

Evaluating Burnout, Secondary Traumatic Stress, and Sleep Disturbances in Healthcare Professionals During a Global Pandemic

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ABSTRACT

Introduction: For healthcare workers, the COVID-19 pandemic resulted in increased workload, work related stress and patient acuity potentially leading to burnout, secondary traumatic stress (STS), and sleep disruptions. This study aims to assess the prevalence of burnout and STS symptoms, as well as sleep disturbances among healthcare personnel working in the United States during the pandemic.

Methods: Healthcare workers from all disciplines and settings in the United States completed a cross-sectional survey about work and personal characteristics from January 20-March 1, 2021. Participants reported on symptoms of burnout, STS, and sleep disruptions.

Results: A total of 360 participants in the United States responded to the survey with representation from 32 states. The average number of reported burnout symptoms ($M = 5.28$; out of a total of 12 possible symptoms), STS symptoms ($M = 2.88$; 8 possible), and sleep disturbances ($M = 2.29$; 5 possible) suggest a high prevalence of negative emotional and wellness experiences among healthcare workers during the pandemic. No differences based on profession were identified. A significant difference in burnout by age and time in the profession demonstrated the youngest participants experienced more burnout symptoms ($F = 8.04$, $p < 0.001$), as well as those with fewer years of experience in their profession ($F = 6.78$, $p < 0.001$). Correlational analyses demonstrated that increased sleep disturbances had a significant association with increased burnout and STS symptoms, as well as perceived impact of the COVID-19 pandemic. Additionally, the number of STS and burnout symptoms were found to have a moderate, positive correlation, suggesting a relationship between burnout and STS.

Conclusion: Most healthcare professionals working since COVID-19 experience symptoms of burnout, STS, and sleep disturbances. Younger healthcare workers may be more susceptible to negative emotional coping and sleep-related changes. Results suggest symptoms of burnout, STS, and sleep disturbance are interrelated, and also affected by perceived impact of the pandemic. These findings have implications for the state of healthcare workers as a whole.

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INTRODUCTION

The first cases of COVID-19 were diagnosed in the United States in January 2020, and these cases brought with them numerous unforeseen challenges for the country and its healthcare system [2]. This novel and highly contagious virus led to drastic changes for healthcare workers, including increased workplace demands, fear of the unknown, and expanded job roles [2-4]. Cancellations of elective procedures, transition of outpatient appointments to telehealth sessions, and supply shortages further challenged the normalcy of healthcare worker responsibilities [5-7]. Elevated levels of stress occurred in all areas of healthcare, but with great magnitude in emergency settings, intensive care units, and primary care [5].

In many professions, people began working from home to limit transmission of the virus; however, many healthcare

professionals continued to report in-person, to provide direct patient care. Additionally, high transmission of COVID-19 among healthcare workers during the early stages of the pandemic resulted from personal protective equipment (PPE) shortages [4]. Individuals exposed to or diagnosed with the disease were mandated to quarantine, miss workdays, and risked potential exposure to family members, in addition to variable symptoms of illness [4]. Workplace stress increased as there were personnel shortages and high risk of exposure to the virus [3-4]. In many cases, protocols and processes changed, including limited social time during breaks, shifting of work assignments, and altered patient interactions [4]. Healthcare workers in many areas and specialties were asked to work more hours, cover other areas within their organizations, and most importantly, treat patients who were seriously ill as a

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result of the virus [3-5]. Furthermore, in many areas health-care professionals were tasked with making tough decisions on treatment of patients, prioritization of medical equipment due to shortages, and high rates of patient death [4-5]. In addition to challenges in the workplace, many professionals elected to protect their families, some choosing to distance from loved ones. For all of these reasons, during the pandemic healthcare workers were at high risk for both burnout and secondary traumatic stress.

