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BEHIND THE FRONTLINE: LINKING LANGUAGE USE TO MENTAL HEALTH
OUTCOMES IN ICU NURSES WORKING DURING THE COVID-19 PANDEMIC

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ABSTRACT

Background: The COVID-19 pandemic has been a time of extreme challenge for the healthcare field and particularly difficult for ICU nurses, whose mental health has declined as a result of increased stress. It is important to recognize nurse burnout early on and intervene promptly to establish safer working conditions, increase job satisfaction and staff retention, as well as improve the mental health outcomes of nurses. Text analysis has been established as a useful tool in understanding psychological states.

Methods: This is a correlational study that examined the associations between emotion language use and levels of burnout in ICU nurses who worked during the COVID-19 pandemic. An online survey was administered to surgical ICU (SICU) nurses at Penn State Health Milton S. Hershey Medical Center. The short version of the Burnout Assessment Tool (BAT-12) assessed current levels of work-related burnout, four open-ended prompts aimed to elicit emotional responses about working during the COVID-19 pandemic, and the BAT-12 was re-administered to assess levels of work-related burnout from March to December 2020. Pearson correlations were used to analyze the associations between emotion language use and levels of burnout.

Results: Twenty-five ICU nurses completed this study and were included for data analysis. Text analysis revealed that a mean of 6.9% of the words used in the open-ended responses were categorized as emotion language, 0.8% of words were positive emotion language, and 5.1% were negative emotion language. Participants' average current burnout was 2.61 (range = 1.50 – 4.00) per BAT-12 and recall burnout level was 2.93 (range = 1.42 – 4.83) per BAT-12. Correlational analyses revealed that total emotion language ($r = 0.439, p = 0.028$) and negative emotion language ($r = 0.490, p = 0.013$) correlated positively with higher levels of recall burnout.

Discussion: ICU nurses recalled experiencing higher levels of burnout from March to December

2020 than they currently experience at work. Participants who used more emotion language to describe their experiences recalled higher levels of burnout from March to December 2020 than those who used less of such language. This study offers a new direction for researching the experiences of nurses working during COVID-19 pandemic and highlights the importance of promoting the mental health of nurses in order to prevent nurse burnout.

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Chapter 1

Introduction

Nurses, among other healthcare professionals, have played a vital role throughout the COVID-19 pandemic, often being referred to as ‘heroes’ and gaining an immense amount of respect and admiration from the public. As frontline workers, nurses’ responsibilities are not only to monitor the status of and provide adequate care to patients, but to prevent the spread of the COVID-19 virus by using personal protective equipment, adhering to standard precautions, and ensuring their own health. Occupational safety is crucial for nurses working during the pandemic, as they are faced with danger on a daily basis (Fawaz et al., 2020). Danger lies in nurses potentially spreading the virus not only among patients and staff, but to their families and surrounding communities. In March 2020, the World Health Organization warned of an impending shortage of personal protective equipment due to increased demands and limited supplies, increasing the immense risk to nurses who relied on this equipment to properly care for patients with COVID-19 and to protect themselves (“Shortage of personal protective equipment endangering health workers worldwide”, 2020). The mental strain placed on nurses as they returned home after each shift, worrying that they could spread the virus to their loved ones, led many to live apart from their families and homes during the initial stages of the pandemic (Marceau et al., 2022).

In addition to the worry of spreading the COVID-19 virus during and after nurses’ shifts, the demand for nursing positions has increased significantly with the pandemic, as the number of people severely ill and requiring hospitalization has spiked. A study by Hoedl et al. (2021)

reported that 75% of nurses have experienced changes in their working hours during the pandemic. Not only has the job itself become more intense with additional stress and fear, but the demand for nurses has led to an often-involuntary increase in working hours. A study by Zhang et al. (2021) revealed that there is a discrepancy between the number of hours nurses prefer to work and how much they have actually worked throughout the pandemic: with hours worked being greater than hours desired. The staffing shortage became so severe that during the winter of 2021, some nurses reported feeling pressured and/or forced to continue working even after testing positive for COVID-19 (Hwang, 2022). The physical strain placed on individuals who are trying to provide care to patients while feeling ill themselves have undoubtedly led to fatigue and exhaustion.

According to the Centers for Disease Control and Prevention, some healthcare workers have experienced symptoms consistent with post-traumatic stress disorder (PTSD) related to working during the pandemic (“Healthcare workers: Work stress & mental health”, 2016). Previous research has shown that the way individuals describe highly emotional experiences correlates with mental health and wellbeing. A study by Fredrickson et al. (2003) suggested that people who displayed positive emotions following crises were more resilient against depression. This study found that in the wake of the September 11th terrorist attacks, individuals with preexisting traits of resilience who expressed positive emotions experienced better psychological outcomes than those who did not experience such emotions (Fredrickson et al., 2003). Analysis of emotion-filled responses to crisis situations has been associated with mental health outcomes.

Significance of Problem

With a greater demand for work and additional pressures associated with the job, nurses have experienced increases in stress levels since the onset of the COVID-19 pandemic. The stressful work environment created as a result of the pandemic can pose serious long-term mental health risks to nurses, including fatigue and burnout, if interventions are not established. It is important to recognize this stress and burnout early on and intervene promptly to establish safer working conditions, increase job satisfaction, and improve the mental health outcomes of nurses.

Purpose of Thesis

The purpose of this thesis is to use a text analysis tool in order to examine the associations between emotion language use and levels of burnout experienced by intensive care unit (ICU) nurses who worked during the COVID-19 pandemic. In allowing individuals to describe their experiences and code the language used, we can identify early on those who may experience long-term mental health struggles. This study aims to answer the following question:

- To what degree is the emotion language used by ICU nurses to describe their experiences working during the COVID-19 pandemic associated with their levels of burnout?

