2023

Posttraumatic Stress Disorder in Registered Nurses During the Covid-19 Pandemic

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POSTTRAUMATIC STRESS DISORDER IN REGISTERED NURSES DURING THE COVID-19 PANDEMIC

A MASTER'S THESIS SUBMITTED TO THE GRADUATE FACULTY

GRADUATE SCHOOL BETHEL UNIVERSITY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTERS OF SCIENCE IN PHYSICIAN ASSISTANT

MAY 2023

ABSTRACT

Posttraumatic stress disorder (PTSD) is a mental health illness that has become an increasing concern during the COVID-19 pandemic. Individuals suffering from PTSD are more likely to suffer from suicidal ideation, suicidal attempts, and death by suicide. Due to the recency of the COVID-19 pandemic, the research conducted on PTSD in nurses from the pandemic is limited. The PTSD checklist for DSM-5 (PCL-5) was distributed to Minnesota Nurses Association (MNA) and Faith Community Nurse Network of the Greater Twin Cities (FCNNTC). Additionally, participants filled out what field of medicine they worked in and their perceived emotional burden from working during the pandemic. Out of 2,634 registered nurses (RNs), 42.14% met diagnostic criteria for probable PTSD. There was no statistically significant difference in prevalence of probable PTSD between medical fields except for a lower than expected prevalence of probable PTSD in the "all other" category. Those who met diagnostic criteria for probable PTSD had significantly higher levels of emotional burden from the pandemic, while those who did not meet criteria for probable PTSD had significantly lower levels of emotional burden from the pandemic. In conclusion, the data suggests the COVID-19 pandemic may have played a role in the psychological health of nurses.

ACKNOWLEDGEMENTS

We would like to thank Bethel University and Christy Hanson, our PA program director, for making this research project possible. A special thanks to Tammie Haveman, research advisor; Angela Whitely, committee chair; Cynthia Goetz, for guiding our research project, as well as providing encouragement and support.

Thank you to Donald Hopper for his help with statistical techniques; to Noah Gritters for his help with Qualtrics and statistical analysis.

A special thanks to Geri Katz, manager of Practice, Education, and Special Projects at Minnesota Nursing Association (MNA) for allowing MNA nurses to participate in our research project. We also thank Abby Jensen, executive director of Faith Community Nurse Network of the Greater Twin Cities (FCNNTC), for allowing FCNNTC nurses to participate in our research project. Finally, thank you to Emily Allen and Molly Que for being a part of our team as well.

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Chapter 1: Introduction

Introduction

The COVID-19 pandemic has caused many challenges for healthcare workers, including staff shortages, tiring and stressful shifts, prolonged use of personal protective equipment, and poor psychological outcomes (d'Ettore et al., 2021). Healthcare providers were put in positions where patients in advanced critical stages of COVID-19 could not receive treatment due to limited respirators or room availability. This lack of resources forced healthcare workers into ethical dilemmas which required them to make difficult decisions. In addition, there was, and still is, a lack of knowledge surrounding the virus, making it challenging to know how to prevent and treat the virus (Zheng et al., 2020). There was also a shortage of staff and an increasing number of patients who needed care. The changing treatment regimens as well as vaccine hesitancy only added more stress. When combined together, these factors have resulted in an increased burden on healthcare workers. Nurses in particular have been highly susceptible to poor psychological outcomes while working during the COVID-19 pandemic, which is likely due to nurses having more contact with their patients (Chen et al., 2021).

There is evidence that disease outbreaks in general have been associated with increased incidence of mental health conditions, specifically posttraumatic stress disorder (PTSD) (d'Ettore et al., 2021). Posttraumatic stress disorder is a chronic and often debilitating mental health disorder. It is a psychological and physiological response to at least one traumatic event and manifests in many ways such as sleep disturbances, flashbacks, avoidance of triggers, mood instability, and intrusive thoughts (Stein & Norman, 2021). These symptoms result in an impaired ability to engage in daily activities (Stein & Norman, 2021).

Chapter one will include a summary of PTSD in healthcare workers and nurses during the COVID-19 pandemic. It will also cover the purpose and significance of this study. The goal of this project is to increase knowledge surrounding the psychological effects of the COVID-19 pandemic in nurses.

Background

Research has shown PTSD was common among nurses and healthcare providers even before the COVID-19 pandemic (d'Ettore et al., 2021, Jacobowitz et al., 2012, Luftman et al., 2017, Mealer et al., 2009). Prior to the pandemic, one study found 33% of healthcare workers who worked in high stress areas of medicine were positive for PTSD, including paramedics, nurses, trauma surgeons, emergency medicine physicians, and residents (Luftman et al., 2017). When assessing nurses specifically, three different studies found a range of 12 to 28.4% of nurses positive for probable PTSD prior to the pandemic (Laposa et al., 2003, Mealer et al., 2009, Rodney et al., 2021). According to Rodriguez et al. (2019), the incidence of PTSD increased after the death of a patient or after conflict with a patient and their family (Rodriguez et al., 2019).

The studies addressing PTSD in healthcare workers during the COVID-19 pandemic found varying rates of participants with PTSD or psychological symptoms that could lead to PTSD (Chen et al., 2020, d'Ettore et al., 2021, Li et al., 2021, Moradi et al., 2020, Shahrour & Dardas, 2020). For example, a systematic review of studies performed on posttraumatic stress symptoms (PTSS) in healthcare workers during the pandemic found a prevalence range of 2.1% to 73.4% (d'Ettore et al., 2021). Chen et al. (2020) stated multiple studies have shown evidence of the toll COVID-19 has taken on healthcare workers, as more than 40% of providers reported

anxiety, 45% reported depression, 32% reported insomnia, and 69% had high levels of stress (Chen et al., 2020).

Although there is limited research done on the prevalence of PTSD in U.S. nurses during the pandemic, various studies have been conducted in different countries. Shahrour and Dardas (2020) stated that nurses in particular were vulnerable to experiencing psychological distress during the COVID-19 pandemic, as they found 65% of Jordanian nurses were experiencing acute stress disorder (Shahrour and Dardas, 2020). Additionally, 39.88% of nurses in Italy who worked during the pandemic met diagnostic criteria for provisional PTSD (Marcomini et al., 2021). Other studies assessed what percent of nurses had PTSD symptoms rather than who met diagnostic criteria for PTSD. For example, Jiang et al (2021) found 88.19% of nurses in China were experiencing mild late onset PTSD symptoms during the pandemic, while Heesakkers et al. (2020) found 22.2% of Dutch ICU nurses had PTSD symptoms. Some of the risk factors for developing PTSD during the pandemic were young age, low work experience, female gender, not living with a partner, and lack of training (d'Ettore et al., 2021). In addition, Chen et al. (2020) found many nurses were experiencing difficulty sleeping, fear of a disaster in the future, anxiety, irritation, and anger (Chen et al., 2020).

A qualitative study described the main challenges nurses experienced during the pandemic, which included poor organizational support, shortage of personal protective equipment, the uncertainty of the virus, physical exhaustion, and psychological turmoil (Moradi et al., 2020). This was evidenced by nurses' desire to leave the profession, as 28.5% of intensive care unit (ICU) nurses considered leaving their job, and 58.7% reported the pandemic was having a negative impact on their life (Heesakkers et al. (2020).

Due to the recency of the COVID-19 pandemic, the research conducted on PTSD in nurses during the pandemic is limited. Many of the studies focus on small, specific populations of nurses from different countries (Heesakkers et al., 2020, Jiang et al., 2021, Shahrour & Dardas, 2020, Zhou et al., 2021). Thus, there is limited data surrounding prevalence of PTSD in the context of the COVID-19 pandemic in U.S. nurses.

Problem Statement

Posttraumatic stress disorder is a mental health illness that has become an increasing concern during the COVID-19 pandemic in healthcare workers (Chen et al., d'Ettore et al., 2021, 2020, Li et al., 2021, Shahrour & Dardas, 2020). This illness can have detrimental effects on healthcare workers, including declining mental health, low motivation, and reduced ability to engage with patients (d'Ettore et al., 2021). Registered nurses (RNs) have been on the front lines caring for COVID-19 patients, potentially putting them at a higher risk for PTSD. Limited knowledge exists regarding the scope of PTSD among U.S. nurses from the pandemic. Gaining a better understanding of this topic would be helpful in planning for future interventions.

Purpose of Research

The purpose of research is to better understand the current prevalence of probable PTSD in U.S. RNs who have worked during the COVID-19 pandemic.

Significance of Research

The research will obtain data that is relevant to healthcare systems, nursing unions, and all nurses who have worked during the COVID-19 pandemic. Those suffering from PTSD are at a higher risk of suicidal ideation and suicidal attempts and often do not seek care due to lack of knowledge regarding the topic, the stigma surrounding mental health, or the belief that

symptoms may decrease with time (d'Ettore et al., 2021). This research will allow healthcare organizations to gather information and implement ways to better serve their healthcare workers.

Research Questions

1. What is the prevalence of probable PTSD in U.S. RNs who have worked during the COVID-19 pandemic?
2. Is there a relationship between the prevalence of probable PTSD and specific fields of medicine RNs worked in during the COVID-19 pandemic?
3. Is there a relationship between the prevalence of probable PTSD and reports of perceived emotional burden from working during the pandemic?

Definition of terms:

PTSD: "Posttraumatic stress disorder is a psychiatric disorder that may occur in people who have experienced or witnessed a traumatic event such as a natural disaster, a serious accident, a terrorist act, war/combat, or rape or who have been threatened with death, sexual violence or serious injury" (American Psychiatric Association, 2020).

COVID-19: "Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus" (World Health Organization, 2021).

Triggers: "Posttraumatic stress disorder triggers are everyday stimuli which cause a person to re-experience the traumatic event as if it were reoccurring in the present or experience symptoms related to the stressful event. These symptoms might include strong feelings, memories, or emotions" (Trauma Practice, 2021).

Flashback: "Flashbacks are an occurrence in which the person feels as though they are re-living the traumatic experience or seeing it before their eyes" (American Psychiatric Association, 2020).

Burnout Syndrome: “Burnout is a response to chronic emotional stress occurring in the workplace. Burnout syndrome involves exhaustion, cynical feelings towards work and perceptions of being incompetent in work” (Costa et al., 2012).

Conclusion

Posttraumatic stress disorder is one of the problems facing healthcare workers and nurses as a result of the COVID-19 pandemic (Chen et al., 2021, d’Ettore et al., 2021, Jiang et al., 2021, Li et al., 2021, Marcomini et al., 2021, Mealer et al., 2009, Shahrour and Dardas, 2020). Current research on the prevalence of PTSD in nurses during the COVID-19 pandemic is minimal and focuses on small populations of nurses in other countries (Heesakkers et al., 2020, Jiang et al., 2021, Shahrour & Dardas, 2020, Zhou et al., 2021). The purpose of this study is to better understand the current prevalence of probable PTSD in a large population of U.S. RNs. This information is important as it will allow medical organizations to determine the psychological state of nurses working during the COVID-19 pandemic, identify struggling nurses, and provide employees or members with resources to treat PTSD. Chapter two will include the criteria needed to make a probable diagnosis of PTSD, as well as available treatment options for PTSD. The current research surrounding PTSD in healthcare workers and nurses working before and during the pandemic will also be discussed in full detail.

Chapter 2: Literature Review

Introduction

Posttraumatic stress disorder is a mental health illness that has become an increasing concern during the COVID-19 pandemic in healthcare workers (d'Ettore et al., 2021). Research has shown healthcare workers who were working directly with patients who had COVID-19 were two to three times more likely to have high PTSS than those not exposed (d'Ettore et al., 2021). It is evident the COVID-19 pandemic has had a psychological impact on both healthcare systems and healthcare workers (d'Ettore et al., 2021). The purpose of this study is to assess the prevalence of probable PTSD in RNs who have worked during the COVID-19 pandemic. The results obtained will present current data that is relevant to healthcare organizations, nursing unions, and nurses who have worked during the pandemic. The purpose of this chapter is to discuss the current body of information surrounding PTSD in healthcare workers and nurses working before and during the COVID-19 pandemic and identify where further research is needed. In addition to this, current diagnostic criteria and treatment options for PTSD will be discussed.