Burnout is a state of physical and emotional fatigue as the result of stress in the workplace [1], while secondary traumatic stress (STS) occurs with exposure to the suffering of others. Although STS and burnout have similar symptomatology, such as physical and psychological changes, STS has a faster onset directly related to exposure to the trauma of another and is associated with feelings of avoidance and isolation. STS could occur in healthcare during the pandemic with experiences such as observation of patients undergoing intubation, isolation from family, or death [1]. Additionally, healthcare workers may be impacted by exposure or involvement in ethical challenges such as dispersion of supplies during a shortage or end of life decisions. The symptoms of exhaustion, cynicism, and inefficiency experienced with burnout [10] differ from avoidance and isolation seen with STS. Individuals that remain in their position following STS may experience decreased productivity and detachment from one's work [1]. Although recovery can occur for burnout and STS, burnout may require changing jobs or other significant workplace changes, while STS is highly treatable once it has been identified [11-12].

Research indicates that frontline healthcare workers during the COVID-19 pandemic reported significant levels of insomnia, depression, and anxiety [12]. In one study, at least 40% of frontline healthcare workers reported symptoms of STS which was attributed mostly to exposure to patients dying from COVID-19 and significant illness or severity of disease of family members or friends [12]. Since sleep may play a role in STS and stress, sleep disturbances may be an important indicator in the experiences of healthcare workers during the pandemic. The purpose of this study is to evaluate burnout and secondary traumatic stress symptoms, as well as sleep disturbances experienced by healthcare professionals working during the COVID-19 pandemic. This study is concerned specifically with the symptoms associated with burnout, STS, and sleep, in an effort to understand the experiences of the healthcare providers working during the COVID-19 pandemic. This approach differs from studies that evaluate the incidence of burnout and STS, which identify the occurrence of the phenomenon and not the experiences with them. Therefore, our research aimed to answer the following research questions:

1. What is the incidence of symptoms related to burnout, STS, and sleep in healthcare professionals working during the COVID-19 pandemic?
2. What is the difference in the incidence of symptoms related to burnout, STS, and sleep reported based on sex, age, profession, and time in the profession?
3. What is the relationship between the number of symptoms of STS, burnout, and sleep disturbances in healthcare professionals working during the COVID-19 pandemic?

4. What is the relationship between symptoms of STS / burnout / sleep disturbances, and an individual's perception of the overall impact of the COVID-19 pandemic in health-care professionals?

METHODS:

Study Design

The following study employed a cross-sectional survey design to answer the four research questions. Participants were recruited to complete a 15–20-minute online survey composed of 20 questions. The electronic survey, administered via Microsoft Forms, facilitated recruitment of a diverse sample, protection of participant confidentiality, and data collection completion in a shorter timeframe. The timing of the survey was critical, as data collection began nine days after a major surge of cases in the spring of 2021 in the United States and seven days after the highest reported seven-day average for COVID-19-related deaths in the United States at that time [17]. Convenience and snowball sampling approaches were utilized to recruit a larger sample of diverse healthcare professionals. The survey link was shared by researchers via social media posts and emails to healthcare leaders. The call for participation was distributed via social media pages, as well as professional healthcare organizations' pages, including the Consortium of Multiple Sclerosis Centers member newsletter, Respiratory Therapy Breakroom Facebook page, respiratory therapy alumni and state society Facebook pages, and a professional fitness group. Additionally, a list of clinical leaders in the community and across the United States was developed and included long-term care facility and acute care departmental leadership. These leaders were invited via email to share the survey link among their teams. The survey link remained active from January 20-March 1, 2021. Follow-up emails and social media posts were distributed after one month of survey availability. Although many of these connections were personal and that may have introduced bias, it allowed for high participation in a quick manner to ensure relevance of responses in regard to the timing of the pandemic. Snowball sampling aimed to recruit participants outside of the researchers' health professional areas and geographic location throughout the United States. All calls for participation included an invitation to share the survey information with other colleagues working in healthcare. Institutional Review Board (IRB) review and approval was completed through the Bellarmine University IRB (#891) prior to data collection.

Participants

Inclusion criteria for participation included any healthcare worker employed and working in healthcare at the time of the survey. These criteria were selected in order to recruit a diverse sample representative of a healthcare system. Upon accessing the Microsoft Forms link, participants gave consent after reading the study protocol. A total of 360 participants from a variety of healthcare backgrounds completed the voluntary online survey via Microsoft Forms.