Study Methodology

Prospective design was chosen to accomplish this study. An electronic survey was administered to surgical ICU (SICU) nurses who cared for patients with COVID-19 at Penn State

Milton S. Hershey Medical Center in order to gather information about their experiences, with the goal of eliciting emotional narratives. Participants provided typed responses to four open-ended questions. The short version of the Burnout Assessment Tool (BAT-12) was also administered in order to determine participants' current levels of burnout as well as a recall of their burnout during the time period of March to December 2020. A validated computer program called the Linguistic Inquiry and Word Count (LIWC) was used to analyze the emotion language used in participants' responses. Statistical analyses were performed in order to examine correlations between emotion language use and levels of burnout.

Significance of Study

This thesis holds promise of filling a void in the identification of nurses who are at risk for experiencing work-related burnout. It is particularly important to recognize these individuals early on and intervene promptly to establish safer working conditions, increase job satisfaction and staff retention, as well as improve the mental health outcomes of nurses. This study creates a new awareness of the needs and experiences of nurses working during the COVID-19 pandemic. Further research should explore the effectiveness of different interventions established by healthcare organizations to identify and improve nurse burnout. The findings of this study support the need for continued research regarding nurses' experiences and unmet needs.

Table 1. Definitions

Pandemic: a significant increase in the number of cases of a disease that has spread over several countries or continents (“Lesson 1: Introduction to epidemiology”, 2012)

COVID-19: a highly contagious respiratory disease caused by the SARS-CoV-2 virus; thought to spread from person to person via droplets in coughs or sneezes; most common symptoms are fever, cough, and trouble breathing (“NCI dictionary of cancer terms”, n.d.)

Burnout: an occupational phenomenon resulting from chronic workplace stress; characterized by feelings of energy depletion or exhaustion, negative feelings towards one’s job, and reduced efficacy in the workplace (“Burn-out an ‘occupational phenomenon’: International classification of diseases”, n.d.)

Intensive care unit (ICU): an organized system to care for critically ill patients, providing intensive and specialized medical and nursing care, careful monitoring, and multiple methods of organ support to sustain life during a critical time period (Marshall et al., 2017)

Emotion language: descriptive words, often adjectives, that convey how the author feels, evoke an emotional response, or persuade the reader of something (“Emotional language in literature”, 2023)

Text analysis: the process of classifying and extracting meaningful information from words, involves detecting and interpreting trends and patterns to obtain insights about the language used (“What is text analysis?”, 2019)

Linguistic Inquiry and Word Count (LIWC): a text analysis software that calculates the percentage of words in a given text that fall into one or more of dozens of linguistic and psychological categories indicating various social, cognitive, and affective processes (“Linguistic Inquiry and Word Count (LIWC)”, n.d.)

Summary

The COVID-19 pandemic has placed a tremendous strain on our healthcare system, resulting in increased workloads and nursing staff shortages. There is a great need to understand

the experiences of nurses who have worked during the COVID-19 pandemic and study the burnout experienced as a result of this work. The LIWC software will be a useful tool in analyzing the text of participants' responses to open-ended survey questions regarding their experiences working during the COVID-19 pandemic.

Chapter 2

Review of Literature

In this chapter, literature on the experiences of nurses working during the COVID-19 pandemic, as well as the use of the Linguistic Inquiry and Word Count (LIWC) software in examining the associations between language use and mental health outcomes were reviewed. Two databases, PubMed and PsycINFO, were used to identify existing literature. While many studies have conducted research on various aspects of these topics, none have used the LIWC software to examine the associations between language use and the mental health of nurses caring for patients with COVID-19, which highlights the need for this study.

Using the search terms “(linguistic inquiry and word count OR LIWC) AND (predict mental health OR mental health outcomes)” in the two databases, 58 results were obtained. Inclusion criteria included (1) scholarly journals, (2) articles published since 2017, and (3) analysis of mental and emotional wellbeing. Four duplicates were found among the two databases; thus, 22 articles were retrieved for full evaluation. Thirteen studies were removed for failing to meet all inclusion criteria, and nine were retained for inclusion in the literature review. This process is depicted in Figure 1.

An additional literature search was conducted using the terms “(COVID-19 OR COVID OR coronavirus) AND (nurses) AND (depression OR stress OR burnout) AND (qualitative)” solely in PubMed. One hundred sixty-nine initial results were obtained. Inclusion criteria included (1) articles published since 2022, (2) English language, and (3) surveys of the experiences of nurses during the pandemic. At the time of this literature search, 30 articles were

retrieved for full evaluation. Twenty-two studies were removed for failing to meet all inclusion criteria, and eight were retained for inclusion in the literature review. This process is depicted in Figure 2. It is important to note that this literature search was conducted in mid-March 2022.