Posttraumatic Stress Disorder Criteria

Posttraumatic stress disorder is a mental health disorder that is chronic and often debilitating. It is a psychological and physiological response to at least one traumatic event and manifests in many ways such as sleep disturbances, flashbacks, avoidance of triggers, mood instability, and intrusive thoughts (Stein & Norman, 2021). This results in an impaired ability to engage in day to day activities (Stein & Norman, 2021). For a proper diagnosis of PTSD, a person must have experienced threatened death, the death of others, sexual abuse, or severe injury either directly, as a witness, through repeated exposure, or hearing the violent details of

such events through a family member or friend (Sareen, 2021). If someone fits into one of these categories, their trauma must manifest in one or more of the following ways: dreams about traumatic event, psychological and physiological reactions to internal and external stimuli that represent or symbolize part of the trauma, flashbacks in which the individual relives or acts as though they are in their past trauma, or involuntary, frequently recurring responses to distressing memories (Sareen, 2021). The criteria for PTSD also states that individuals will use avoidance approaches such as avoiding triggers, thinking about trauma, and locations, persons, or things associated with the trauma (Sareen, 2021).

Individuals diagnosed with PTSD will have at least two marked negative cognitive effects such as an inability to remember parts of the trauma due to distortive cognition, a negative change of thought about the world, others, or themselves, a distortion of understanding an event that leads to self-blame, persistent negative emotions such as anger, fear, and horror, or the inability to enjoy life and experience positive emotions, and feeling estranged from others (Sareen, 2021). Along with this, individuals will also have a notable change in arousal and reactivity such as difficulty with sleep, angry outbursts for no apparent reason, increased startle reflex, hypervigilance, engagement in behaviors considered reckless or self-harming, and difficulty focusing (Sareen, 2021). Finally, all of the criteria listed above must have persisted for over one month, interfered substantially with relationships, socialization, and work, and must not be due to medications or substance abuse (Sareen, 2021).

Posttraumatic Stress Disorder in Healthcare Workers Before the COVID-19 Pandemic

In a study conducted by Luftman et al. (2017), data was collected from multiple healthcare providers such as paramedics, nurses, trauma surgeons, emergency medicine physicians, and residents. The prevalence of PTSD in hospital and prehospital providers was

analyzed by sending an altered version of the Primary Care PTSD test to providers in the Trauma Regional Advisory Council. In order to test positive for PTSD, three or more of the four questions had to be answered affirmatively. Less than three affirmative answers resulted in testing negative for PTSD. The survey questionnaire was filled out by 546 providers, with 180 (33%) testing positive for PTSD and 366 (67%) testing negative (Luftman et al., 2017). The data showed no significant difference in prevalence among sex categories, region, and age. However, there was a significant difference in prevalence between prehospital providers such as paramedics (42%) in comparison to hospital providers (21%) (Luftman et al., 2017). Of all 546 providers that participated, only 55% were aware of what PTSD was and only 13% had sought out treatment to help with symptoms (Luftman et al., 2017).

Robertson and Perry (2010) conducted a systematic review of nine different studies involving PTSD in institutionally based healthcare workers. The studies involved several different designs that included cross-sectional, longitudinal, prospective and retrospective designs, and quantitative measures were used in all studies (Robertson & Perry, 2010). Five of the nine studies looked at PTSD in disaster response and physical or verbal abuse in healthcare workers, while the other four studies looked at institutionally based health care workers' prevalence of PTSD in routine health care (Robertson & Perry, 2010). Of the five studies that looked at disaster and physical/verbal abuse, PTSD incidence ranged from 9-19.3% depending on the study (Robertson & Perry, 2010). Of the four studies that looked at standard care, anywhere from 0-29% of participants fully met qualification for PTSD depending on the study (Robertson & Perry, 2010).

Furthermore, Spencer et al. (2019) conducted a study that researched PTSD prevalence and debriefing amongst providers, nurses, and healthcare assistants who experienced an in-

hospital cardiac arrest (IHCA). A 33 question survey was filled out by 414 employees from a district general hospital. Seventy-five percent of the respondents had participated in an IHCA. Nine percent of those who filled out the survey received a positive score for PTSD (Spencer et al., 2019). Debriefing after a code was not very common and only 17.6% of participants had ever participated in a debrief (Spencer et al., 2019). While debriefing did not seem related to the prevalence of PTSD, the majority of those who had experienced a post IHCA debriefing found it to be a positive experience when well organized (Spencer et al., 2019).

Another study assessed the prevalence of PTSD, burnout, resilience, and coping strategies in a sample of Spanish pediatric intensive care units (PICU) and compared the results to a sample of general pediatric staff (Rodriguez et al., 2019). The participant population was composed of 298 PICU medical staff and 189 pediatric medical staff. Burnout, PTSD, resilience, and coping strategies were measured using a Brief Resilience Scale, a Coping Strategies Questionnaire for healthcare providers, the Maslach Burnout Inventory, and the Trauma Screening Questionnaire (Rodriguez et al., 2019). There was no significant difference in PTSD and burnout rates between the two groups. Twenty percent of each group were positive for PTSD according to the trauma screening questionnaire, while 56% reported burnout in at least one category according to the Maslach Burnout Inventory. Incidence of PTSD and burnout increased substantially after the death of a patient or after conflict with a patient and their family (Rodriguez et al., 2019). The results of this study suggest there is a need for options that will address current PTSD and prevent further PTSD from occurring (Rodriguez et al., 2019).

Walhberg et al. (2017) conducted a study that sent the validated Screen Questionnaire Posttraumatic Stress Disorder to Members of the Swedish Society of Obstetrics and Gynaecology and the Swedish Association of Midwives to assess prevalence of partial or

probable PTSD in relation to traumatic events during labor. Traumatic events were defined as the death or severe injury of the infant and/or mother, maternal near-miss, and threats of violence (Wahlberg et al., 2017). Of the 47% of obstetricians that filled out the questionnaire, 84% had experienced one of the defined traumatic events. Of the 40% of midwives that completed the questionnaire, 71% had also experienced one of the defined traumatic events (Wahlberg et al., 2017). Fifteen percent of obstetricians and midwives met criteria for partial PTSD, while 7% and 5% of respective professions met full criteria for PTSD diagnosis (Wahlberg et al., 2017). The data in this study suggests that traumatic birthing events may be related to partial or probable PTSD (Wahlberg et al., 2017).

In a study performed by O et al. (2016), researchers looked at the prevalence of PTSD in end-of-life medical staff who had been enrolled in mindfulness-based communication training. Surveys including Acceptance and Action Questionnaire, Cognitive Fusion Questionnaire, and the Posttraumatic Stress Disorder Checklist–Civilian Version were sent to palliative staff to assess prevalence of PTSD (O et al., 2016). Twenty-one providers filled out the questionnaires, with 42% testing positive for several PTSS, and 33% testing positive for probable PTSD. The data suggested that avoidance strategies and poor coping mechanisms may increase the prevalence of PTSD (O et al., 2016). A major limitation to this study was the small sample size of 21 participants. However, based on the data presented, PTSD and PTSS appear to be prevalent amongst end-of-life medical staff (O et al., 2016).

Lastly, the data regarding the impact of work-related trauma was analyzed from eleven studies in a meta-analysis to investigate how healthcare workers were affected (de Boer et al., 2011). These eleven studies were reviewed under scrutiny by two independent researchers. Thorough criteria for exclusion from meta-analysis were used to evaluate the quality of research

(de Boer et al., 2011). The eleven studies varied in design and methodology. However, the results of each study concluded that work-related traumatic events impacted healthcare workers to the point of having multiple PTSS (de Boer et al., 2011). Not only did many providers show PTSS, but anxiety and depression as well (de Boer et al., 2011).

Posttraumatic Stress Disorder in Nurses Before the COVID-19 Pandemic

Rodney et al. (2022) conducted a cross-sectional study to determine the prevalence of PTSD in U.S. nurses, including inpatient, outpatient, management, academic setting, licensed but not practicing, and "other" types of nurses (Rodney et al., 2021). Researchers recruited nurses through various social media platforms. A 20-item Posttraumatic Stress Disorder Checklist version 5 (PLC-5) was used on Qualtrics to measure rates of PTSD. Overall, 28.4% of participants had a presumptive diagnosis of PTSD, while 15.4% had severe PTSD (Rodney et al., 2021). Researchers did not find significant demographic correlations regarding the severity of PTSD, such as age, marital status, or field of practice (Rodney et al., 2021). One limitation of the study was a potential sampling bias, since those who did not use social media were not able to participate in the survey (Rodney et al., 2021).

In a cross-sectional study of nurses at Al Zahraa University Hospital in Egypt, prevalence rate of burnout syndrome (BOS), PTSD, depression, and anxiety were measured (Hamed et al., 2020). A total of 181 nurses filled out questionnaires, which included ICU nurses, non-ICU nurses, and outpatient nurses. The nurses filled out sociodemographic data as well as various questionnaires which assessed anxiety, depression, and trauma. (Hamed et al., 2020). Researchers found 19.9% of nurses had PTSD symptoms (Hamed et al., 2020). Additionally, 79% had depression and 64.9% had anxiety (Hamed et al., 2020). Altogether, 87.8% of nurses were experiencing at least one symptom of BOS, including either emotional exhaustion,

depersonalization, or lack of personal accomplishment (Hamed et al., 2020). While there were no significant differences in depression, anxiety, or PTSD among the different nurse groups, there was a significantly higher prevalence of BOS in ICU nurses compared to other nurse groups (Hamed et al., 2020).

At the University of Colorado Hospital, a cross-sectional study was conducted over an eight-month period to examine the prevalence of PTSD and BOS amongst nurses (Mealer et al., 2009). The nurse manager of each unit received questionnaires to be filled out by their nurses. The questionnaires included questions about their feelings towards their work environment. The PTSS-10, Posttraumatic Diagnostic Scale, the Hospital Anxiety and Depression Scale, and the Maslach Burnout Inventory surveys were also included for completion (Mealer et al., 2009). Overall, 810 questionnaires were delivered, and 332 questionnaires were completed. Specifically, four categories were formed to group nurses based on their specialty which included outpatient, ICU, non-ICU in high stress, and other non-ICU. Researchers found all four groups of nurses were experiencing psychological symptoms. Sixteen percent were positive for anxiety, 13% for depression, 22% for symptoms of PTSD, and 18% met diagnostic criteria for PTSD (Mealer et al., 2009). In addition, 86% of nurses who met diagnostic criteria were positive for at least one of the three types of BOS, including either emotional exhaustion, depersonalization, and lack of personal accomplishment (Mealer et al., 2009). Lastly, results showed nurses in the inpatient settings (20%) are more likely to meet diagnostic criteria for PTSD than nurses working outpatient (5%) (Mealer et al., 2009).

In a study conducted by Mealer et al. (2006), general nurses were compared with ICU nurses in determining whether ICU nurses are more prone to having PTSD. Intensive care unit nurses in three hospitals affiliated with Emory University were given surveys (Mealer et al.,

2006). Of the 351 participants who completed the surveys, 230 were ICU nurses and 121 were general nurses (Mealer et al., 2006). In order to limit skewed results, no words about depression, anxiety, or PTSD were included in the anonymous survey. The results found 14% of general nurses tested positive for symptoms for PTSD, compared to 24% of the ICU nurses. (Mealer et al., 2006). However, stress outside of work was found to be the same for general nurses and ICU nurses (Mealer et al., 2006).

Jacobowitz (2013) conducted a study on the prevalence of PTSD among psychiatric nurses working in a mental health clinic. Sixty one percent of nurses who were assaulted at work displayed some of the symptoms of PTSD, while only 10% met the criteria to be diagnosed with PTSD (Jacobowitz, 2013). Researchers also found stress increased more for nurses who experienced verbal abuse when compared to physical assault. This finding implied verbal and physical abuse may result in similar incidences of developing PTSD (Jacobowitz, 2013). Participants actually reported more frequent symptoms of frustration, fear, irritability, sadness, and low self-esteem after a non-physical violent episode compared to a physical violent episode (Jacobowitz, 2013). Overall, the interpretation of these results showed that the actual act of abuse may cause the development of PTSD rather than physical injury from abuse (Jacobowitz, 2013). Risk factors that could contribute to PTSD in psychiatric nurses included the nurse's social support, the workplace environment with amount of abuse, current stress in life, and history of abuse and psychological state (Jacobowitz, 2013).