The Survey

In total, 20 questions were included in the electronic survey

(see Appendix A). The survey asked individuals to report their age range, gender, profession, years in their profession/primary work setting. Additionally, participants were asked to respond to questions about their perceived experience of burnout symptoms as well as questions about how the pandemic may have impacted their sleep. In these questions, participants were able to choose any symptoms that applied. Symptoms of burnout were defined by the Center for Disease Control (CDC) and included feelings of anxiety, irritation, lack of motivation, feelings of overwhelm, feelings of sadness or depression, difficulty sleeping and difficulty concentrating [18]. To determine burnout, the number of symptoms selected by each participant was counted and checked for accuracy by both researchers. A total of 12 burnout symptoms were available for participants to identify, as well as an option for no symptoms. Participants also identified symptoms of STS and sleep disturbances. A total of eight STS symptoms such as flashbacks, disturbed sleep, and emotional numbness were identified from the literature and included in the item [19-21]. Participants chose from five sleep disturbances, including: waking up often, difficult falling asleep, and decreased sleep quantity. One Likert-type item asked participants to rank the perceived impact of the COVID-19 pandemic on their life, with 0 being no impact and 10 being constant impact. Although the survey is not a validated tool, face validity was established through two reviewers with survey research, data collection, healthcare experience, and burnout expertise.

Data Analysis

Anonymous survey results were downloaded from Microsoft Forms to SPSS version 26 statistical software. Data was coded to include the total number of burnout symptoms, STS symptoms, and sleep disturbances reported by each participant. Descriptive statistics evaluated the mean and standard deviation for each outcome variable in all participants and by demographic groupings. Comparison of means was performed for each group. The final statistical analyses were performed to evaluate the relationships between the number of reported STS symptoms, sleep disturbances, burnout symptoms, and perceived impact of the COVID-19 in healthcare professionals working during the COVID-19 pandemic.

RESULTS

A total of 360 surveys were completed. Most participants identified as female and represented a wide variety of health professions. Participants aged 26 to 35 years old and 36 to 45 years old represented the most frequently identified age groups. Healthcare experience was measured by number of years in profession ranging from less than two years to greater than 20

Table 1: Number of Reported Burnout Symptoms, STS Symptoms, and Sleep Disturbances based on participant demographics

Demographics	N (%)	Mean Number of Burnout Symptoms (SD)	Mean STS Symptoms (SD)	Mean Number of Sleep Disturbances (SD)
Gender				
Male	28 (8)	5.11 (3.22)	2.57 (2.01)	1.93 (1.70)
Female	309 (86)	5.31 (2.84)	3.06 (1.98)	2.33 (1.54)
Age (years)				
< 25 years	19 (5)	7.16 (2.67)	3.11 (1.91)	2.47 (1.54)
26-35 years	118 (33)	5.72 (2.79)	3.23 (1.98)	2.50 (1.51)
36-45 years	118 (33)	5.44 (2.80)	3.30 (2.00)	2.32 (1.56)
46-55 years	59 (16)	4.88 (2.95)	2.71 (1.98)	2.34 (1.73)
>55 years	45 (13)	3.49 (2.42)	1.96 (1.76)	1.62 (1.35)
Time in Profession				
< 2 years	22 (6)	6.05 (3.26)	2.50 (1.90)	2.00 (1.35)
2-5 years	55 (15)	6.58 (2.46)	3.40 (1.51)	2.80 (1.42)
6-10 years	72 (20)	5.47 (2.82)	3.39 (2.19)	2.35 (1.57)
11-15 years	67 (19)	4.84 (2.57)	2.98 (2.05)	2.30 (1.60)
16-20 years	59 (16)	5.76 (2.98)	3.42 (1.98)	2.49 (1.60)
>20 years	85 (24)	4.07 (2.78)	2.24 (1.89)	1.84 (1.57)
Healthcare Profession				
Physician/physician extender	80 (22)	5.36 (2.94)	3.18 (2.12)	2.27 (1.69)
Nurse	60 (17)	5.33 (3.00)	2.92 (1.96)	2.54 (1.56)
Rehabilitation Professionals	91 (25)	4.76 (2.60)	3.11 (1.96)	2.08 (1.48)
Respiratory Therapy	80 (22)	5.90 (3.00)	2.84 (2.11)	2.27 (1.61)
Administration	13 (4)	4.77 (2.59)	2.15 (1.28)	2.54 (1.39)
Support Staff	6 (2)	4.33 (3.93)	2.83 (1.33)	2.33 (1.03)
Other	28 (8)	4.96 (2.65)	2.32 (1.59)	2.32 (1.59)
Cumulative Reported Scores				
All participants	360	5.29 (2.88)	2.99 (1.99)	2.29 (1.57)

years. Participants were included from 32 different states, with the majority of participants (73.6%) from Kentucky (n =265). This study did not account for any healthcare experience prior to the individual's current professional position. Demographic characteristics are further summarized in Table 1.