Figure 1. Literature Review Tree: LIWC and Mental Health Outcomes

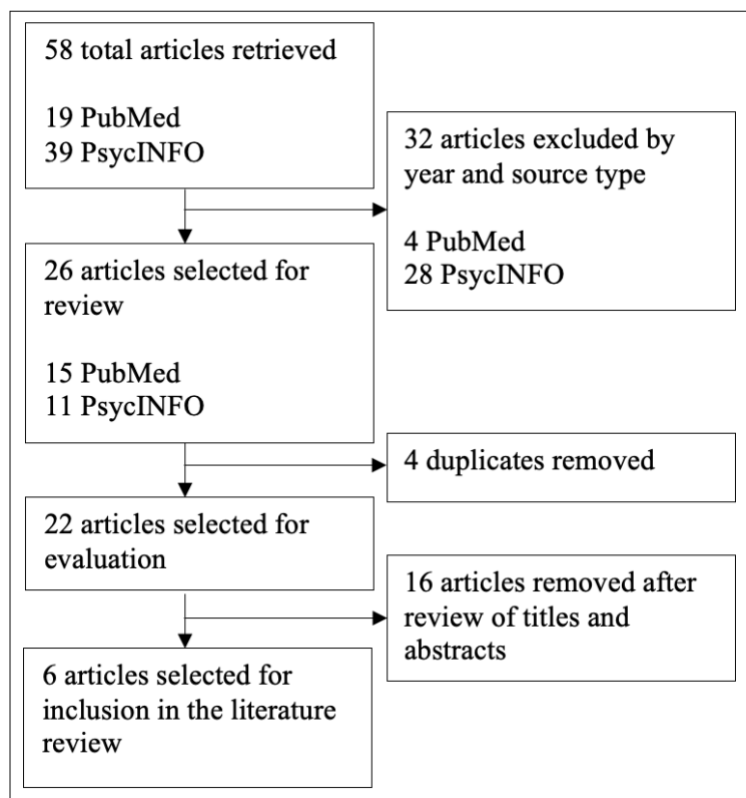
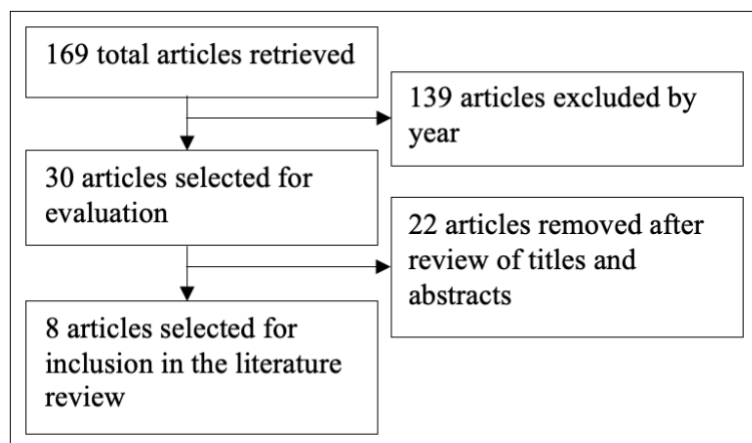


Figure 2. Literature Review Tree: COVID-19 and Nurses' Mental Health



Severity of the COVID-19 Pandemic for Nurses

While the COVID-19 pandemic has affected almost every profession in some way, the work of nurses has changed in ways that no healthcare professional could have ever imagined. Adjustments have been required to almost every aspect of the job, from increased working hours and changes in staff, to increased patient deaths and heightened fears of infection. The burdens of this pandemic have been greater than our healthcare system was prepared for and significant stresses on staff, resources, and patients has resulted from a lack of crisis preparedness (Ghorbani, 2022).

A study by Marceau et al. (2022) found that nurses impacted by the COVID-19 pandemic have experienced a deterioration of working conditions. Nurses of this study reported a significant increase in working hours, between mandated overtime and changes in employment status from part-time to full-time. The reorganization of work due to the pandemic has led some nurses to redeploy to different units or healthcare establishments and to change shifts or have irregular schedules. Additionally, some retired nurses have returned to work in order to fill

positions after other nurses retired early or left the profession (Marceau et al., 2022). According to a study by Hallgren et al. (2021), certified registered nurse anesthetists at a hospital in Sweden were transferred on short notice to care for critically ill patients with COVID-19 in the ICU, a role that is not within their specialty. Feelings of unpreparedness, ambivalence, and insecurity arose from nurses in these situations of redeployment (Hallgren et al., 2021). The departure of previous staff, addition of new staff, and increase in tasks (including disinfection and donning/doffing personal protective equipment) have contributed to work overload and resulted in a decrease in the quality of patient care (Marceau et al., 2022).

Unique Experiences of ICU Nurses

The intensive care unit (ICU), as its name suggests, is a setting of increased gravity with patients in extremely critical states who require the most complex care. Traditionally, ICU nurses have been challenged to care for dying patients and their families. The COVID-19 pandemic has heightened the intensity of ICU nurses' work demands, with increased levels of patient acuity and increased numbers of patient deaths (Levi & Moss, 2022). Along with this increased mortality, ICU nurses have been constantly witnessing patients with COVID-19 and their families in extremely vulnerable states as they say goodbye to one another. During certain points of the pandemic, many hospitals did not allow visitors until patients were in their most critical condition and others did not allow visitors at all, creating an additional burden for nurses to facilitate telecommunications with the patients' loved ones, as well as remain with patients in their final moments of life (Levi & Moss, 2022). Of healthcare workers, ICU nurses have rich

experiences in caring for patients critically ill with COVID-19, as they confront death every shift and have undergone significant changes in nursing practice (Levi & Moss, 2022).

Impact of COVID-19 on Nurses' Mental Health

There have been a number of studies published since the onset of the pandemic that have equated the experiences of nurses working during the COVID-19 pandemic to traumatic events that could result in the development of post-traumatic stress disorder (PTSD). A study by Levi and Moss (2022) found that seven out of 10 ICU nurses caring for patients with COVID-19 met diagnostic criteria for PTSD. One nurse in this study reported frequently re-experiencing an episode of trying to save her patient's life, recognizing that flashbacks of trauma are characteristic of PTSD. These nurses described an emotional toll from not only caring for critically ill patients and witnessing death every day, but an intense fear of bringing the virus home to their own families (Levi & Moss, 2022). The ambiguity in communication from hospital administration regarding infection control policies led to additional confusion and stress about the transmission of this virus for many nurses (Marceau et al., 2022).

Feelings of fear, anxiety, and worry have consumed nurses' minds not only during work but have extended into their personal lives as well (Ahmadidarrehsima et al., 2022). While the public has generally appreciated the role of nurses in combating the COVID-19 pandemic, many people have feared the risk of viral transmission from healthcare professionals. According to a study by Marceau et al. (2022), some nurses reported experiencing social discrimination as a result of their profession, including being denied access to businesses and rejected from social settings. Additionally, familial and marital strains were reported as a result of increased stress

and tension, social isolation, lack of physical contact with loved ones, and difficulties balancing work and personal life (Marceau et al., 2022). According to a study by Ghorbani et al. (2022), one nurse reported not seeing her children for about a month and another shared that her husband separated himself once she began caring for patients with COVID-19.

