</td>
<td>612</td>
<td>62%</td>
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<td><strong>Insurance Type</strong></td>
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<tr>
<td>Private Insurance</td>
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</tr>
<tr>
<td>Medicaid</td>
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<tr>
<td>No Insurance</td>
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<tr>
<td><strong>Previous Counseling Experience</strong></td>
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<tr>
<td>Has Had Previous Experience</td>
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<tr>
<td>No Previous Experience</td>
<td>273</td>
<td>85%</td>
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</tr>
<tr>
<td></td>
<td>Age</td>
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</tr>
<tr>
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<td>--------</td>
</tr>
<tr>
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<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.09*</td>
<td>0.03</td>
<td>1</td>
</tr>
<tr>
<td>Burn</td>
<td>0.30*</td>
<td>0.17**</td>
<td>0.08*</td>
</tr>
<tr>
<td>Vehicle</td>
<td>0.15*</td>
<td>-0.05</td>
<td>0.09**</td>
</tr>
<tr>
<td>Fall</td>
<td>0.15*</td>
<td>0.17**</td>
<td>0.03</td>
</tr>
<tr>
<td>Violent</td>
<td>0.17*</td>
<td>-</td>
<td>-0.11**</td>
</tr>
<tr>
<td>ATV</td>
<td>0.14*</td>
<td>0.20**</td>
<td>-0.03</td>
</tr>
<tr>
<td>Other</td>
<td>0.08*</td>
<td>0.09**</td>
<td>-0.11**</td>
</tr>
<tr>
<td>Physical</td>
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<td>0.03</td>
<td>0.10**</td>
</tr>
<tr>
<td>Avoid</td>
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<td>-0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Startle</td>
<td>0.04</td>
<td>-0.07*</td>
<td>0.07*</td>
</tr>
<tr>
<td>Mood</td>
<td>0.15*</td>
<td>-0.08*</td>
<td>0.09**</td>
</tr>
<tr>
<td>Total</td>
<td>0.13*</td>
<td>-</td>
<td>0.12**</td>
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</table>

Note. ** Correlation is significant at the 0.01 level, * Correlation is significant at the 0.05 level
Table 3. Logistic Regression Predicting Somatic Symptoms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient (b)</th>
<th>SE</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.001</td>
<td>0.02</td>
<td>0.957</td>
</tr>
<tr>
<td>Female</td>
<td>0.587</td>
<td>0.184</td>
<td>.001**</td>
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<tr>
<td>White</td>
<td>0.133</td>
<td>0.196</td>
<td>0.496</td>
</tr>
<tr>
<td>Burn*</td>
<td>-0.462</td>
<td>0.296</td>
<td>0.63</td>
</tr>
<tr>
<td>Vehicle Collision*</td>
<td>0.547</td>
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<td>.045*</td>
</tr>
<tr>
<td>Fall*</td>
<td>0.016</td>
<td>0.345</td>
<td>0.964</td>
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<tr>
<td>Violent Injury*</td>
<td>0.016</td>
<td>0.341</td>
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<tr>
<td>ATV*</td>
<td>0.126</td>
<td>0.373</td>
<td>0.735</td>
</tr>
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</table>

Note. *** p < .001, **p < .01, *p < .05
*Other Injuries
Log Likelihood = 818.541
Cox & Snell R Square = .030
Nagelkerke R Square = .051

Table 4. Logistic Regression Predicting Avoidance Symptoms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient (b)</th>
<th>SE</th>
<th>p-value</th>
</tr>
</thead>
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<td>0.077</td>
</tr>
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<tr>
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<td>-0.287</td>
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<td>0.49*</td>
</tr>
<tr>
<td>Burn*</td>
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<td>Vehicle Collision*</td>
<td>0.387</td>
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<td>0.358</td>
<td>0.252</td>
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<tr>
<td>Violent Injury*</td>
<td>0.370</td>
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<td>0.153</td>
</tr>
<tr>
<td>ATV*</td>
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<td>0.277</td>
<td>0.051*</td>
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</tbody>
</table>