1. Incidence of Symptoms Related to Burnout, STS, and Sleep

To address the first study aim, mean scores for the number of burnout symptoms, STS symptoms, and sleep disturbances were evaluated. Means and standard deviations for each outcome variable, based on the total number of symptoms and sleep disturbances identified by participants, are reported as a cumulative total and by demographic grouping are included in Table 1. Results revealed the cumulative average number of burnout symptoms reported was 5.28 (out of a total of 12 possible symptoms). All but five participants (1.4%) identified at least one symptom of workplace burnout. Participants identifying six or more symptoms of burnout represented 45.2% of respondents, while 24.4% identified three or four symptoms. Healthcare professionals who participated in the survey, on average, reported an average of 2.29 sleep disturbances (out of a total of 5 possible symptoms) and 2.99 STS symptoms (out of a total of 8 possible symptoms). Using a 10-point Likert scale, the average perceived impact of COVID-19 on one's life was high (M=7.53, SD = 1.80).

2. Burnout, STS, and Sleep Variance by Sex, Age, Exposure, and Profession

Gender

An alpha level of $p = 0.05$ was established for all statistical tests comparing means between groups. Independent samples t -tests revealed no statistically significant difference in burnout symptoms ($t(334) = -0.345, p = 0.732$), STS symptoms ($t(334), -1.24, p = 0.22$), and sleep disturbances ($t(334) = -1.31, p = 0.19$) when comparing males to females. Homogeneity of variance was confirmed using Levene's test; all p values were greater than 0.05. Although the assumption of normality was violated in the burnout dataset in this case, results were confirmed via Mann-Whitney non-parametric testing ($U = 4220, p = 0.83, r = -0.012$).

Age

Differences in the incidence of burnout symptoms, STS symptoms, and sleep disturbances between age groups were evaluated using a one-way ANOVA analysis, which demonstrated a statistically significant difference in the number of burnout and STS symptoms by age, with older health professionals generally identifying fewer symptoms of burnout ($F = 8.041, p < 0.001$) and fewer symptoms of STS ($F = 4.627, p = 0.001$). Post hoc comparisons using Bonferroni test indicated that the number of burnout symptoms experienced by healthcare providers older than 55 years of age ($M = 3.49, SD = 2.42$) was significantly lower than those aged less than 25 years ($M = 7.16, SD = 2.67, p < 0.001$), 26-35 years ($M = 5.72, SD = 2.79, p < 0.001$), and 36-45 years ($M = 5.44, SD = 2.80, p = 0.001$). Additionally, there was a statistically lower number of burnout symptoms reported by individuals aged 46-55 years old ($M = 4.88, SD 2.95$) when compared to those less than 25 years old ($p = 0.02$). When evaluating STS symptoms between groups, a significant difference was noted between those older than 55 years old ($M = 1.96, S = 1.76$) compared with those aged 26-35 years old ($M = 3.23, SD = 1.98, p = 0.001$), as well as those aged 36-45 years old ($M = 3.30, SD = 2.00, p = 0.001$). Although there was a statistically significant difference between age groups when comparing number of sleep disturbances ($F = 2.73, p = 0.029$), within-group analysis based on age revealed specific significance only for participants aged 26-35 years old ($M = 2.47, SD = 1.54$) compared with those greater than 55 years ($M = 1.62, SD = 1.35, p = 0.01$).