Laposa et al. (2003) completed a study that looked at the correlation between working in the emergency department and the incidence of PTSD. The study involved 51 staff members, primarily nurses, in a Canadian emergency department (Laposa et al., 2003). The Posttraumatic Stress Diagnostic Scale was used to assess PTSD (Laposa et al., 2003). Researchers found 12%

of participants met full criteria for a diagnosis of PTSD. In addition, 67% of those who completed the questionnaires did not feel like they received support within their job after a traumatic situation occurred at work (Laposa et al., 2003). Due to work-related trauma, 20% considered leaving the hospital and finding a different job (Laposa et al., 2003). The hospital that was studied offered critical incident stress debriefing but only 18% attended (Laposa et al., 2003). Out of the 51 staff members, no one looked for help or relief from stress outside of work (Laposa et al., 2003).

Another nursing specialty that has been researched regarding the prevalence of PTSD is pediatric acute care nurses. Most of the subjects were white females in their mid-30's. Surveys were given to tertiary-care nurses at a children's hospital who dealt with level 1 trauma (Czaja et al., 2011). The surveys were completed anonymously and included demographic, work, and education-related questions. The majority of the questions were geared toward work environments, feelings about work, and work-related stressors. Additionally, the research team assessed symptoms of PTSD, depression, anxiety, and BOS. Two groups were created which included the high intensity group composed of oncology, ER, and ICU nurses and the low intensity group composed of surgery and general medicine nurses. A total of 404 surveys were mailed out, and 173 were completed (Czaja et al., 2011). Fifty-six percent of the completed surveys were from high intensity nurses. Eighty two percent of the total nurses showed at least one psychological symptom of PTSD (Czaja et al., 2011). Criteria for PTSD was prevalent in 21% of nurses, with symptoms present for over three months prior to the survey (Czaja et al., 2011). Nightmares, severe anxiety, and panic were the top three most common symptoms among these nurses (Czaja et al., 2011). According to Czaja et al. (2011), the stressors that were most commonly causing symptoms of PTSD were not related to violence or dealing with their

patients' death but rather were related to feeling overextended, fear of adverse events, poor team interactions, and direct threats from patients or family members (Czaja et al., 2011). There was no significant difference in PTSD symptoms when comparing general medical, general surgical, oncology, ICU, and ER nurses (Czaja et al., 2011).

Monoamine neurotransmitter and levels in nurses were studied to see if there was a correlation with increased incidence of PTSD (Ke et al., 2020). One hundred thirty one operating room nurses were studied and divided into three different groups: PTSD, non-PTSD who still had a degree of PTSD symptoms, and control group with no symptoms of PTSD (Ke et al.l, 2020). In order to assess the levels of the monoamine neurotransmitter and cytokine levels, enzyme-linked immunosorbent assays were completed (Ke et al., 2020). Researchers found there was an association between higher neurotransmitter and cytokine levels and the severity of PTSD. In this study, they found operating room nurses who had PTSD had higher levels of a monoamine neurotransmitter and cytokine levels compared to those who did not have PTSD (Ke et al., 2020).

In 2015, South Korea experienced an outbreak in Middle East Respiratory Syndrome (Jung et al., 2020). This outbreak affected 225 people with 186 infected who recovered and 39 deaths (Jung et al., 2020). Once the outbreak was over, Jung et al. (2020) assessed whether the nurses had a higher incidence of PTSD. Three hundred nurses participated in the survey, which was administered two months after the outbreak ended (Jung et al., 2020). The surveys asked about these nurses' experiences and stress levels during the outbreak in their workplace. Using the General Health Questionnaire (GHQ) to assess the nurse's mental health, the mean score was 28.2 out of 36 which showed that stress levels were found to be higher throughout the outbreak than during a normal work day (Jung et al., 2020). Posttraumatic stress disorder was experienced

at some level in 84 of the nurses studied. Twenty five percent of those 84 nurses scored 25 or above on the GHQ which is considered as experiencing full PTSD (Jung et al., 2020). Additionally, 32% of the 84 nurses studied scored between 18 and 24 which shows they experienced some level of PTSD (Jung et al., 2020).

Posttraumatic Stress Disorder in Healthcare Workers During the COVID-19 Pandemic

d'Ettore et al. (2021) conducted a literature review to assess PTSS among healthcare workers in hospital settings during the COVID-19 pandemic. Researchers used the major scientific databases MEDLINE and PubMed to gather data. Studies showed young age, limited work experience, female gender, not living with a partner, and lack of training were some of the risk factors related to PTSS during the pandemic. In one of the literature reviews, González-Sanguino (2020) hypothesized that because women have traditionally taken on caregiving roles at home, it is difficult for them to balance work and life. Researchers also found those who were unmarried or widowed were at a higher risk of PTSD, which may have been due to the lack of emotional support from a partner (d'Ettore et al., 2021). In addition, lower age and less training experience were risk factors in healthcare workers for PTSS, as researchers hypothesized older healthcare workers are more experienced and equipped to deal with stress (d'Ettoree et al., 2021). Of the 14 articles d'Ettore et al. (2021) examined, 2.1% to 73.4% of participants had PTSS. This variation is partially due to the timing of the studies, as some studies took place when the outbreak was more controlled, and others took place at the peak of the pandemic, as well as having different settings investigated.

Li et al. (2021) also conducted a systematic review of the major scientific databases to examine the prevalence of depression, anxiety, and PTSD among healthcare providers during COVID-19. Altogether, researchers assessed 65 studies to gather data, which included 97,333

healthcare workers across 21 different countries. Seventy percent of the participants were female and 45% were nurses. Li et al. (2021) found there was a 21.7% incidence of depression, 22.1% incidence of anxiety, and 21.5% incidence of PTSD among all participants. Researchers noted most of the studies used non-random sampling, which may have led to a selection bias. However, the prevalence of depression, anxiety, and PTSD in healthcare workers during the pandemic was higher compared to the general population, which draws attention to the psychological impact of the pandemic on healthcare workers (Li et al., 2021).

In a study done by Zhou et al. (2021), researchers examined the effects of perceived organizational support, self-efficacy, and coping strategies in healthcare workers with PTSD symptoms fighting against COVID-19 in Wuhan. Eighty-three local healthcare workers and 24 medical team members who were deployed to Wuhan from other provinces of China participated in the study. The majority of the participants (81%+) worked in areas combating COVID-19, which included those in the emergency department, quarantined ward, and fever clinic (Zhou et al., 2021). The Impact Event Scale-Revised was used to measure PTSS of the frontline healthcare workers, focusing on intrusion, hyperarousal, and avoidance. Another unit of measure used was a perceived organizational support scale, which consisted of questions relating to the hospital's supportive work environment, communication with clear changes in work routine, and instrumental protection. Participants used a Likert scale of one to five, with five being strongly agreed, to determine their perceived organizational support. Results found that prevalence of PTSD among healthcare workers was 9.3% and that local healthcare workers were more likely than rescue members to develop PTSD. One limitation noted by the authors was the sample size, as well as only two types of coping strategies used. However, this study showed how organizational support has an important role in reducing PTSD symptoms (Zhou et al., 2021).

Lu et al. (2021) conducted a cross-sectional study to assess the prevalence of PTSD symptoms, sleep problems, and psychological distress. The study consisted of 500 healthcare workers who worked on the frontlines during the COVID-19 pandemic at the National Cheng Kung University in Taiwan (Lu et al., 2021). Participants responded to surveys on fear of COVID-19, stress, depression, anxiety, PTSD, insomnia, perceived stigma, and self-stigma. After the surveys were taken, the majority of participants were found to be female nurses (Lu et al., 2021). Overall, researchers found frontline healthcare workers are prone to experiencing psychological problems. For example, 15.4% were experiencing PTSD symptoms, 44.6% insomnia, 25.6% depressive symptoms, 30.6% anxiety symptoms, and 23.4% stress (Lu et al., 2021). There were significantly positive interrelationships between all variables, which means as one variable increases the other variables will also increase (Lu et al., 2021).

Posttraumatic Stress Disorder in Nurses Working During the COVID-19 Pandemic

Shahrour and Dardas (2020) found nurses in particular were vulnerable to experiencing psychological distress during the COVID-19 pandemic, as they have been on the frontlines with patients. Shahrour and Dardas (2020) performed a quantitative cross-sectional study by creating a survey to assess the prevalence of psychological distress in Jordanian nurses, 73% of which were female. Overall, researchers found 65% of nurses were experiencing acute stress disorder, which puts them at risk for PTSD. In addition, 33% of nurses were experiencing psychological distress. Shahrour and Dardas (2020) noted that lower levels of coping self-efficacy was a positive predictor for PTSD. Researchers also found younger nurses were more prone to experiencing psychological stress, as older individuals tend to have more adaptive approaches to manage stress (Shahrour & Dardas, 2020). There were some limitations to the study, one being that 50% of participants were excluded due to missing data. In addition, it was a cross-sectional

study of a largely female, Jordanian population. This concentration is a limitation as the results of the study cannot be generalized to a broader population. (Shahrour & Dardas, 2020).

Chen et al. (2020) performed a cross-sectional large-scale survey where nurses could voluntarily answer questionnaires regarding trauma, burnout, and posttraumatic growth during the COVID-19 pandemic. The study included 12,596 nurses who worked in critical care units, intensive care, pulmonary medicine, infectious disease, and emergency departments. Chen et al. (2020) found the most common symptoms related to the pandemic were difficulty sleeping (34.8%), fear of disaster in the future (33.9%), being anxious or frightened (28.1%), and irritation or anger (27%). Additionally, researchers found 13.3% of nurses had symptoms of trauma (Chen et al., 2020). Higher levels of trauma and emotional exhaustion were reported in women, intensive care departments, or any work related to COVID-19.

Heesakkers et al. (2020) conducted a study to determine the impact of the first COVID-19 surge on the mental well-being of ICU nurses. Researchers conducted a nationwide cross-sectional survey of 801 Dutch ICU nurses to measure anxiety, depression, PTSD, and need for recovery. Seven hundred twenty-six nurses completed the survey, of which 73.8% were female with an average work experience of 16.2 years. Of the 726 participants, 28.5% considered leaving their job, while 58.7% reported the pandemic had a negative impact on their life (Heesakkers et al., 2020). In addition, 80.7% of ICU nurses worked more hours than normal during the first COVID-19 surge (Heesakkers et al., 2020). However, the majority of ICU nurses did experience pleasant collaboration with other healthcare workers and ICU nurses (Heesakkers et al., 2020). When looking at mental health outcomes of the ICU nurses, 27.0% had anxiety, 18.6% had depression, and 22.2% had PTSD symptoms (Heesakkers et al., 2020). The need for recovery from the working conditions during the COVID-19 pandemic was present in 41.7% of

participants. The first surge of COVID-19 had a large impact on ICU nurses, as over half of the participants had at least one symptom of poor mental health (Heesakkers et al., 2020).

A qualitative study was done by Moradi et al. (2020) to examine the challenges experienced by 17 ICU nurses during the COVID-19 pandemic. Face to face interviews were conducted and participants were asked to describe their challenges as an ICU nurse. There were four major challenges that came to light while interviewing the nurses. The first challenge was poor organizational support. Nurses felt they were not being rewarded for their efforts, financially or emotionally, and also felt they had an excessive workload with a shortage of nursing staff (Moradi et al., 2021). There was also a shortage of personal protective equipment, which made nurses more likely to contract the virus. The second challenge for ICU nurses on COVID-19 units was physical exhaustion, due to the protective gear and long tiring shifts (Moradi et al., 2021). The third challenge was living with uncertainty. Many nurses were fearful of becoming infected or bringing the virus home to their family. There was also limited knowledge regarding the prognosis of the disease which made nurses feel unsafe (Moradi et al., 2021). Finally, a major challenge for ICU nurses was the psychological turmoil. The stress from the pandemic caused fear, worry, depression, confusion, anxiety, and aggression (Moradi et al., 2021).

A study conducted by Jiang et al. (2021) evaluated late-onset PTSD and coping strategies for frontline clinical nurses six months after working in China during the COVID-19 pandemic. Methods included a total of 864 questionnaires made up of three professional scales, the impact of event scale-revised, simplified coping style questionnaire and social support rating scale included. Findings concluded that 88.19% of the participated frontline nurses in the study were classified as having late-onset PTSD (Jiang et al., 2021). However, nurses tended to lean toward

positive coping strategies by looking on the brighter sides of things, confiding in others, and not taking it too seriously, compared to negative coping strategies like drinking, smoking, or refusing to think about the situation (Jiang et al., 2021). Of the participants in the study, 88.19% were classified as having mild late-onset PTSD symptoms, 46.64% of the were classified as moderate level of late-onset PTSD symptoms, and 13.54% were classified as severe late-onset PTSD symptoms (Jiang et al., 2021). Due to COVID-19's lethality and unpredictability, a huge amount of psychological shock is placed on frontline nurses.