Text Analysis in Understanding Psychological States

Researchers have analyzed the way individuals express emotional experiences as a method of understanding their psychological states. Responses to crisis situations are emotion-filled and serve as sources of rich, detailed language. The Linguistic Inquiry and Word Count (LIWC) software has been established as a useful text analysis tool in psychology, categorizing text into linguistic and psychological domains (Ziemer & Korkmaz, 2017). In conjunction with measures such as depression and anxiety scales, this method has shown promise for understanding mental health.

A study by Bloomer et al. (2015) examined the language used by pediatric and neonatal ICU nurses in describing their experiences caring for dying patients using the LIWC software. It was found that analyzing interviews for emotion language can provide insight into work-related psychological stressors (Bloomer et al., 2015). Additionally, a study by Wardecker et al. (2017) used the LIWC software to reveal that survivors of childhood sexual abuse who used more emotion language, both positive and negative, to describe their trauma had better psychological outcomes than those who used fewer such words. It was discussed that this association may reflect the idea that individuals who use emotion language are more cognizant and in tune with their mental state (Wardecker, 2017).

Similarly, a study by Burkhardt et al. (2021) showed the use of more plural and fewer singular pronouns in less depressed individuals in online therapy chat logs, suggesting that word choice reflected participants' psychological state. A study by Moore et al. (2021) examined how people of different ages experienced the COVID-19 pandemic and revealed that language provided insight into how individuals thought and felt during this time of crisis. The study found that younger people were more anxious and self-focused, while older people were more concerned with health (Moore et al., 2021).

Understanding individuals' psychological states in times of distress shows promise to the field of psychology in helping reframing thought processes about such experiences. Improving the ability to express emotions may be beneficial when describing highly emotional experiences (Wardecker et al., 2017). This psychosocial approach is known as Cognitive Behavioral Therapy and includes discussing one's experiences as a way to become aware of their thought processes and view challenging situations more clearly in order to respond to them in a more effective way (Mayo Foundation for Medical Education and Research, 2019).

Novelty of Current Research

Text analysis will be used in this study to analyze the emotion language used by ICU nurses who worked during the COVID-19 pandemic in order to determine whether there is a correlation between the way individuals discuss their experiences and their levels of burnout. The traumatic nature of the COVID-19 pandemic in healthcare settings provides an opportunity to utilize the narratives of ICU nurses in order to better understand their psychological states and discuss long-term mental health outcomes.

Summary

The COVID-19 pandemic has been a time of extreme challenge for the healthcare field and particularly difficult for ICU nurses, whose mental health has declined as a result of increased stress. Text analysis has been established as a useful tool in understanding the psychological states of individuals. This study used text analysis to analyze the narratives of ICU nurses who described their experiences working during the COVID-19 pandemic and examined the associations between emotion language use and levels of burnout.

Chapter 3

Methods

This is a correlational study that examined the associations between emotion language use and levels of burnout experienced by ICU nurses who worked during the COVID-19 pandemic using the LIWC-22 software. It is important to understand how the mental health of nurses has been affected by the pandemic in order to identify early on those who may experience long-term mental health struggles. This study aims to answer the following question: To what degree is the emotion language used by ICU nurses to describe their experiences working during the COVID-19 pandemic associated with their levels of burnout? This study was approved by the Institutional Review Board (IRB) at Penn State in October 2022, prior to engaging with any human subjects.

Sample and Setting

This study aimed to recruit ICU nurses who provided critical care for patients with COVID-19 during the initial phases of the pandemic. Convenience sampling was used to recruit participants from the surgical ICU (SICU) at Penn State Health Milton S. Hershey Medical Center, as this unit cared primarily for patients with COVID-19 from the time period of March to December 2020. Inclusion criteria for this study was (1) current registered nurses at Penn State Health Milton S. Hershey Medical Center, (2) worked in the surgical ICU (SICU) at Penn State Health Milton S. Hershey Medical Center caring for patients with COVID-19 during the time period of March to December 2020, (3) English speakers, and (4) U.S. residents.

Recruitment and Screening

A study invitation was sent electronically in mid-November 2022 to the nurses of the surgical intensive care unit (SICU) at Penn State Health Milton S. Hershey Medical Center. This recruitment email outlined the goal of the study, inclusion criteria, study procedures, and financial compensation. Participants were invited to complete a one-time online study in Qualtrics with an optional compensation of \$15. Any participant who wished to receive a \$15 Amazon gift card could follow a separate link to provide their email address after completing the survey. The recruitment email was resent after one week to reinvite any individuals who may not have read the initial study invitation and the survey remained open for approximately two weeks until early December 2022. The target sample size was ten participants.

Measures

Measures of this study include (1) demographic information and (2) burnout assessment. The demographic information section included eight questions and was administered to participants at the start of the survey: (1) age, (2) gender, (3) race/ethnicity, (4) start date of first nursing job (month, year), (5) nursing position at the start of the COVID-19 pandemic (already working in the ICU or working in a different healthcare setting and transferred to the ICU in order to care for patients with COVID-19), (6) relationship status for the majority of March to December 2020, (7) number of individuals that lived in participants' household from March to December 2020, and (8) start and end dates of time working with patients with COVID-19 in the ICU (month, year). Demographics were expected to be primarily white females.

The burnout assessment section included three main sections: (1) the short version of the Burnout Assessment Tool (BAT-12) to measure levels of burnout related to current work-related feelings/emotions (Appendix A), (2) open-ended prompts to describe personal experiences caring for patients with COVID-19 from March to December 2020 (Appendix B), and (3) the BAT-12 to measure levels of burnout related to feelings/emotions during the time period of March to December 2020 (Appendix C).