Time in Profession

One-way between-group ANOVA analysis revealed a significant difference in the number of burnout symptoms based on time in profession ($F = 6.78, p < 0.001$). Post hoc comparisons using Bonferroni test indicated that the number of burnout symptoms experienced by healthcare providers who practiced for 2-5 years had significantly more burnout symptoms ($M = 6.58, SD = 2.46$) compared to those who practiced 11-15 years ($M = 4.84, SD = 2.57, p = 0.009$); providers who practiced 6-10 years had significantly fewer burnout symptoms ($M = 5.47, SD, 2.82$) compared to those who practiced 16-20 years ($M = 5.76, SD = 2.98, p = .026$). Finally, those practicing for more than 20 years had a significantly smaller number of burnout symptoms ($M = 4.07, SD = 2.78$) compared to those who practiced fewer than 2 years ($M = 6.05, SD = 3.26, p = 0.046$), 2-5 years ($p < 0.001$), and 16-20 years ($p = 0.005$). Professionals with more than 20 years of experience reported the fewest STS symptoms ($M = 2.24, SD = 1.89$), which was significantly fewer than those with 2-5 years' experience ($M = 3.40, SD = 1.51, p = 0.01$) and 6-10 years of experience ($M = 3.39, SD = 2.19, p = 0.004$). Although there was a difference in reported sleep disturbances based on experience ($F = 3.05, p = 0.01$), post hoc testing revealed that only those with 2-5 years of experience ($M = 2.80, SD = 1.42$) significantly differed from those with more than 20 years of experience ($M = 1.84, SD = 1.57, p = 0.005$).

Profession

While there was no difference in the number of burnout symptoms reported based on profession, respiratory therapists reported the highest number of symptoms ($M = 5.90, SD = 3.00$) and rehabilitation professionals reported the highest number of STS symptoms ($M = 3.11, SD = 1.96$).

3. Relationship of Symptoms of STS, Burnout, and Sleep Disturbances

Using Pearson's correlation, results of the survey demonstrated a positive and significant correlation between all tested variables, as demonstrated in **Table 2**. Sleep disturbances demonstrated a moderate correlation to the number of reported STS symptoms, and the number of reported burnout symptoms. The number of reported STS symptoms were also moderately correlated to the number of burnout symptoms.

Table 2: Pearson correlations

	Sleep Disturbances	STS Symptoms	Burnout Symptoms	Perceived Impact of COVID-19
Sleep Disturbances	1			
STS Symptoms	.63**	1		
Burnout Symptoms	.53**	.69**	1	
Perceived impact of COVID-19	.17**	.34**	.40**	1

* Correlation is significant at the 0.05 level.

** Correlation is significant at the 0.01 level.

4. Relationship with Perception of the Impact of COVID-19

The perceived impact of the COVID-19 pandemic was moderately correlated to STS symptoms. A weak, yet significant, correlation between the number of reported sleep disturbances and perceived impact of the pandemic was also noted.

DISCUSSION

As clinicians working during the pandemic, the researchers of this study observed various symptoms of burnout, STS, and sleep dysfunction among coworkers across numerous demographics, professions, and job settings. Reports of the drastic changes to the healthcare system likely have implications to the mental wellness and sleep habits of those exposed to the healthcare system during pandemic times [2-7]. Physician burnout has been estimated to be around 50% prior to the COVID-19 pandemic, affecting practicing physicians and those still in training [9]. Factors affecting burnout among physicians include workload or intensity, call hours and work-life imbalance [9, 22]. A large systematic review reported emotional exhaustion prevalence between 31-54% and decreased personal accomplishment of 6-44.5% [22]. Studies evaluating nurses reported 11.2% burnout in the United Kingdom in 2003, prior to the pandemic [23]. In a survey among nurses in the United States in 2018-2019, 31% reported workplace burnout as the primary reason of leaving their job, and 60-68% reported burnout as a factor related to workplace stress or consideration of leaving their job [24]. Pre-pandemic burnout rates in critical care have been reported at 50% for physicians and 33% for nurses [23-24]. Additionally, some settings reported higher levels of burnout, including emergency medicine, general practice and neurology [22-24].

Several authors investigated healthcare worker burnout since the onset of the COVID-19 pandemic. For example, a survey-based study of healthcare professionals in India reported personal burnout of 44.6% and workplace burnout at 26.9% as the result of COVID-19 [25-26]. This study also found younger workers (aged 21-30) and females reported higher levels of workplace burnout. Additionally, physicians reported 1.64 times more burnout than other professionals, but support staff reported the highest burnout rate at five times above other groups [25]. Lack of equipment, overcrowding of facilities, and ethical or moral conflicts were identified in the literature as some of the challenges faced by healthcare workers during the pandemic that may be attributed to increased levels of workplace stress and burnout [18, 27-29].