A study done by Marcomini et al. (2021) investigated the prevalence of PTSD among nursing staff in a COVID hospital located in Italy. Of 275 questionnaires filled out by staff, 39.88% received a provisional PTSD diagnosis (Marcomini et al., 2021). Researchers found that working in the emergency department increased the risk of being diagnosed with PTSD compared to those who did not work in the emergency department (Marcomini et al., 2021). They also found that managing ventilation and intubation devices, end of life care, and constant use of PPE caused distress. Results from this study confirmed the presence of PTSD among nursing staff related to the COVID-19 pandemic.

Treatment and Resources

There are multiple treatment options for PTSD and most treatment plans include a combination of pharmacological agents and psychotherapy. The goal of pharmacological treatment is to decrease the emotional effects of PTSD (Stein, 2021). This includes addressing issues of depression, emotional instability, intrusive thoughts, hyperactivity, and avoidance of triggers (Stein, 2021). There are several classes of drugs used to treat PTSD including selective serotonin reuptake inhibitors, serotonin-norepinephrine inhibitors, second generation antipsychotics, and alpha-adrenergic receptor blockers (Stein, 2021). There are other drug classes

that have been considered for use of PTSD treatment but have inconsistent data and may be more harmful than helpful (Stein, 2021).

Trauma based therapy is considered the first line treatment option for PTSD (Stein & Norman, 2021). Cognitive-behavioral therapy (CBT), prolonged exposure therapy, and eye movement desensitization and reprocessing therapy are the options that have been found to be effective treatment options for those with PTSD (Stein & Norman, 2021). The therapy with the most research behind it is CBT. This is a combination therapy that focuses on the identification and alteration of maladapted beliefs about oneself or the situation and reducing reactions to triggers through exercises or actual exposure. This therapy method may also aid in forming healthy coping mechanisms and stress management (Stein & Norman, 2021). There are different forms of CBT which include cognitive processing therapy, prolonged exposure therapy, and written exposure therapy (Stein & Norman, 2021).

Cognitive processing therapy works on addressing perceptions of the trauma's impact on a person's life. An example of this would be addressing self-blame for the situation or an incorrect thought of not being safe anymore (Stein & Norman, 2021). Exposure based therapy focuses more on introducing the patient to situations or environments that they have avoided since trauma either physically or mentally (Stein & Norman, 2021). Prolonged exposure therapy will have the patient physically be in a place or environment in which the memories of trauma are provoked. This occurs over around twelve sessions. Discussion with a therapist after the exposure addresses the feelings provoked by the environment and addresses negative thoughts of self and the trauma (Stein & Norman, 2021).

Written exposure therapy involves the patient writing a narrative of their trauma. The therapist will then read the trauma narrative aloud to the patient encouraging them to engage

their emotions. Discussion of maladapted beliefs of self or situation would be addressed during and after the reading (Stein & Norman, 2021). Eye movement desensitization and reprocessing is a therapy in which the therapist will slowly swipe two fingers in the air right to left with the patient's eyes following the fingers. While following the therapist's fingers with their eyes, they will recount part of the trauma. They will then discuss the memories, thoughts, and feelings experienced. This is repeated until the memory invokes less anxiety and then the patient is instructed to pursue a positive or true thought of their role in the situation (Stein & Norman, 2021). An example of this would be to initially think "it was all my fault" and end the session thinking "I did everything I could." The most appropriate therapy for each person may differ. However, there is little research comparing the efficacy of each therapy method. Those that have compared therapies have not found a significant difference between types (Stein & Norman, 2021).

Coping strategies commonly used by nurses have been shown to be causing nurses to stay stressed instead of improving their stress levels (Morrison Wylde et al., 2017). A study was completed to learn more about how nurses can cope better and improve their symptoms (Morrison Wylde et al., 2017). The research team created two separate studies of nurses in a pediatric nurse residency program with one group of 46 nurses in a smartphone delivered mindfulness (SDM) intervention and another group of 49 nurses in a traditionally delivered mindfulness (TDM) intervention (Morrison Wylde et al., 2017). Within TDM, nurses attended one session per week which involved eating, walking, yogic postures, and lying down (Morrison Wylde et al., 2017). The SDM group had access to a three-month subscription to an app called Headspace (Morrison Wylde et al., 2017). In order to measure stress and potential trauma, the Life Events Checklist and the PTSD Checklist - Civilian Version were required for nurses to

complete (Morrison Wylde et al., 2017). Data showed that the SDM had more benefits overall (Morrison Wylde et al., 2017). However, neither SDM nor TDM showed benefits for nurses with symptoms of PTSD. The study concluded that neither of the strategies were helpful because prior to the intervention, nurses could have already created their own coping strategies (Morrison Wylde et al., 2017). Another conclusion was made that the nurses with symptoms of PTSD might need more intervention than an app or traditional mindfulness to cope with their trauma (Morrison Wylde et al., 2017).

d'Ettore et al. (2021) found that passive training through educational pamphlets, emails, or websites was effective in decreasing psychological distress related to the pandemic. For example, education on the history of the virus and appropriate use of infection control was helpful in lowering the risk of PTSS (d'Ettore et al., 2021). In addition, evidence has shown better outcomes regarding mental health when supervisors and management spend time teaching their employees about methods of coping, how to reduce distress, and how to support their colleagues (d'Ettore et al., 2021).

For nurses who experienced assault at work and developed PTSD, Critical Incident Debriefing was created to help participants with their stress (Jacobowitz, 2013). Resilience programs have been studied with positive results in decreasing the incidence of psychiatric nurses developing PTSD (Jacobowitz, 2013). The resilience programs were created through workplace training which taught nurses how to deal with violence. Psychiatric nurses who went through the resilience programs had more confidence in stressful situations and were not as negatively impacted by stress (Jacobowitz, 2013).

Conclusion

Posttraumatic stress disorder is a mental health disorder that is chronic and often debilitating and can manifest in many different ways. Although there are different treatment options for PTSD, many healthcare workers do not seek help (d'Ettore et al., 2021, Laposa et al., 2003, Luftman et al., 2017). Multiple studies above show evidence of symptoms of PTSD in healthcare workers and nurses who have worked both before and during the COVID-19 pandemic (Chen et al., 2020, Czaja et al., 2011, d'Ettore et al. 2021, Heesakkers et al., 2021, Jiang et al., 2021, Laposa et al., 2003, Li et al., 2021, Luftman et al., 2017, Moradi et al., 2021, Shahrour and Dardas, 2020). The studies also indicate there are interventions needed to protect healthcare workers and nurses from the psychological effects of the pandemic. Due to the recency of the COVID-19 pandemic, more research is needed to better understand how the pandemic has impacted nurses. Much of the research was done in specific, small sample sizes of nurses, which does not allow for generalization. There is knowledge to be gained regarding the psychological effects of the broader population of nurses who were involved in the COVID-19 pandemic.

Chapter three will cover the study design, the defined population with inclusion and exclusion criteria, organizations participating in research, data collection, experimental procedures, statistical analysis, and potential limitations of the study.

Chapter 3: Methodology

Introduction

Posttraumatic stress disorder is a mental health illness that has become an increasing concern during the COVID-19 pandemic in healthcare workers (d'Ettore et al., 2021). This illness can have detrimental effects on providers, including declining mental health, low motivation, and reduced ability to interact well with patients (d'Ettore et al., 2021). Nurses have been on the front lines caring for COVID-19 patients, potentially putting them at a higher risk for stress. The main purpose of this research is to assess the prevalence of probable PTSD in registered nurses (RNs) who have worked during the COVID-19 pandemic. This research aims to answer the following questions:

1. What is the prevalence of probable PTSD in U.S. RNs who have worked during the COVID-19 pandemic?
2. Is there a relationship between probable PTSD and specific fields of medicine RNs worked in during the COVID-19 pandemic?
3. Is there a relationship between the prevalence of probable PTSD and reports of perceived emotional burden from working during the pandemic?

Chapter three will cover the study design, defined population with inclusion and exclusion criteria, organizations participating in research, data collection, experimental procedures, statistical analysis, and potential limitations of the study.

Study Design

The research was conducted through a retrospective, quantitative cross-sectional study. Cross-sectional studies are used to assess prevalence of an illness in a population or sample that

experienced the same exposure at a given point in time (Levin, 2006). Since all participants experienced the COVID-19 pandemic, a control group could not be obtained. The results of the study were analyzed quantitatively by calculating the prevalence of probable PTSD in RNs, as well as in various fields of medicine. Chi-square was also used to assess the relationship between fields of medicine and prevalence of probable PTSD, in addition to perceived emotional burden from the pandemic and prevalence of probable PTSD. The independent variable of the study is the COVID-19 pandemic, while the dependent variable is the prevalence of probable PTSD in RNs.

Population

All RNs who were current members of Minnesota Nurses Association (MNA) or were associated with the Faith Community Nurse Network of the Greater Twin Cities (FCNNTC) were included in the research, regardless of age, gender, years of experience, field of medicine worked in, or facility type. The study population was defined based on the decided study parameters and organizations who were willing to participate in research.

Minnesota Nurses Association was established in 1905 and is dedicated to advocating for nurses, patients, and quality care in Minnesota, Iowa, North Dakota, and Wisconsin (MNA, n.d.-a). They value the professional and personal well-being of nurses. They also uphold the characteristics of excellence, integrity, autonomy, and advocacy for accessible, affordable, and quality care for patients (MNA, n.d.-b). Membership of MNA includes RNs, licensed practical nurses (LPNs), and non-nurse professionals in a MNA facility (MNA, n.d.-c). Other types of membership are RNs who work in hospitals not represented by MNA with full membership access, associate membership for RNs who wish to have access to MNA for limited activities, and student nurses enrolled in an RN program eligible for associate membership (MNA, n.d.-c).

The population of MNA members who participated in this research study included RNs only, working in Minnesota, Iowa, North Dakota, or Wisconsin, which consists of 22,000 RNs. Licensed practical nurses, certified nursing assistants, medical assistants, and non-nurse professionals were excluded from this study due to the differing roles compared to RNs.

Faith Community Nurse Network of the Greater Twin Cities is a professional nursing practice focused on whole-person health and intentional care of the spirit (FCNNTC, 2021). Faith Community Nurse Network of the Greater Twin Cities has over 400 RNs within their organization. In order to be a part of FCNNTC, nurses are required to have at least five years of experience as an RN (A. Jensen, personal communication, February 28, 2022). There are multiple states that are involved with FCNNTC, including Arkansas, Arizona, California, Florida, Iowa, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, North Dakota, New Hampshire, Nevada, New York, Ohio, Pennsylvania, South Carolina, South Dakota, Texas, Virginia, Vermont, and Wisconsin (A. Jensen, personal communication, February 28, 2022). Since faith community nurses typically practice in the community, and not in clinical settings, they have not had the same experience as front line nurses in hospitals. However, nurses involved in FCNNTC have played an important role in caring for their communities by providing health information and collaborating with faith community leadership and government agencies (A. Jensen, personal communication, February 28, 2022). They have also helped individuals cope with loss, grief, fear, and isolation during the pandemic (A. Jensen, personal communication, February 28, 2022).

Experimental Procedures

The MNA and FCNNTC organizations were contacted and agreed to participate in research (see Appendix A and B). Each organization distributed the PTSD checklist for DSM-5

(PCL-5) survey to their employed RNs (see Appendix C). The PTSD checklist for DSM-5 (PCL-5) was chosen as the survey tool based on current research which supports strong validity and reliability (see Data Collection). It is a 20-question self-inventory survey where the participants grade how much they were bothered by symptoms of a stressful experience over the past month. The grading range includes “not at all” (0 points), “a little bit” (1 point), “moderately” (2 points), “quite a bit” (3 points), and “extremely” (4 points). For a provisional PTSD diagnosis, at least one question from B item (questions 1-5) and C item (questions 6-7) and at least two questions from D item (questions 8-14) and E item (questions 15-20) must be answered “moderately” or higher.