The Short Version of the Burnout Assessment Tool (BAT-12)

The Burnout Assessment Tool (BAT) is a comprehensive 23-item self-report questionnaire used to measure work-related burnout, developed alongside a shortened 12-item version (BAT-12) so as not to burden respondents unnecessarily. Schaufeli et al. (2020) reported a six-month test-retest reliability (r) of 0.74 for the BAT-12. Participants indicate the degree to which they agree with each of the 12 statements using a 5-point frequency scale with 1 indicating never and 5 indicating always. Burnout scores are computed as the average of the 12 items. Total scores can range from 1 to 5, with higher scores indicating higher levels of burnout.

The BAT-12 (Appendix A) was administered in the beginning of this survey in order to determine participants' current feelings/emotions towards work (*current burnout*) and re-administered at the end of the survey with the verbiage modified to past tense in order to determine participants' feelings/emotions during the time period of March to December 2020 (*recall burnout*). For participants that failed to complete one of the 12 questions, the mean of the other 11 items was calculated and this value replaced the missing item. Participants who failed to complete more than one question were removed from the analysis.

Open-Ended Prompts

Four questions were developed as the main content of this study. These open-ended prompts (Appendix B) aimed to elicit emotional responses from participants regarding caring for patients with COVID-19 during the time period of March to December 2020. Development of these prompts began with identifying target themes of information and then scripting questions to prompt such narratives. Questions asked about participants' work experiences, how their personal lives were affected, where they felt the most and least support, and whether there was a time they considered leaving their job and/or the nursing profession. No word minima or maxima were required; participants were encouraged to share as much detailed information as possible.

Text Analysis

Text analysis was performed on participants' responses to the open-ended prompts using the Linguistic Inquiry and Word Count (LIWC) computerized software program, which categorizes text into linguistic and psychological domains ("Linguistic Inquiry and Word Count [LIWC]", n.d.). The LIWC-22 is the newest version of this software, which analyzes the words within a given text file and calculates the percentages of words that are represented in each of the dozens of linguistic categories (Boyd et al., 2022). These categories range from affect and cognition to lifestyle and culture; many contain subcategories which further classify the language.

Responses to the four open-ended prompts were compiled into one comprehensive text file per participant, each of which were previewed and corrected for spelling/grammatical errors prior to introduction to the software program. In order to standardize the language among each

text file, medical abbreviations were expanded (e.g., respiratory therapist instead of RT) and words were used to express numbers (e.g., seven instead of 7). Participants' total word count for the open-ended responses ranged from 25 to 1364 ($M = 225.64$).

The LIWC-22 was used to analyze the narratives of participants in describing their experiences caring for patients with COVID-19 from March to December 2020 to generate themes among the text. This study focused on three linguistic categories which have proven useful in previous research (Wardecker et al., 2017): total emotion, positive emotion (e.g., good, love), and negative emotion (e.g., bad, hate). In the LIWC-22 database, a total of 1030, 337, and 618 words are included in the total emotion, positive emotion, and negative emotion categories, respectively. The software identifies the number of such words within a piece of text and reports the data as a percentage.

Statistical Analysis

Statistical analyses were performed using IBM® SPSS® statistical software. Demographic information, LIWC-22 data, and burnout scores were analyzed using descriptive and frequency statistics. Descriptive statistics were used for total emotion, positive emotion, negative emotion, recall burnout levels, current burnout levels, word count, age, and start date of first nursing job. Frequency statistics were used for gender, race, relationship status from March to December 2020, nursing position until March 2020, as well as start dates, end dates, and duration of time caring for patients with COVID-19 in the ICU. Pearson correlations were conducted to analyze the associations between emotion language use (total emotion, positive

emotion, and negative emotion) and levels of burnout (recall and current burnout levels). P values less than 0.05 were considered significant.

Summary

An online Qualtrics survey was administered to the SICU nurses at Penn State Health Milton S. Hershey Medical Center, which consisted of demographic information and burnout assessment sections (the BAT-12 for current levels of work-related burnout, four open-ended prompts, and the BAT-12 for levels of work-related burnout from March to December 2020). The LIWC-22 was used to categorize the language used in the open-ended prompts into three domains: total emotion, positive emotion, and negative emotion. Pearson correlations analyzed the associations between emotion language use and levels of burnout.

Chapter 4

Results

The purpose of this analysis is to determine the degree to which emotion language use correlates with levels of burnout. Correlational analyses were conducted to examine the associations between emotion language use (represented as a percentage of total words) and Burnout Assessment Tool (BAT-12) scores, both recall and current.

Thirty-six responses were obtained from the electronic survey. Nine participants were removed from the dataset for failing to meet all inclusion criteria and two additional participants were ruled out due to failing to complete multiple survey questions or providing one-word answers to open-ended prompts. These two individuals did not provide sufficient data to be able to calculate burnout scores and be included for comprehensive text analysis. After excluding 11 total responses, 25 participants were retained for inclusion in data analysis (N = 25).

Participant Demographics

Participant demographics are listed in Table 2. Participants' ages ranged from 24 to 58, with a mean of 39. A total of 88% of participants were female (n = 22) and 12% were male (n = 3). All participants were white (n = 25). For the majority of time between March and December 2020, 52% of participants (n = 13) were married, 24% (n = 6) were living with a partner, 8% (n = 2) were divorced, 8% (n = 2) were single, 4% (n = 1) were separated, and 4% (n = 1) were widowed. The start date of participants' first nursing job ranged from April 1989 to July 2020; participants had a mean of 14.75 years of nursing experience. A total of 96% of participants (n = 24) were working in the ICU setting until March 2020 while only 4% (n = 1) worked on a

different unit (i.e., critical care float pool) until they began caring for patients with COVID-19 in the ICU. As for the start date of participants' time caring for patients with COVID-19 in the ICU, 56% (n = 14) began in March 2020 and 24% (n = 6) began in April 2020. A total of 80% of participants (n = 20) were still working in the ICU setting caring for patients with COVID-19 while participating in this study and 20% (n = 5) stopped between March and June 2022. Participants' duration of time caring for patients with COVID-19 ranged from 17 to 33 months, with 52% (n = 13) reporting 32 months.