Secondary traumatic stress syndrome (STS) is defined as “stress derived from helping others who are suffering or have been traumatized” [31]. The phenomenon represents the negative behaviors and emotions one experiences as a direct result of caring for or working with an individual who has been traumatized [19]. Symptoms of STS often fall into three major categories: intrusion, avoidance, and arousal [20]. Intrusion may include imagery, such as vivid dreams, nightmares and/or flashbacks. Avoidance may present as difficulty expressing feelings or emotional numbness, as well as difficulty concentrating and increased mal-adaptive behaviors, such as increased alcohol or drug consumption. Symptoms in the arousal domain might

include irritability and disruptions in sleep. STS has been documented in multiple areas of healthcare, including emergency room nurses who witnessed trauma and social workers who witnessed abuse or neglect, as well as oncology healthcare professionals, those involved in crimes, among others [21, 32-33]. In each of these cases, professionals are impacted by their observation of and proximity to another person’s trauma.

Inadequate sleep habits of physicians has previously been evaluated as a factor in negative patient outcomes [34]. Trockel et. al. evaluated over 11,000 physicians and demonstrated a high prevalence of physician sleep deprivation was associated with medical error potential [34]. Another study by Fahrenkopf et. al. showed a positive and significant relationship between burnout and depression and the likelihood of medication errors [35]. Badahdah et. al. studied 150 healthcare workers and found that one third reported symptoms of anxiety, one half reported symptoms of depression, and 40% reported a decrease in sleep quality since the onset of COVID-19 [38]. Research by Stewart et. al. has shown a significant prevalence of poor sleep among healthcare workers since the onset of the COVID-19 pandemic [39]. In a study of 963 participants, 96% of participants reported poor sleep quality. Additionally, 61% of participants reported that their sleep issues included nightmares or chronic disturbances in sleep [39]. Additional evidence demonstrated the strong relationship between poor sleep habits, increased symptoms of burnout, and incidence of medical errors [37-39].

The objective of this study was to identify self-reported burnout symptoms, STS symptoms, and sleep disturbances experienced by healthcare workers during the COVID-19 pandemic in the United States in 2020. This study adds to the available research in that it focuses on the symptoms of these phenomena to capture the unique experiences related to mental health changes experienced by healthcare professionals during the pandemic. The timing of the study is valuable, because the survey was administered in the United States within ten days of the exceptionally high new case numbers and patient deaths (March 2020 to November 2021) [17]. Since burnout is often related to workload, and STS related to secondary trauma exposure, this is likely an important time for data collection. These results also provide data for comparison to later periods of the pandemic. Additionally, this study explored a wide range of healthcare professions to capture a full picture of the state of mental health experiences across healthcare. While many studies explore the phenomenon of burnout alone, this study sought to evaluate the potential negative impacts of working in healthcare during the pandemic through the lens of the symptoms experienced related to burnout, STS, and sleep disturbances.

A total of 98.6% of the 360 professionals who participated in the survey indicated at least one symptom of burnout since the onset of the COVID-19 pandemic. A mean of around five of twelve burnout symptoms were reported. Approximately 88% of participants reported experiencing at least one symptom of STS, and 82% reported at least one sleep disturbance. These findings suggest that most healthcare professionals are experiencing mental health and/or sleep changes since the onset of the COVID-19 pandemic. The average reported number of symptoms in each category poses potential concerns for quality of patient care and provider well-being. Since sleep disturbances

have been attributed to worse outcomes, this study suggests the need to address these findings [34-35]. Sleep disturbances are associated with increased risk of errors in the medical field and could be potentially dangerous to patients, as well as those experiencing the symptoms. Employers may benefit from offering support through counseling, support groups or educational programming to inform healthcare workers of the risks and dangers of sleep deprivation, as well as coaching to improve sleep habits.