A Likert scale was created by these researchers which addressed how much the participants were emotionally burdened from working during the COVID-19 pandemic (see Appendix D). Since there were likely other factors other than the pandemic leading to PTSD, the scale helped determine how much of a role the pandemic contributed to PTSD. The range included “not at all” (1 point), “somewhat” (2 points), “moderately” (3 points), “quite a bit” (4 points), and “extremely” (5 points). A score of three or above indicated high emotional burden, while a score of two or below indicated low emotional burden.

An informed consent form was created and included a description of the study, potential risks, the methods by which participant information would be kept private, and the participant's right to drop out of the study at any point without penalty (see Appendix E). Additionally, participants answered what field of medicine they worked in during the pandemic to examine whether certain specialties were more prone to PTSD (see Appendix F). An Institutional Review Board (IRB) form was completed and approved by Bethel University prior to sending surveys (see Appendix G).

The informed consent form, PTSD checklist for DSM-5 (PCL-5), field of medicine, and Likert scale on emotional burden of the pandemic were entered into Qualtrics. A link to the Qualtrics surveys was sent to each nursing organization, which was distributed to all RNs a part of their organization. Participant information was kept confidential by sending out anonymous surveys. The Qualtrics survey contained no identifying information other than which organization the participant was associated with. Additionally, the IP address of the participants was not recorded. The consent form contained a statement of confirmation rather than a signature, which stated that by advancing to the next page, they were consenting to the study. This method allowed participants to answer survey questions without their name being associated with their responses in any way. Any information obtained that could identify the participants remained confidential and would be disclosed only with their permission.

The participants were given two weeks from the initial email to complete the survey. A second email with the same information was sent to all participants two weeks later. Participants who had already completed the survey were instructed to discard the second email. Finally, a third email was sent out roughly two weeks later, again with instructions to discard the email if the survey had already been completed. Around four weeks after the third email, all available data was analyzed to assess prevalence and demographic trends. Further discussion of statistical analysis can be found in the section labeled “Statistical Analysis” and chapter 4 of this paper.

Ethical considerations were taken into account throughout the duration of research. One possible ethical issue was privacy, since participants answered questions about their mental health. However, to ensure privacy, the researchers did not have access to personal information since the survey was conducted anonymously using Qualtrics. Another ethical consideration was the potential for emotional discomfort from the survey, especially for those who had experienced

trauma during the pandemic. To minimize the risk of adverse effects, participants were allowed to discontinue the survey at any time without penalty.

Study Tool

The PTSD checklist for DSM-5 (PCL-5) was chosen to obtain quantitative data on the prevalence of probable PTSD in RNs working during the COVID-19 pandemic. This tool was chosen due to current studies indicating its strong internal consistency, (α = .94 to .96), test-retest reliability (rs = .74 to .85), and convergent and discriminant validity (Blevins et al., 2015; Bovin et al., 2016). All DSM-5 tools have received thorough scrutiny from mental health experts (American Psychiatric Association, 2017). This process involves a task force composed of hundreds of mental health professionals that oversee the entire DSM project. Additionally, work groups of mental health professionals with pertinent specialties create the DSM surveys by evaluating current evidence-based research on the topic. The developed content is proposed to and approved or denied by an independent committee before publication in the DSM-5 (American Psychiatrist Association, 2017).

Statistical Analysis

In order to assess the prevalence of probable PTSD in RNs during the COVID-19 pandemic, RNs were asked to complete the PTSD checklist for DSM-5 (PCL-5) survey. The overall prevalence of probable PTSD was determined by dividing the number of RNs who meet the criteria for having probable PTSD by the total number of RNs who participated in the study. Prevalence of probable PTSD within specific medical fields was calculated in a similar manner. Additionally, participants were asked to answer one question at the end of the survey rating their emotional burden related to the pandemic. Chi-square tests were performed to determine whether there was a statistically significant relationship between fields of medicine and a probable

diagnosis of PTSD, as well as between emotional burden from the pandemic and a probable diagnosis of PTSD. A critical value of 0.05 was used to assess statistical significance. A professional statistician assisted researchers in statistical analysis.

Limitations

One potential barrier of the study was lack of participation in the surveys. Some nurses may not check their email frequently or may not see the email. In addition, nurses were not required to participate, which could have limited the sample size. This possible barrier was addressed by resending the survey three separate times as a reminder. Another potential barrier was that participants may have been hesitant to answer questions honestly due to the sensitive information of the survey. This barrier was addressed by letting participants know researchers did not have access to personal information since the survey was conducted anonymously. Participants were also made aware that the information was confidential and would be disclosed only with their permission.

In addition, there are limitations related to a cross-sectional study design. Due to the one-time measurement, cross-sectional studies give no indication of the sequence of events. In this study, it is not certain whether the COVID-19 pandemic occurred before, during, or after the onset of PTSD (Levin, 2006). Also, other factors that could affect mental illness were not controlled, meaning a causal relationship could not be deduced from the results of the study (Setia, 2016). This barrier was addressed by comparing the prevalence of PTSD in nurses prior to the pandemic to the prevalence of PTSD in this study during the pandemic. In addition, participants filled out a Likert scale to address self-perceived emotional burden from working during the COVID-19 pandemic.

Another limiting factor to a cross-sectional study design is its inability to determine incidence. The prevalence of RNs with probable PTSD can be determined at the time of the study, but the percentage of new cases of probable PTSD cannot be determined with this study design (Levin, 2006). However, incidence is not required for answering the research questions of this study.

Conclusion

With nurses potentially having increased stress during the COVID-19 pandemic, PTSD is an area of concern. In order to assess the prevalence of probable PTSD during the COVID-19 pandemic, a validated PTSD Checklist for DSM-5 was distributed by an anonymous survey on Qualtrics. The consent form, PTSD checklist for DSM-5 (PCL-5) survey, medical field survey, and Likert scale were sent to all RNs who were members of MNA and FCNNTC. The survey was sent two additional times as a reminder. The data received from all surveys remained confidential since the survey was made anonymous. To minimize adverse effects, participants were able to discontinue the survey at any time. Data was gathered from the Qualtrics survey and analyzed statistically by examining the prevalence of probable PTSD in nurses, as well as demographic trends with the field of medicine. Chi-square tests were performed to determine whether there was a statistically significant relationship between medical fields and a probable diagnosis of PTSD, as well as between emotional burden related to the pandemic and a probable diagnosis of PTSD. Chapter four will include the results of the study.

Chapter 4: Results

Introduction

In order to assess the prevalence of probable PTSD in RNs during the COVID-19 pandemic, the PTSD checklist for DSM-5 (PCL-5) was distributed to RNs associated with MNA and FCNNTC. The PTSD checklist for DSM-5 (PCL-5) was used to determine the prevalence of probable PTSD in RNs who worked during the COVID-19 pandemic. Additionally, participants indicated the field of medicine in which they worked to examine whether there was a relationship between medical fields and prevalence of probable PTSD. Finally, participants were asked how much they were emotionally burdened from working during the pandemic. Emotional burden was assessed with a Likert scale which was used to explore the relationship between emotional burden from working during the pandemic and the prevalence of probable PTSD.

For statistical analysis of the results, a prevalence calculation and chi-square test were used. This chapter will include data analysis of the response rate, prevalence of probable PTSD, prevalence of probable PTSD in various fields of medicine, and emotional burden from working during the COVID-19 pandemic. It will also include techniques used for statistical analysis.

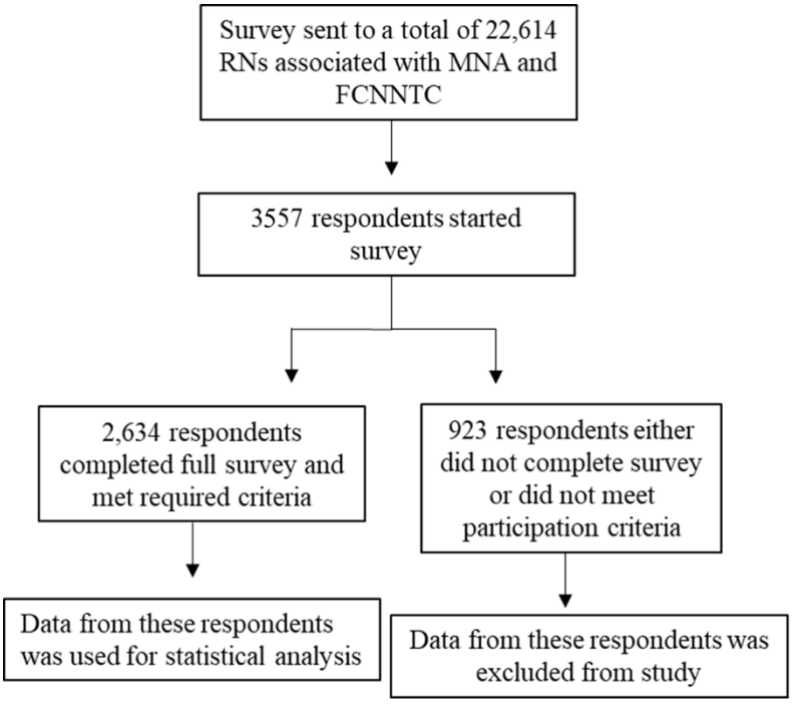
Data Analysis

Response Rate

The surveys were sent to 22,614 RNs, all of which were from MNA and FCNNTC. A total of 3,557 RNs took the survey, but participants were excluded if they did not work during the pandemic or if they did not finish the survey, which resulted in 923 respondents being excluded from the study (see Figure 1). Overall, 2,634 RNs were included in the study, resulting in an 11.65% response rate (see Figure 1). Minnesota Nursing Association had 2,613 RNs who participated, while FCNNTC had 21 RNs who participated in the study.

Figure 1

Respondent Data Stratification for Statistical Analysis



Prevalence of Probable PTSD

The prevalence of probable PTSD was determined with the use of the PTSD checklist for DSM-5 (PCL-5) survey. In order to meet criteria for probable PTSD, a specific number of questions had to be answered by participants as "moderately" or higher (see Experimental Procedures, Chapter 3). Out of the 2,634 RNs who completed the survey, 42.14% met criteria for probable PTSD, which included 1,110 RNs. In contrast, 57.86% of RNs did not meet criteria for probable PTSD, which included 1,524 RNs.

Prevalence of Probable PTSD in Various Fields of Medicine

Registered nurses answered in which field of medicine they worked during the COVID-19 pandemic to assess whether various fields had higher rates of probable PTSD. The options for fields of medicine listed in the survey included outpatient, critical care, emergency medicine,

public health, home care, and "all other" (see Table 1). The critical care field had the most RNs who participated in the survey, which totaled 1,060 RNs, with a prevalence of probable PTSD at 47.55%. The "all other" category followed critical care with 960 RNs, with a prevalence of probable PTSD at 35.00% ($p < .05$). The "all other" category was the only field of medicine which was statistically significant with having a lower prevalence of probable PTSD than expected (see Figure 2 and 3). Registered nurses who worked in emergency medicine totaled 440 RNs, with a prevalence of probable PTSD at 43.18%. Outpatient RNs totaled 90 with a prevalence of probable PTSD at 40.00%. Home care totaled 45 RNs with a prevalence of probable PTSD at 53.33%. Finally, public health totaled 39 RNs with a prevalence of probable PTSD at 51.28%. With the exception of the "all other" category, there was no significant difference between various fields of medicine.