Table 2. Descriptive and Frequency Statistics of Participant Demographics

Demographic	Mean \pm <i>SD</i> (range)/ <i>n</i> (%)
Age	38.8 \pm 10.2 (24–58)
Gender, female	22 (88%)
Race, white	25 (100%)
Relationship status	
Married	13 (52%)
Living with a partner	6 (24%)
Divorced	2 (8%)
Single	2 (8%)
Separated	1 (4%)
Widowed	1 (4%)
Start of first nursing job	February 2008 (April 1989 – July 2020)
Nursing position until March 2020	
ICU	24 (96%)
Critical care float pool	1 (4%)
Start of caring for COVID-19 patients in ICU	
February 2020	1 (4%)
March 2020	14 (56%)
April 2020	6 (24%)
September 2020	1 (4%)
October 2020	1 (4%)
Missing data	2 (8%)
End of caring for COVID-19 patients in ICU	
March 2022	2 (8%)
April 2022	1 (4%)
June 2022	2 (8%)
Present	20 (80%)
Duration of time caring for COVID-19 patients in ICU	
17 months	1 (4%)
23 months	1 (4%)
25 months	1 (4%)
26 months	3 (12%)
31 months	3 (12%)
32 months	13 (52%)
33 months	1 (4%)
Missing data	2 (8%)

As shown in Table 3, a mean of 6.9% of the words that participants used in the open-ended responses were categorized as emotion language (i.e., total emotion). Positive emotion

language comprised 0.8% of participants' words, and negative emotion language comprised 5.1%. These calculations were conducted by the LIWC-22 software and are reported as a percentage of the total words in each participant's set of open-ended responses.

Table 3. Descriptive Statistics of the Use of Emotion Language

Item	Minimum	Maximum	Mean	Std. deviation
Total emotion	0.0%	32.4%	6.9%	8.0%
Positive emotion	0.0%	6.1%	0.8%	1.4%
Negative emotion	0.0%	21.4%	5.1%	6.0%

As shown in Table 4, current burnout scores ranged from 1.50 to 4.00 with a mean score of 2.61. Recall burnout scores ranged from 1.42 to 4.83 with a mean score of 2.93. These scores were conducted using the BAT-12; scores can range from 1 to 5, with higher scores indicating higher levels of burnout.

Table 4. Descriptive Statistics of Burnout Levels Based on BAT-12 Scores

Item	Minimum	Maximum	Mean	Std. deviation
Current BAT-12	1.50	4.00	2.61	0.575
Recall BAT-12	1.42	4.83	2.93	0.774

Narrative Description of Experiences

In the open-ended survey responses, participants described their experiences caring for patients with COVID-19 in the ICU setting from March to December 2020 in many ways: sharing feelings of fear, anger, grief, heartbreak, exhaustion, stress, panic, anxiety, depression, helplessness, uncertainty, confusion, social isolation, overstimulation, pressure, and more. Frustration was expressed towards those who did not believe in or take seriously the severity of the COVID-19 situation. Envy was implied of nurses in other units who did not have to work during the initial months of the pandemic and were still being paid. Burdens were felt as many hospital workers, including physicians and maintenance staff, would not enter patient rooms and required nurses to complete additional tasks. Distance grew from family and friends who could not relate to the intense work environment and were fearful of contracting the COVID-19 virus.

Participants recalled feeling the most support from family, significant others, and co-workers during the time period of March to December 2020. Hospital administration was mentioned frequently as providing the least support to nurses during this time, described by one participant as “very removed from the realities of what [nurses] were doing and experiencing on a daily basis”. Participants generally perceived the public to be initially supportive but eventually fearful of nurses spreading the virus and non-compliant to infection prevention protocol. Another participant shared that “there were times [they] would get hollered at, called a liar, and even a killer by people while [they] would be out running errands”.

A total of 60% (n = 15) of participants reported considering leaving their job and/or the nursing profession due to the hardships of working in the ICU during the COVID-19 pandemic; many shared that they remained in their positions out of consideration for their co-workers and patients. Some participants reported that they still consider leaving the nursing profession; one

stated that they “still frequently consider leaving after the damage the pandemic has done”. Caring for patients with COVID-19 in the ICU from March to December 2020 undeniably affected the wellbeing of participants, as they shared many ways in which their health declined. Participant statements included: “[My] mental health slowly deteriorated overtime”, “[My] personal, physical, and mental health suffered”, as well as “I was diagnosed with anxiety and PTSD and have required treatment for these problems”. Disappointment was expressed in the lack of mental health support available during the time period of March to December 2020.

Associations between Emotion Language Use and Levels of Burnout

This study aimed to examine the associations between emotion language use and levels of burnout. Pearson correlations were conducted to analyze the associations between emotion language use and levels of burnout. As shown in Table 5, participants who used more total emotion language in their narratives showed significantly higher levels of recall burnout ($r = 0.439, p = 0.028$) but did not associate with current burnout ($r = 0.296, p = 0.151$). Similarly, participants who used more negative emotion language reported significantly higher levels of recall burnout ($r = 0.490, p = 0.013$) but did not associate with current burnout ($r = 0.375, p = 0.065$). The use of positive emotion language was not shown to correlate significantly with levels of burnout, neither recall burnout ($r = -0.12, p = 0.955$) nor current burnout ($r = -0.57, p = 0.788$). Word count correlated negatively with negative emotion language use ($r = -0.402, p = 0.046$), but did not associate with total emotion language ($r = -0.395, p = 0.051$) or positive emotion language use ($r = -0.179, p = 0.392$).