No difference in burnout symptoms, STS symptoms, or sleep disturbances were noted based on gender or healthcare profession, which is congruent with previous literature [25-27]. On the other hand, there was a difference in STS symptoms, burnout symptoms, and sleep disturbances based on age. Younger professionals (defined as less than 25 years old) reported a higher number of symptoms of burnout (7.16) than those in an older age group (defined as over 55 years of age) who reported an average of 3.49 symptoms. This difference was also identified in other studies [16, 38, 40]. Additionally, individuals who were newer to the profession (2-5 years in the field) generally reported more symptoms of burnout (M=6.58) compared to more experienced professionals (over 20 years of service) who averaged 4.07 symptoms.

Correlational analyses demonstrated that increased number of sleep disturbances had a significant association with increased number of burnout and STS symptoms, as well as perceived impact of the COVID-19 pandemic. There was a weak correlation between the number of sleep disturbances and perceived impact of the pandemic.

The number of STS and burnout symptoms were found to have a moderate, positive correlation, suggesting an increased number of burnout symptoms are associated with a higher number of reported STS symptoms. This aligns with other literature, which suggests the similarity in both phenomena [19]. However, burnout can occur in any profession, whereas STS is unique to individuals working in helping fields who are exposed to the trauma of others [11]. Increased symptoms of STS and burnout were both related to a larger perception of the negative impact of COVID-19 on a participant's life.

LIMITATIONS

Limitations of this study include gender disparity: i.e., more responses from females than males (309 females, 29 males). Although there were responses from 32 states, 265 of the participants (73.6%) were from Kentucky, introducing possible bias from that region. Additionally, although the survey collected valuable information, it is not a validated research tool. Convenience and snowball sampling did not allow for controlling who participated in the survey. Despite this fact, a robust sample of interprofessional healthcare professionals and different ages were represented. Although previous studies suggest a higher incidence of burnout in medical and nursing assistants [30], only 2% of this study's sample included support staff, preventing comparison of previous findings in this population.

The cross-sectional nature of the survey was not able to control, nor was it able to evaluate, external factors that may have led participants to experience symptoms of burnout, STS, and sleep disturbances. This methodology does not allow researchers to relate cause and effect with the pandemic. The study also did not evaluate differences in outcome variables between participants working in outpatient and inpatient settings.

Future Studies

Future research should include larger study populations using validated assessments of burnout and STS for more generalizable data. Due to the varying nature of COVID-19 cases throughout the pandemic, further studies should be longitudinal in nature and evaluate the onset of these symptoms during COVID-19 surges to better understand the onset of symptoms and relationship to professional workload. Additionally, intervention studies should identify ways of decreasing the incidence of burnout, STS, and sleep disturbances in this population of workers. Studies could also contribute to our understanding of how interventions can improve patient care and the experiences of healthcare professionals.

COVID-19 is likely to cause ripple effects around the world. Healthcare is uniquely impacted by the pandemic, and healthcare organizations need to develop a better understanding of the experiences of their employees. While this data did not support a significant difference between professions and their reported symptoms of burnout, future studies should explore this concept further, as some studies suggest differences [25-27]. A widened geographical region should be utilized in future studies to further investigate the impact of the pandemic in other areas. Future studies could evaluate interactions between variables as they relate to the presentation of clinician burnout.

CONCLUSION

The impact of the COVID-19 pandemic has been significant on healthcare professionals, and this study suggests a high prevalence of burnout symptoms experienced by individuals of a wide variety of professions and sub-specialties. Some demographics (age < 25 years old) and those working in their profession for a shorter amount of time (2-5 years) report more symptoms of burnout and STS. Although these two groups reported the most significant number of symptoms of burnout, only 1.4% of survey responders denied experiencing any symptom of burnout, proving the widespread impact of the pandemic. Burnout is a syndrome affecting a person's emotional and physician wellness, as well as efficiency and effectiveness in the workplace, which could negatively impact patient care. Effective patient care in all settings has never been more important. Not only will healthcare organizations need to address patient needs, but also those of its workforce. Burnout, STS, and sleep disturbances will need to be subject to future studies to understand its presentation, prevention, and management in healthcare professionals.