Table 1

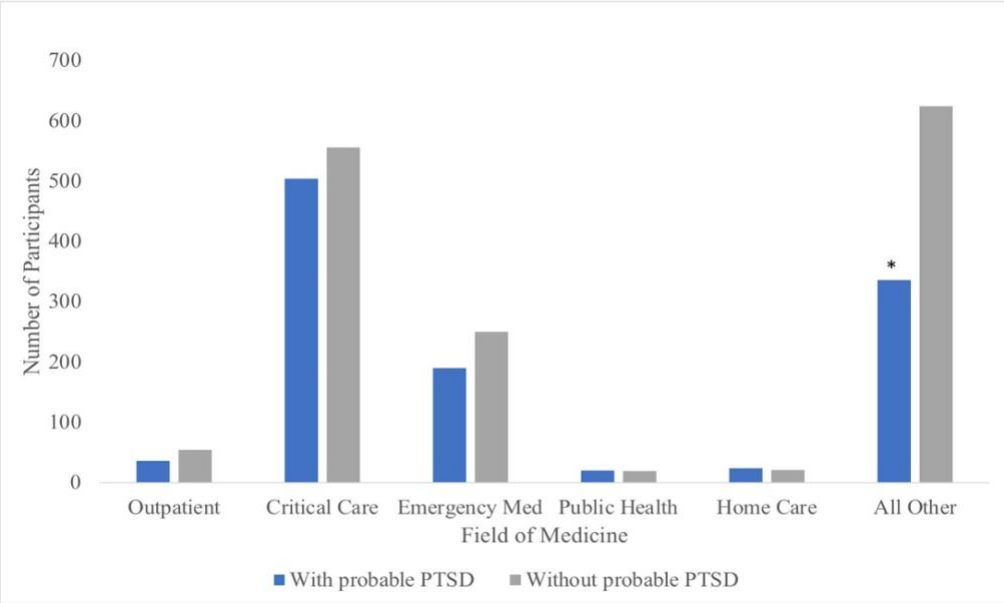
RNs with and without Probable PTSD Among Various Medical Fields

	With PTSD	Without PTSD
Outpatient	36	54
Critical Care	504	556
Emergency Medicine	190	250
Public Health	20	19
Home Care	24	21
All Other	336*	624

Note. * indicates a significant difference between the observed and expected value with $p < .05$.

Figure 2

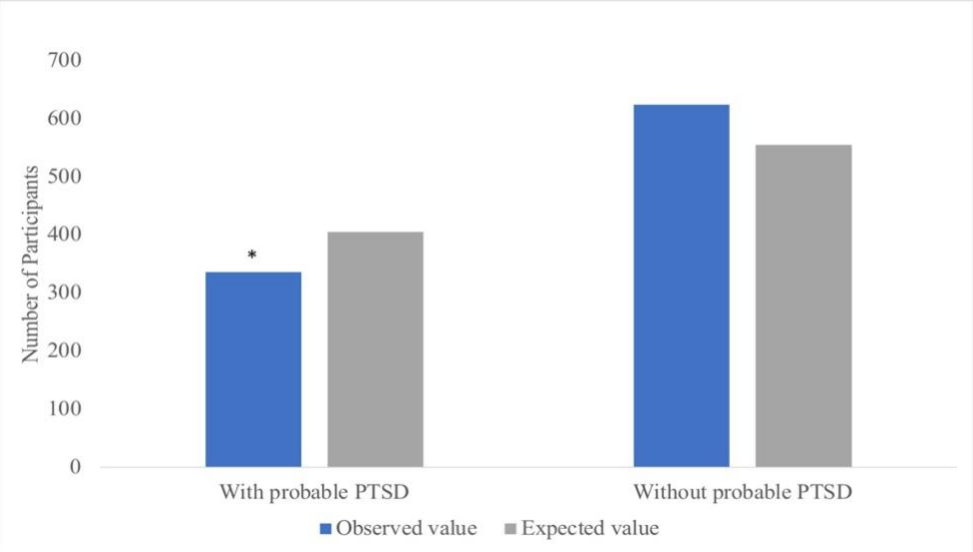
Comparison of Probable PTSD Among RNs in Various Medical Fields



Note. * indicates a significant difference between the observed and expected value ($p < .05$). The numbers in this figure represent the observed values. The "All Other" category had a significantly lower prevalence of PTSD than expected.

Figure 3

Comparison of Probable PTSD Among RNs in the "All Other" Category



Note. * indicates a significant difference between the observed and expected value ($p < .05$), which was significantly lower than expected.

Perceived Emotional Burden from the Pandemic

Registered nurses answered whether they experienced high or low emotional burden from working during the COVID-19 pandemic. Among participants who were positive for probable PTSD, 1,106 (99.6%) reported high emotional burden, which was significantly higher than expected ($p < .05$) (see Table 2 and Figure 4). In contrast, four RNs (.4%) reported low emotional burden, which was significantly lower than expected ($p < .001$). Among participants who did not meet criteria for probable PTSD, 1,277 (84%) reported high emotional burden, which was significantly lower than expected ($p < .05$). In contrast, 247 RNs (16%) reported low emotional burden, which was significantly higher than expected ($p < .001$) (see Table 2 and Figure 4).

Table 2

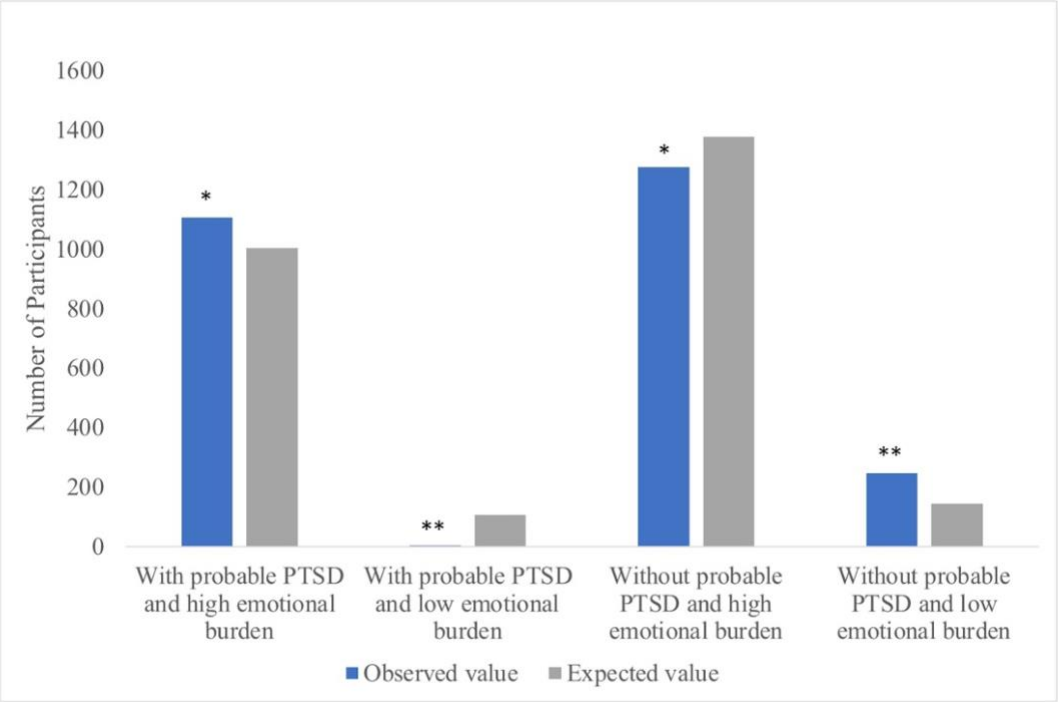
Emotional Burden Among RNs with and without Probable PTSD in Various Medical Fields

	High Emotional Burden With Probable PTSD	Low Emotional Burden With Probable PTSD	High Emotional Burden Without Probable PTSD	Low Emotional Burden Without Probable PTSD
Outpatient	36	0	38	16
Critical Care	503	1	474	82
Emergency Medicine	189	1	212	38
Public Health	20	0	14	5
Home Care	24	0	18	3
All Other	334	2	521	103
Totals	1106*	4**	1277*	247**

Note. * indicates a significant difference between the observed and expected value with a $p < .05$, while ** indicates a $p < .001$. The numbers in this table represent the observed values.

Figure 4

Comparison of High and Low Emotional Burden Resulting from the Pandemic in RNs with and without Probable PTSD



Note. * indicates a significant difference between the observed and expected value with a $p < .05$, while ** indicates a $p < .001$. The findings suggest those who with high emotional burden from the pandemic were more likely to have probable PTSD, whole those with low emotional burden from the pandemic were less likely to have probable PTSD.

Techniques

A prevalence calculation and chi-square test were used for statistical analysis of this research. The prevalence of probable PTSD amongst RNs working during the COVID-19 pandemic was calculated by dividing the number of cases of probable PTSD by the total number

of participants and multiplying that number by 100% as demonstrated in the following equation: Probable PTSD prevalence = (# of RNs with probable PTSD/total participants) x 100%.

The second research question was posed to explore the relationship between probable PTSD prevalence and field of medicine. The third research question was posed to explore the relationship between probable PTSD prevalence and perceived emotional burden from working during the pandemic. A chi-square test was used to explore these two relationships. The null hypothesis for the second research question was that there would be no difference in prevalence of probable PTSD between different fields of medicine. Expected values were created by the multiplication of the total individuals found to have probable PTSD by the total number of participants in a field of medicine. The number obtained was divided by the total number of participants. This was done for each variable. After this was done for each variable, the observed and expected values were calculated with the use of the chi-square formula (see Equation 1). The numbers obtained from each variable from the chi-square formula correlated to a critical value on a critical value chart (see Table 4), but degrees of freedom were first determined to know which row to use on the critical value chart. Degrees of freedom were calculated by use of the following equation: Degrees of freedom = (# of rows - 1)(# of columns - 1). The numbers of rows and columns used for this equation can be found in Table 3. The critical value chart was used to determine when results were statistically significant (see Table 4). This could be done because each critical value was associated with a *p*-value. A *p*-value of <0.05 was considered statistically significant for the purpose of this research. The same statistical analysis was used to analyze the relationship between probable PTSD and perceived emotional burden from working during the pandemic with a null hypothesis that there would be no difference in probable PTSD between those with high emotional burden and those with low emotional burden.

$$X^2 = \sum \frac{(o-e)^2}{e}$$

(1) Note. o= observed, e= expected

Table 3

Emotional Burden Among RNs with and without Probable PTSD

	High emotional burden	Low emotional burden
With Probable PTSD	1106*	4**
Without probable PTSD	1277*	247**

Note. * indicates a statistically significant result where $p < .05$, while ** indicates a statistically significant result where $p < .001$.

Table 4

Critical Value Chart for Chi-square test

	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.605	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.236	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.362	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.275	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.542	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.769	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.989	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.204	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.412	31.41	34.17	35.02	37.566	39.997	43.072	45.315

Note. DF= degrees of freedom, P= *p*-value

Chapter 5: Discussion

Introduction

The COVID-19 pandemic has posed many challenges for healthcare systems and healthcare workers, including poor psychological outcomes (d'Ettore et al., 2021). Posttraumatic stress disorder is a mental health illness that has become an increasing concern during the COVID-19 pandemic, as those who were working directly with COVID-19 were two to three times more likely to have high PTSS than those not exposed (d'Ettore et al., 2021). Individuals suffering from PTSD are more likely to suffer from suicidal ideation, suicidal attempts, and death by suicide, making the prevention of PTSD in healthcare workers an area of concern (d'Ettore et al., 2021). Due to the recency of the COVID-19 pandemic, the research conducted on PTSD in U.S. nurses during the pandemic is limited. Many of the studies focus on small, specific populations of nurses in non-U.S. countries. Thus, there is limited data surrounding the prevalence of PTSD in the context of the COVID-19 pandemic in U.S. nurses. The main purpose of this research is to assess the prevalence of probable PTSD in RNs who have worked during the COVID-19 pandemic. Additionally, this research seeks to determine if there is a relationship between prevalence of probable PTSD and various medical fields, and if there is a relationship between prevalence of probable PTSD and perceived high emotional burden from working during the pandemic.

In order to assess the prevalence of probable PTSD in RNs during the COVID-19 pandemic, the PTSD checklist for DSM-5 (PCL-5) was distributed to two nursing organizations, MNA and FCNNTC. The population of RNs who participated in the study worked in various fields of medicine, which included outpatient, critical care, emergency medicine, public health, home care, and an "all other" category. The PTSD checklist for DSM-5 (PCL-5) is a 20-question

self-inventory survey where the participants rate how much they have been bothered by symptoms of a stressful experience over the past month. The PTSD checklist for DSM-5 (PCL-5) was used to determine the prevalence of probable PTSD in RNs who have worked during the pandemic. Additionally, participants filled out what field of medicine they worked in to examine whether various fields of medicine had a higher prevalence of probable PTSD. Finally, participants were asked how much they were emotionally burdened from working during the pandemic. Emotional burden was assessed using a Likert scale to help determine how much the pandemic contributed to probable PTSD, as there could be several outside factors leading to PTSD.

This chapter will cover the results of the study, how the findings relate to previous research, limitations to this research, and avenues for future research on PTSD in nurses during the COVID-19 pandemic.