Table 5. Outcome Measures for Emotion Language

Item		Recall burnout	Current burnout	Word count
Total emotion	Pearson correlated	0.439*	0.296	-0.395
	Sig (2-tailed)	0.028	0.151	0.051
Positive emotion	Pearson correlated	-0.12	-0.57	-0.179
	Sig (2-tailed)	0.955	0.788	0.392
Negative emotion	Pearson correlated	0.490*	0.375	-0.402*
	Sig (2-tailed)	0.013	0.065	0.046

*correlation is significant at the 0.05 level (2-tailed)

Summary

Twenty-five participants were included for data analysis. A mean of 6.9% of the words that participants used in the open-ended responses were categorized as emotion language, 0.8% of words were positive emotion language, and 5.1% were negative emotion language. Current burnout scores ranged from 1.50 to 4.00 with a mean score of 2.61. Recall burnout scores ranged from 1.42 to 4.83 with a mean score of 2.93. Total emotion language ($r = 0.439$, $p = 0.028$) and negative emotion language ($r = 0.490$, $p = 0.013$) correlated positively with higher levels of recall burnout. Emotion language use did not correlate significantly with current levels of burnout.

Chapter 5

Discussion

The goal of this study is to examine the associations between emotion language use and levels of burnout in ICU nurses working during the COVID-19 pandemic. It was found that nurses recall experiencing significant levels of burnout from March to December 2020 and that their levels of burnout remained at the current practice with only a slight decrease. Total emotion language and negative emotion language use correlated positively with higher levels of recall burnout.

Burnout of ICU Nurses Caring for Patients with COVID-19

Results revealed that participants' mean current burnout level was 2.61 (range = 1.50 – 4.00) and mean recall burnout level was 2.93 (range = 1.42 – 4.83). Thus, participants recalled experiencing slightly higher levels of burnout from March to December 2020 than they currently experience at work. Also, recall burnout levels displayed a greater range among participants, while current burnout levels were more consistent among participants. One possible reason for this result is that the hospital work environment has improved over the past three years since the COVID-19 pandemic began. With time, it is likely that healthcare organizations have been able to acquire sufficient resources, increased staff, and better support for nurses as compared to the initial stages of the pandemic in March to December 2020. Another explanation for this finding is that nurses have better adapted to the challenges of caring for patients with COVID-19 over time. Increased experience and skills may better prepare nurses to combat the pandemic today,

thus, subsiding current levels of burnout. Additionally, the COVID-19 pandemic likely affected participants' work and personal lives to various extents. Certain individuals were more significantly impacted by the lifestyle changes related to the onset of the COVID-19 pandemic as compared others (e.g., family dynamics, physical health, financial situations), explaining the variability in both current and recall levels of burnout.

According to the Burnout Assessment Tool User Manual, BAT-12 scores of this study can be compared with that of the Flemish or Dutch workforce in order to interpret the burnout levels of participants (Schaufeli et al., 2020). The average burnout levels of Flemish employees range from 1.51 to 2.35 and the average burnout levels of Dutch employees range from 1.51 to 2.79. Of this study, the mean current burnout score was 2.61 and the mean recall burnout score was 2.93. Thus, the burnout levels for participants in this study (both current and recall) are higher than the average Flemish and Dutch working population. While this result may be attributed to cultural differences between American and European working conditions and lifestyles, it is still significant to note, indicating that participants of this study are experiencing above average levels of burnout. Future research should use the BAT-12 to determine average burnout levels of the American working population, specifically healthcare workers.

Associations Between Emotion Language Use and Levels of Burnout

This study aims to answer the following question: To what degree is the emotion language used by ICU nurses to describe their experiences working during the COVID-19 pandemic associated with their levels of burnout? It was found that participants who used more emotion language to describe their experiences recalled higher levels of burnout from March to

December 2020 than those who used less of such language. Thus, nurses who were more burnt out by the COVID-19 pandemic from March to December 2020 conveyed more emotion in their current narrative descriptions. One possible explanation for this result is that individuals who were more psychologically affected by the COVID-19 pandemic provided a richer description of their experiences than those who were not as impacted. In the field of psychology, it has been suggested that discussing one's highly emotional experiences can promote understanding and reframing of negative thought processes (Wardecker et al., 2017). This psychosocial approach, known as Cognitive Behavioral Therapy, can be applied to the population of nurses whose mental health has been affected by the COVID-19 pandemic. Future research should examine whether discussing negative thoughts and feelings regarding the COVID-19 pandemic can decrease levels of burnout and improve long-term mental health outcomes in ICU nurses.

Implications for Clinical Practice

The results of this study suggest that nurses recall experiencing significant burnout during the COVID-19 pandemic and that their levels of burnout remained at the current practice with only a slight decrease. Interventions are necessary in order to mitigate the harmful effects of nurse burnout on the healthcare system. To establish safer working conditions, increase job satisfaction and staff retention, as well as improve the mental health outcomes of nurses, healthcare organizations should take a proactive approach that begins with acknowledging the detrimental effects of working during the COVID-19 pandemic on nurses' mental health. This study used a standardized burnout scale to identify nurses who experienced burnout as well as open-ended prompts to understand how the COVID-19 pandemic has affected nurses' lives.

Burnout in the healthcare field impacts not only the physical and mental health of nurses, but ultimately the quality of patient care. According to a study by Ryu and Shim (2021), nurse burnout correlated positively with decreased patient safety, with a larger incidence of medication errors and greater indifference towards patients. It was discussed that improving the work environment for nurses could minimize job stressors and improve burnout, thus, increasing patient safety and improving health outcomes (Ryu & Shim, 2021). It is important to support the wellbeing of nurses, as they are the direct caretakers of patients and play a large role in patient health outcomes. In order for nurses to provide safe and quality patient care, their mental health should be addressed and prioritized.

When asked if there was a time they considered leaving their job and/or the nursing profession from March to December 2020, 60% (n = 15) of participants answered yes. Some reported that they still consider leaving after the damages that resulted from the pandemic. This finding is consistent with a study by Berlin et al. (2022), which reported that 32% of surveyed nurses indicated a likelihood of leaving their current position in November 2021. Factors contributing to their desire to leave included insufficient staffing, inadequate pay, lack of support, and emotional burnout (Berlin et al., 2022). The risk of large numbers of nurses leaving their current jobs and/or the nursing profession has serious implications. An even greater staffing shortage would occur, with additional strain placed on the remaining nurses, worsened nurse-to-patient ratios, and an inevitable impact on the quality of patient care.