Note. *** p < .001, **p < .01, *p < .05
*Other Injuries
Log Likelihood = 1313.071
Cox & Snell R Square = .020
Nagelkerke R Square = .026
### Table 5. Logistic Regression Predicting Startle Symptoms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient (b)</th>
<th>SE</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.007</td>
<td>0.018</td>
<td>0.691</td>
</tr>
<tr>
<td>Female</td>
<td>0.404</td>
<td>0.161</td>
<td>0.012**</td>
</tr>
<tr>
<td>White</td>
<td>-0.375</td>
<td>0.177</td>
<td>0.035*</td>
</tr>
<tr>
<td>Burn(^a)</td>
<td>-0.530</td>
<td>0.249</td>
<td>0.034*</td>
</tr>
<tr>
<td>Vehicle Collision(^a)</td>
<td>0.231</td>
<td>0.242</td>
<td>0.339</td>
</tr>
<tr>
<td>Fall(^a)</td>
<td>-0.100</td>
<td>0.304</td>
<td>0.743</td>
</tr>
<tr>
<td>Violent Injury(^a)</td>
<td>0.531</td>
<td>0.288</td>
<td>0.065</td>
</tr>
<tr>
<td>ATV(^a)</td>
<td>0.251</td>
<td>0.324</td>
<td>0.437</td>
</tr>
</tbody>
</table>

Note. *** p < .001, ** p < .01, * p < .05

\(^a\)Other Injuries

Log Likelihood = 1007.785

Cox & Snell R Square = .029

Nagelkerke R Square = .044

---

### Table 6. Logistic Regression Predicting Mood Symptoms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient (b)</th>
<th>SE</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.068</td>
<td>0.016</td>
<td>&lt;.001***</td>
</tr>
<tr>
<td>Female</td>
<td>0.468</td>
<td>0.142</td>
<td>&lt;.001***</td>
</tr>
<tr>
<td>White</td>
<td>-0.422</td>
<td>0.154</td>
<td>0.006**</td>
</tr>
<tr>
<td>Burn(^a)</td>
<td>-0.251</td>
<td>0.210</td>
<td>0.233</td>
</tr>
<tr>
<td>Vehicle Collision(^a)</td>
<td>0.192</td>
<td>0.214</td>
<td>.371</td>
</tr>
<tr>
<td>Fall(^a)</td>
<td>-0.021</td>
<td>0.266</td>
<td>0.936</td>
</tr>
<tr>
<td>Violent Injury(^a)</td>
<td>-0.040</td>
<td>0.266</td>
<td>0.879</td>
</tr>
<tr>
<td>ATV(^a)</td>
<td>-0.224</td>
<td>0.296</td>
<td>0.450</td>
</tr>
</tbody>
</table>

Note. *** p < .001, ** p < .01, * p < .05

\(^a\)Other Injuries

Log Likelihood = 1217.592

Cox & Snell R Square = .049

Nagelkerke R Square = .067
Table 7. Linear Regression on Total CSDC-SF Score

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient (b)</th>
<th>SE</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.039</td>
<td>0.012</td>
<td>.002**</td>
</tr>
<tr>
<td>White</td>
<td>-0.341</td>
<td>0.119</td>
<td>.004**</td>
</tr>
<tr>
<td>Female</td>
<td>0.502</td>
<td>0.111</td>
<td>&lt; .001***</td>
</tr>
<tr>
<td>Burn(^a)</td>
<td>-0.202</td>
<td>0.164</td>
<td>0.218</td>
</tr>
<tr>
<td>Vehicle Collision(^a)</td>
<td>0.311</td>
<td>0.173</td>
<td>0.072</td>
</tr>
<tr>
<td>Fall(^a)</td>
<td>-0.007</td>
<td>0.207</td>
<td>0.975</td>
</tr>
<tr>
<td>Violent Injury(^a)</td>
<td>0.45</td>
<td>0.215</td>
<td>.037*</td>
</tr>
<tr>
<td>ATV(^a)</td>
<td>0.171</td>
<td>0.228</td>
<td>0.452</td>
</tr>
</tbody>
</table>

Note. *** p < .001, **p < .01, *p < .05

\(^a\)Other Injuries
R=.249
R Square =.062
Adjusted R Square = .054