Results

Prevalence of Probable PTSD in RNs

The first question of this research assessed the prevalence of probable PTSD in RNs who worked during the COVID-19 pandemic. Out of 2,634 nurses, 42.14% met diagnostic criteria for probable PTSD with the use of the PTSD checklist for DSM-5 (PCL-5) survey. Prior to the pandemic, researchers found a range of 12% to 28.4% of nurses who met criteria for probable PTSD (Rodney et al., 2021, Laposa et al., 2003, Mealer et al., 2009). The results in this study suggest a marked increase in prevalence of probable PTSD at 42.14%, which may indicate that the pandemic had an impact on the psychological health of nurses.

A study similar to this research assessed PTSD in nurses in Italy during the COVID-19 pandemic. Researchers found 39.88% of nurses met criteria for a provisional diagnosis of PTSD,

with use of the Impact of Event Scale - Revised (IES-R) (Marcomini et al.). In contrast, most of the studies done during the pandemic did not examine how many participants met diagnostic criteria for provisional or probable PTSD, but rather what percent of nurses had PTSS. For example, Heesakkers et al. (2020) found 22.2% of Dutch ICU nurses had PTSS, while Jiang et al. (2021) found 88.19% of nurses in China had mild late onset PTSS. While this gives an indication as to how many nurses had at least one symptom of PTSD, it does not give the number of participants who met diagnostic criteria for PTSD. Additionally, many of the research studies performed during the pandemic were done in other countries, including China, Netherlands, Italy, and Jordan (Chen et al., 2020, Heesakkers et al., 2010, Jiang et al., 2021, Marcomini et al., 2021, Shahrour & Dardas, 2020). This may cause differences in the results of studies due to differing medical systems, equipment/resource availability, and timing of when COVID-19 hit each country. Various studies also used different scales to assess PTSD symptoms, such as the IES-R scale (Jiang et al., 2021 & Marcomini et al., 2021). It is important to note that using different assessment tools makes it more difficult to compare studies. Finally, previous research was done during the peak of the pandemic in 2020 and 2021, whereas this current study was done as the pandemic was on the down slope nearing the end of 2022.

Prevalence of Probable PTSD in RNs in Various Fields of Medicine

The second question of this research assessed the prevalence of probable PTSD in various fields of medicine. The prevalence of probable PTSD for outpatient care was 40.00%, critical care 47.55%, emergency medicine 43.18%, public health 51.28%, home care 53.33%, and “all other” 35% (see Table 1). There was no significant difference between the prevalence of probable PTSD in various fields of medicine, with the exception of the “all other” category, which had a significantly lower value of probable PTSD than expected ($p < .05$) (see Figure 2).

This data suggests nurses of all fields have struggled with PTSD, not only critical care or frontline nurses. In contrast to this study, Marcomini et al. (2021) found that emergency medicine nurses were more likely to meet criteria for probable PTSD during the pandemic when compared to non-emergency medicine providers. Additionally, Chen et al. (2020) found that nurses who worked in intensive care departments during the pandemic experienced more trauma when compared to other nurse fields. One possible explanation for these variations may have been influenced by the timing of the pandemic and the stress nurses were under at the time of the survey.

Prior to the pandemic, Rodney et al. (2021) assessed PTSD in nurses in various work settings as well, including inpatient, outpatient, management, academic setting, licensed but not practicing, licensed but not practicing, and "other". Overall, a prevalence of 28.4% of participants were found to have a presumptive diagnosis of PTSD, but there was no significant difference between medical fields. These results were similar to the findings of this research as there was no statistically significant difference in prevalence of probable PTSD in each specified field of medicine except "all other."

In contrast, a couple other studies prior to the pandemic found an increased prevalence of PTSD in ICU nurses compared to non-ICU nurses (Mealer et al., 2009 & Mealer et al., 2006). Mealer et al. (2009) compared ICU, non-ICU high stress, and other non-ICU nurses at the University of Colorado to learn more about PTSD in different settings. Researchers found that nurses in the inpatient setting were more likely to meet diagnostic criteria for PTSD (20%) than were nurses in an outpatient setting (5%) (Mealer et al., 2009). Overall, the combined groups had a PTSD prevalence of 18%. Similarly, Mealer et al. (2006) compared PTSS in ICU nurses with

non-ICU nurses. This study found 24% of ICU nurses had PTSS, while 14% of non-ICU nurses had PTSS (Mealer et al., 2006).

In summary, it is evident there are fluctuations in prevalence of PTSD between fields of medicine. Various studies prior to and during the pandemic found that ICU, inpatient, and emergency medicine nurses had a higher prevalence of PTSD (Marcomini et al., 2021, Mealer et al., 2009, Mealer et al., 2006). In comparison, this current research study found that there was no difference between fields of medicine, except for a significantly lower prevalence in the "all other" category. Comparing the results from these studies may be better assessed in future research by including more options for medical fields rather than having "all other" as an option (see Further Research).

Emotional Burden in RNs from Working During the Pandemic

Finally, participants rated how emotionally burdened they were from working during the COVID-19 pandemic, using a Likert scale. Since other factors which could cause PTSD were not controlled for, this question aimed to help determine if there was a relationship between probable PTSD and higher perceived emotional burden of working during the COVID-19 pandemic. The data showed those who met diagnostic criteria for probable PTSD had significantly higher levels of emotional burden from the pandemic ($p < .05$), while those who did not meet criteria for probable PTSD had significantly lower levels of emotional burden from the pandemic ($p < .001$) (see Figure 4). Although causation cannot be determined in this study, these results suggest a relationship between perceived emotional burden from the pandemic and the prevalence of probable PTSD. Researchers were not able to compare these results to prior research as no other studies assessed perceived emotional burden from working during the COVID-19 pandemic.

Limitations

It is important to note there were other stressors which could lead to PTSD that were not accounted for in this study. Examples of these could be home stressors, such as relational, financial, or physical ailments. These could also include military experience, physical, sexual, or verbal abuse, the loss of a loved one, and more. Thus, researchers could not conclude that the COVID-19 pandemic caused probable PTSD in participants in this study. This barrier was addressed by comparing the prevalence of PTSD in nurses prior to the pandemic to the prevalence of probable PTSD in this study. In addition, participants filled out a Likert scale to address self-perceived emotional burden from working during the COVID-19 pandemic. This helped to determine whether or not there was a correlation between the pandemic and prevalence of probable PTSD.

Additionally, a cross-sectional study design has a number of limitations which must be addressed in relation to this study. Due to the one-time measurement, cross-sectional studies give no indication of the sequence of events (Levin, 2006). In this study, it was not certain whether the COVID-19 pandemic occurred before, during, or after the onset of probable PTSD. Another limiting factor to a cross-sectional study design is its inability to determine incidence. The prevalence of RNs with probable PTSD could be determined at the time of the study, but the percentage of new cases of probable PTSD could not be determined with this study design (Levin, 2006). A longitudinal design would be beneficial in the future to allow researchers to follow participants over time (See Future Research).

After the surveys were sent out, a new barrier came up for researchers. A few participants emailed researchers asking if they should take the survey since they knew the pandemic had not played a role in their personal journey of PTSD. Their main concern was that they would be

skewing the results. At that time, participants were encouraged to take the survey even if they did not feel the pandemic was related to their PTSD. There may have been other participants who felt the same way, which may have resulted in a couple different outcomes. First, it was possible less individuals participated in the study due to the uncertainty of whether or not they should participate. Second, it may have resulted in more participants who met criteria for probable PTSD with no relation to the pandemic. In the future, it would be beneficial to control for other variables which could lead to PTSD (see Further Research).

Finally, a limitation of the study was lack of participation, which limited the sample size. It is possible participants did not check their email or chose not to take the survey for personal reasons. This barrier was addressed by sending out surveys two additional times to give participants more time to take the survey. Additionally, some of the participants did not finish the survey, which resulted in exclusion from the study. While it would have been great to have everyone in the target population complete the survey, the goal response rate was met.

Further Research

In the future, it may be beneficial to use a longitudinal study to follow the same sample of participants over time. This would result in a proper sequence of events, which allows researchers to observe changes in participants over time (Wagle, 2019). Since researchers would be aware of the sequence of events, it would better identify whether there is a cause and effect relationship. In this case, researchers could examine at what point in time surrounding the pandemic participants developed probable PTSD. Controlling for other variables which could lead to PTSD is another area of research that could be pursued in the future. Although this study showed evidence of a relationship between high emotional burden from the pandemic and prevalence of probable PTSD, a cross sectional study does not allow for causation. Additionally,

it may be helpful to add a control group of participants who did not work during the COVID-19 pandemic. This would allow for researchers to assess whether there was a significant difference of probable PTSD in nurses who worked during the pandemic compared to those who did not work during the pandemic.

Another way to better determine how the pandemic affected the mental health of RNs would be to include additional questions related to their perspective while filling out the PTSD checklist for DSM-5 (PCL-5). For example, asking if their flashbacks or nightmares, if they have them, pertain to working during COVID-19, work apart from COVID-19, or a personal trauma. Asking these additional questions may give better insight into why the participants are meeting criteria for probable PTSD.

An expansion of the fields of medicine would be beneficial for future researchers to pursue as well. The only field of medicine which had a significantly lower prevalence of probable PTSD than expected was the "all other" category. Since there was no way to know which areas of medicine fit into this category, future researchers could expand upon options for the fields of medicine or allow participants to enter their own answer. Interestingly, the finding that all fields of medicine had no statistically significant difference in prevalence of probable PTSD, except for the "all other" category, differed from other studies that looked at PTSD in different fields of medicine. Other researchers found that higher stress or acuity fields of medicine yielded higher rates of PTSD (Marcomini et al., 2021, Mealer et al., 2009, Mealer et al., 2006). There was no way to know why this research differed from others, but it would be interesting for future studies to reexamine this finding within the context of the COVID-19 pandemic. If future research has findings similar to this research, this may open up more avenues to explore what exactly it is about the pandemic that affects people in all fields of medicine.

Similarly, it would also be beneficial to add various demographics, such as age, gender, and years of experience. This would give more insight into whether specific people groups were more likely to suffer from PTSD.

This research could also be furthered by looking into treatment success. There are multiple different PTSD treatment pathways with different medications and therapies. It would be interesting to see if one treatment has a better success rate at treating PTSD in the context of the COVID-19 pandemic. This would have to be performed after many other avenues have been researched as it requires more definitive knowledge that the COVID-19 pandemic did indeed play a large role in the development of PTSD. It may also be beneficial to provide educational information to participants regarding PTSD, as well as various resources which are available to them.

Finally, it may be beneficial for future researchers to pursue a community project regarding PTSD in healthcare professionals. Making educational pamphlets or videos about PTSD would be helpful for healthcare providers to become more aware of the signs and symptoms of PTSD. It would also be helpful to offer various resources available to those who are struggling with PTSD.

Conclusion

Posttraumatic stress disorder is a mental health disorder that is chronic and often debilitating and can manifest in many different ways. There is evidence that disease outbreaks in general have been associated with increased incidence of mental health conditions, specifically PTSD (d'Ettore et al., 2021). Furthermore, researchers aimed to answer three questions regarding PTSD and the COVID-19 pandemic. The first was to determine the prevalence of probable PTSD in RNs who worked during the COVID-19 pandemic. The second was to compare the

prevalence of probable PTSD between different fields of medicine to determine if there were any fields of medicine with a statistically significantly higher or lower prevalence of probable PTSD. The third was to see if there was a statistically significant relationship between the presence of probable PTSD and higher perceived emotional burden from the COVID-19 pandemic. Data was collected by sending out the PTSD checklist for DSM-5 (PCL-5) to RNs associated with MNA and FCNNTC. The participants also received a Likert scale question which asked them to rate their emotional burden from working during the COVID-19 pandemic, as well as what medical field they worked in.

The prevalence of overall probable PTSD was determined using a simple prevalence equation. The second two research questions were statistically analyzed using the chi-square test. The prevalence of probable PTSD in RNs in this research was found to be 42.14%, while in research performed prior to the pandemic, prevalence of PTSD ranged from 12% to 28.4% (Rodney et al., 2021, Laposa et al., 2003, Mealer et al., 2009). There was no statistically significant difference in prevalence of probable PTSD between medical fields except for a lower than expected prevalence in the "all other" group ($p < .05$). These results differed from previous studies, as higher acuity settings, such as ICU nurses, were found to have a higher prevalence of PTSD compared to lower acuity settings (Mealer et al., 2009 & Mealer et al., 2006). Finally, those with probable PTSD had significantly higher levels of emotional burden from the pandemic ($p < .05$), while those without probable PTSD had significantly lower levels of emotional burden from the pandemic ($p < .001$). These results suggest a relationship between perceived emotional burden from the pandemic and the prevalence of probable PTSD. Studies prior to this research have not looked into this topic so there is no research to compare these results to.