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Appendix A: Survey Questions

Gender

- Male
- Female
- Prefer not to respond

Which state do you practice in? (select all that apply)

- Multi select all 50 states

Age Range

- <25
- 26-35
- 36-45
- 46-55
- Over 55
- Prefer not to respond

Profession

- Nurse
- Physician/Physician Assistant/Nurse Practitioner
- Respiratory Therapist
- Rehab: PT/OT/SLP
- Administration
- Support staff: nurse's aides, technicians, scribes, etc.
- Other (please specify)
- Prefer not to respond

Length of time in healthcare profession

- <2 years
- 2-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- > 20 years
- Prefer not to respond

Job Status

- Full time
- Part time
- PRN (as needed)
- Prefer not to respond

Primary work setting (check all that apply)

- Emergency Department
- ICU
- NICU/PICU
- Inpatient hospital
- Outpatient clinic
- Immediate care/urgent care facility
- Physician office/practice
- Other (please specify)
- Prefer not to respond

Social/Marriage Status

- Married, no kids
- Married with kids
- Live-in partner/family/roommate
- Single with kids
- Single, lives alone
- Prefer not to respond

Known Exposure to COVID-19

- Yes, at healthcare job
- Yes, but elsewhere
- No
- Unsure
- Prefer not to respond

Positive COVID test personally

- Yes
- No
- Prefer not to respond

Known personal risk factors related to COVID 19 prognosis (select all that apply)

- Diabetes
- Obesity
- Lung disease (COPD, asthma)
- Heart disease
- Chronic kidney disease
- Immune-suppressed state
- Pregnancy
- Smoking
- None of the above
- Prefer not to respond

Has your employer conducted any surveys related to employee burnout (formal or informal) since March 1, 2020?

- Yes
- No
- Prefer not to respond

Has your employer conducted any training on strategies to prevent/manage workplace burnout since March 1, 2020?

- Yes
- No
- Prefer not to respond

Have you felt burnout with your current healthcare job since March 1, 2020?

- Yes
- No
- Prefer not to respond

Have you taken any unscheduled days off work to manage stress, burnout, etc. since March 1, 2020?

- Yes
- No
- Prefer not to respond

What symptoms of burnout/emotional exhaustion have you experienced since March 1, 2020?

- Anxiety about getting the virus
- Anxiety about spreading the virus
- Lack of resources/equipment to do your job
- Increased work hours
- Decreased days off
- Low morale in the workplace
- Death of patients due to the virus
- Death of co-workers/friends/family due to the virus
- Sleep disruption
- Irritability
- Negative interactions with co-workers due to stress
- Crying, expression of emotions
- Prefer not to respond

What percent of your life has been impacted by COVID-19?

0 %- Not at all

100 %- constant impact

Prefer not to respond

Have the stressors of the Covid-19 pandemic made you consider a change in jobs or careers?

- Yes
- No
- Maybe
- Prefer not to respond

Which of the following (if any) changes in your sleep have you noticed since March 1, 2020?
(check all that apply)

- Dreams (vivid or intense)
- Disturbed sleeping (waking up often)
- Difficulty falling asleep
- Decreased sleep quantity (less hours per night)
- Decreased sleep quality (not feeling rested)
- Other (please list)
- None of the above
- Prefer not to respond

Which of the follow have you experienced since the onset of COVID-19 (March 1, 2020)? (check all that apply)

- Hypervigilance
- Flashbacks or nightmares
- Irritability
- Difficulty concentrating
- Disturbed sleep
- Avoiding feelings or emotional numbness
- Increased use of drugs and/or alcohol
- Difficulty with feelings (feeling sad, anger, hopeless)
- None of the above
- Prefer not to respond

What (if any) interventions HAVE you ALREADY pursued that were beneficial in helping manage your workplace stress/burnout?

(check all that apply)

- Group discussion sessions in person
- Group discussions virtually
- Burnout training
- Mindfulness
- Yoga or meditation
- Individual therapy
- Other (please specify)
- Not applicable
- Prefer not to respond

What (if any) interventions WOULD you pursue if available to help manage your workplace stress/burnout?

(check all that apply)

- Group discussion sessions in person
- Group discussions virtually
- Burnout training
- Mindfulness
- Yoga or meditation
- Individual therapy
- Other (please specify)
- I would not pursue any interventions
- Prefer not to respond

Is there any additional information you want to share about your experience with burnout/emotional exhaustion related to the COVID-19 pandemic?