Participants of this study frequently mentioned receiving the least support from hospital administration from March to December 2020, described as being detached from and disengaged in the nurses' various struggles in caring for patients with COVID-19. This lack of organizational support is counterproductive to effective healthcare delivery. It is necessary for

nurses to feel supported by their entire healthcare team, including administration. The development and implementation of interventions to promote the wellbeing of nurses should include protection from inadequate staffing, mandatory rest breaks, and monitoring of burnout (Sullivan et al., 2021). Nurses should feel supported by their co-workers, other healthcare professionals, and hospital administration in order to thrive in their work environment and perceive a strong sense of community.

The finding that ICU nurses who used more emotion language to describe their experiences working during the COVID-19 pandemic recalled higher levels of burnout from March to December 2020 is applicable to the field of nursing. Emotion language use correlated with recall burnout levels but did not correlate with current burnout levels, which is an interesting finding that should be explored in future research. These results could be used to determine early on individuals who may be at risk to experience long-term burnout and intervene to prevent poor mental health outcomes. This study also highlights the need to prioritize the wellbeing of nurses who have endured extensive mental and physical strains throughout the COVID-19 pandemic.

Study Strengths and Limitations

This study exhibited both strengths and limitations. There are various strengths that improve the quality of study results. To date, this is one of few studies to examine levels of burnout in ICU nurses who worked during the COVID-19 pandemic. The collection of primary data during an ongoing pandemic provides the opportunity to understand the unique experiences of nurses during a historic time period. Secondly, this study introduced a novel use of the LIWC-

22 software in examining the associations between language use and the mental health of nurses caring for patients with COVID-19. This is the first study to use text analysis to draw associations between ICU nurses' emotion language use and levels of burnout.

This study has various limitations that highlight the need for future research. The sample size of this study was small and limited to nurses from one ICU in one hospital. Results may not be generalizable to other healthcare settings, geographic areas, or the larger population of nurses. Given that the electronic survey was administered in mid-November 2022 and data on burnout during the pandemic was not collected during the time period of interest (March to December 2020), recall bias likely occurred as participants needed to recall their thoughts and feelings from over two years prior. Finally, the results of this study indicate correlation rather than causation. It was found that participants who reported higher levels of recall burnout also used more emotion language, but a definitive causation cannot be concluded.

Directions for Future Research

Future research is necessary in order to establish safer working conditions for healthcare professionals, reduce the incidence and long-term effects of burnout, support the mental health of nurses, as well as increase job satisfaction and staff retention. In continuing research on nurse burnout, we can identify early on those who may be at risk to experience long-term mental health struggles. One avenue for future research is to conduct more extensive interviews to elicit deeper emotional responses and richer descriptive language, and further explore the COVID-19 experiences and workplace needs of nurses. Another direction is to conduct a longitudinal study to evaluate the associations between emotion language use and levels of burnout as well as the

impact of the COVID-19 pandemic on nurses' mental health over time. Additionally, the results of this study should be replicated on a larger scale, including a larger sample size and more diverse sample (e.g., various healthcare settings and geographic areas).

Conclusion

This study offers a new direction for researching the experiences of nurses working during the COVID-19 pandemic and highlights the importance of promoting the mental health of nurses in order to prevent nurse burnout. The findings of this study support the critical need for continued research to address nurses' mental and emotional wellbeing. Future research is needed to further examine the associations between emotion language use and levels of burnout as well as implications for the field of nursing.

Appendix A

The Short Version of the Burnout Assessment Tool (BAT-12) as it relates to current feelings/emotions

Exhaustion

1. At work, I feel mentally exhausted
2. After a day at work, I find it hard to recover my energy
3. At work, I feel physically exhausted

Mental distance

4. I struggle to find any enthusiasm for my work
5. I feel a strong aversion towards my job
6. I'm cynical about what my work means to others

Emotional impairment

7. At work, I feel unable to control my emotions
8. I do not recognize myself in the way I react emotionally at work
9. At work I may overreact unintentionally

Cognitive impairment

10. At work, I have trouble staying focused
11. When I'm working, I have trouble concentrating
12. I make mistakes in my work because I have my mind on other things

Scored on an ordinal frequency scale ranging from 1 (never) to 5 (always)

Appendix B

Open-Ended Prompts

1. What did you experience while caring for COVID-19 patients from March to December 2020 (e.g., thoughts, feelings, working conditions, patients' health statuses, communicating with patients' loved ones)?
2. How was your personal life affected by caring for COVID-19 patients from March to December 2020 (e.g., fear of illness or spreading virus, concern for loved ones, personal physical and mental health)?
3. Where did you feel the most support while caring for COVID-19 patients from March to December 2020? The least (e.g., hospital administration, coworkers, the public, significant others, loved ones)?
4. Was there a time you considered leaving your job and/or the nursing profession while caring for COVID-19 patients from March to December 2020? Why or why not?

Appendix C

The Short Version of the Burnout Assessment Tool (BAT-12) as it related to feelings/emotions during the time period of March to December 2020

1. At work, I felt mentally exhausted
2. After a day at work, I found it hard to recover my energy
3. At work, I felt physically exhausted
4. I struggled to find any enthusiasm for my work
5. I felt a strong aversion towards my job
6. I was cynical about what my work meant to others
7. At work, I felt unable to control my emotions
8. I did not recognize myself in the way I reacted emotionally at work
9. At work I may have overreacted unintentionally
10. At work, I had trouble staying focused
11. When I was working, I had trouble concentrating
12. I made mistakes in my work because I had my mind on other things

Scored on an ordinal frequency scale ranging from 1 (never) to 5 (always)

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