Furthermore, the findings of this study may indicate the COVID-19 pandemic had an impact on the psychological health of nurses. With the use of a cross-sectional study design, causation could not be deduced from the results of the study. However, this study has opened up many avenues for future research. It may be beneficial to examine PTSD in nurses using a longitudinal study design, which would allow researchers to follow participants over time and implement a cause and effect relationship. Future researchers could also control for other factors which could lead to PTSD, such as past traumatic experiences other than the COVID-19 pandemic, to better determine how strong of a relationship there is between working during the pandemic and developing PTSD. Additionally, researchers could expand the medical fields and examine whether specific areas of medicine had a higher prevalence of probable PTSD. The results of this study showed that there was no difference in prevalence of probable PTSD in various medical fields, which differed from prior studies. It would be important for future researchers to assess this area of research and find a possible explanation for this difference. Finally, to take this research to the next level, it would be beneficial to compare which treatment regimens are most successful for those who developed PTSD from working during the COVID-19 pandemic.

In conclusion, the results of this study suggest there may be a relationship between the COVID-19 pandemic and development of PTSD. Many individuals do not seek treatment for PTSD due to the stigma and lack of knowledge surrounding mental health, as well as the belief that symptoms will diminish overtime (d'Ettore et al., 2021). Those who suffer from PTSD are two to five times more likely to be at risk for suicidal ideation, suicidal attempts, and death by suicide, marking the significance of the prevention and treatment of PTSD (d'Ettore et al., 2021).

Therefore, continued research regarding the COVID-19 pandemic and PTSD would be greatly valued.

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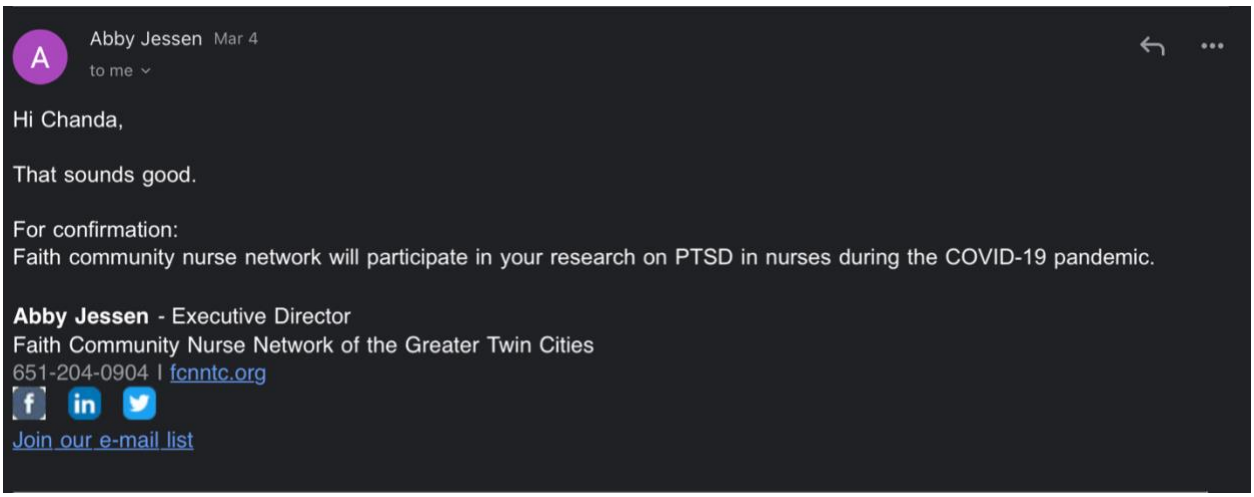
APPENDIX A

Faith Community Nurse Network of the Greater Twin Cities Approval



Abby Jessen Mar 4
to me

Hi Chanda,

That sounds good.

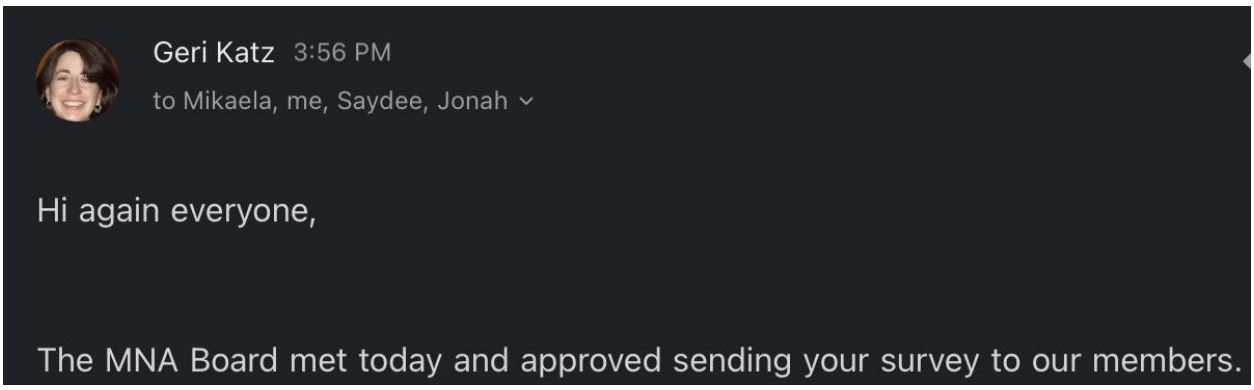
For confirmation:
Faith community nurse network will participate in your research on PTSD in nurses during the COVID-19 pandemic.

Abby Jessen - Executive Director
Faith Community Nurse Network of the Greater Twin Cities
651-204-0904 I fcnntc.org

Join our e-mail list

APPENDIX B

Minnesota Nursing Organization Approval



APPENDIX C

DSM-5 (PLC-5) Survey

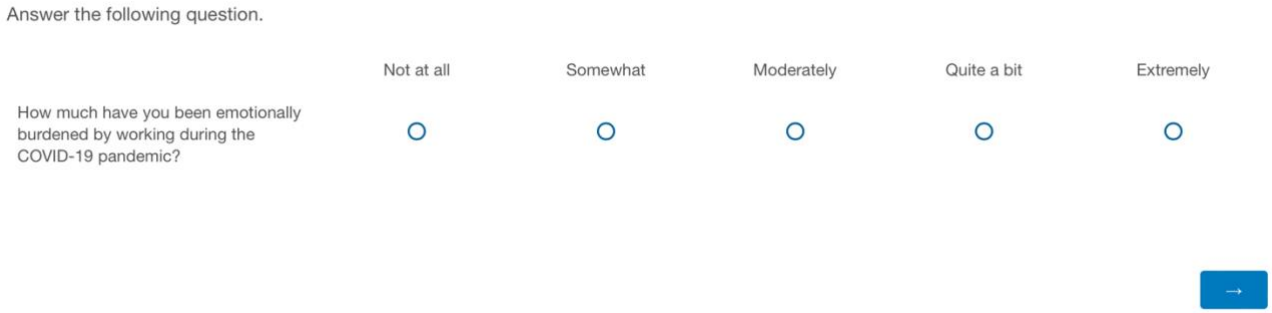
PCL-5

Instructions: Below is a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

In the past month, how much were you bothered by:	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing, and unwanted memories of the stressful experience?	0	1	2	3	4
2. Repeated, disturbing dreams of the stressful experience?	0	1	2	3	4
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?	0	1	2	3	4
4. Feeling very upset when something reminded you of the stressful experience?	0	1	2	3	4
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?	0	1	2	3	4
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	0	1	2	3	4
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	0	1	2	3	4
8. Trouble remembering important parts of the stressful experience?	0	1	2	3	4
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?	0	1	2	3	4
10. Blaming yourself or someone else for the stressful experience or what happened after it?	0	1	2	3	4
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	0	1	2	3	4
12. Loss of interest in activities that you used to enjoy?	0	1	2	3	4
13. Feeling distant or cut off from other people?	0	1	2	3	4
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	0	1	2	3	4
15. Irritable behavior, angry outbursts, or acting aggressively?	0	1	2	3	4
16. Taking too many risks or doing things that could cause you harm?	0	1	2	3	4
17. Being "superalert" or watchful or on guard?	0	1	2	3	4
18. Feeling jumpy or easily startled?	0	1	2	3	4
19. Having diff[illegible] concentrating?	0	1	2	3	4
20. Trouble fa[illegible]r staying asleep?	0	1	2	3	4

APPENDIX D

Likert Scale on the Perceived Emotional Burden from Working During the COVID-19 Pandemic



APPENDIX E

Informed Consent

Dear [Nursing Association],

We are physician assistant students from Bethel University's Physician Assistant Program, conducting research in partial fulfillment of the requirements for a Masters Degree in Physician Assistant Studies. Our study is investigating the prevalence of trauma symptoms in nurses who have worked during the COVID-19 pandemic. We hope to learn more about how the pandemic has influenced the psychological health of nurses.

You were selected as a possible participant in this study because you are a registered nurse who has worked during the COVID-19 pandemic. If you decide to participate, you will be asked to indicate the field of medicine you work in, as well as how much you have been emotionally burdened by working during the COVID-19 pandemic. You will also be asked to fill out a trauma symptom checklist, which is commonly used to assess posttraumatic stress disorder (PTSD). We are collecting data on the level of symptoms often associated with experiences of trauma. Please note that we are not making a formal diagnosis of PTSD, as this must be made by a licensed mental health or medical professional.

Some of the questions may cause discomfort or emotional responses depending on your experience during the pandemic. If you are struggling with trauma symptoms, some resources are listed below:
-SAMHSA's National Helpline - Visit https://www.samhsa.gov/find-help/national-helpline or Call 1-800-662- HELP (4357)
-National Suicide Prevention Lifeline - Call 1-800-273-TALK (8255) or Text "HELLO" to 741741
-Disaster Distress Helpline – Visit https://www.samhsa.gov/find-help/disaster-distress-helpline or Call 1-800-985-5990

This should only take five minutes of your time. Participation is voluntary so you may refuse to participate. Your decision or refusal to participate will not affect future relations with MNA in any way. If at any point you feel you want to withdraw from the research, you may do so without penalty.

Any information obtained in connection with this study that can identify you will remain confidential and will be disclosed only with your permission. In any written reports or publications, no one will be identified and only aggregate data will be presented.

This research project has been reviewed and approved in accordance with Bethel University's Levels of Review for Research with Humans. If you have any questions about the research, please email Chanda Gritters (chanda-gritters@bethel.edu), Saydee Homolka (s-homolka@bethel.edu), Mikaela Morrison (mikaela-morrison@bethel.edu), Jonah Bergstrand (jonahbergstrand@bethel.edu), or Peter Jankowski (pjankows@bethel.edu, Bethel IRB Chair). A copy of the consent form was sent to you with link to this survey.

We understand you have an extremely busy schedule and your time is limited. Please realize your participation is vital to this research. Thank you in advance for your prompt response to this study.

Sincerely,
Chanda Gritters, Saydee Homolka, Mikaela Morrison, and Jonah Bergstrand

By moving on to the next page, you understand the purpose, benefits, and risks of this study, and have consented to participating in the study.

APPENDIX F

Field of Medicine

Please select your work setting.

- Outpatient clinic
- Critical care
- Emergency medicine
- Public Health
- Home care
- All other

APPENDIX G

IRB Approval

BETHEL UNIVERSITY

Institutional Review Board
3900 Bethel Drive
PO2322
St. Paul, MN 55112

May 12, 2022

Chanda Gritters
Bethel University
St. Paul, MN 55112

Re: Project SP-32-22 Posttraumatic Stress Disorder in Registered Nurses during the COVID-19 Pandemic

Dear Chanda,

On May 12, 2022, the Bethel University Institutional Review Board completed the review of your proposed study and approved the above referenced study.

Please note that this approval is limited to the project as described on the most recent Human Subjects Review Form documentation, including email correspondence. Also, please be reminded that it is the responsibility of the investigator(s) to bring to the attention of the IRB any proposed changes in the project or activity plans, and to report to the IRB any unanticipated problems that may affect the welfare of human subjects. Last, the approval is valid until May 11, 2023.

Sincerely,

Peter Jankowski, Ph.D.
Chair, Bethel University IRB