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The Impact of the Work Environment, Workplace Support and Individual-Related Factors on Burnout Experience of Nurses during the COVID-19 Pandemic

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Abstract

Introduction: *Nurses worldwide are facing hardships during the COVID-19 pandemic.*

Aims: *To examine the impact of work environment, workplace support and individual-related factors on burnout during the COVID-19 pandemic.*

Methods: *This was an analytical cross-sectional study conducted in a hospital in Singapore that nursed confirmed and suspected COVID-19 patients between 12 March and 25 May 2020. An email invitation was sent to all nurses to participate in an online survey. Multivariable logistic regression analysis was conducted to examine associations between burnout and work environment, workplace support and individual-related factors.*

Results: *855 nurses responded to the survey. Compared to nurses working in low-risk areas, nurses in high-risk areas had 1.6 times higher risk of burnout (95% CI: 1.072 – 2.454; p=0.022). Perceiving lack of teamwork (OR = 1.630, 95% CI: 1.067– 2.492, p=0.024), not feeling appreciated (OR = 14.811, 95% CI: 3.520 – 62.328, p<.001) and poor self-rated health (OR=0.348, 95% CI: 0.264-0.460, p<.001) were associated with burnout.*

Discussion: *Nurses working in high-risk areas, such as wards are designated for acute respiratory infections patients, are at higher risk of experiencing burnout.*

Implications for practice: *Nurses in high-risk areas would benefit from interventions that build physical health and esprit de corps to prevent burnout.*

Keywords: COVID-19, Cross-sectional, Burnout, Psychological stress, Practice environment, Pandemic, Perceived risk, Nursing, Online survey

Introduction

Nurses, along with other health care workers, worldwide are facing unique hardships during the current coronavirus disease 19 (COVID-19) pandemic. COVID-19 is highly infectious and spreads more quickly in the community compared to SARS and MERS [1]. To date, over 33 million people have been infected with COVID-19 worldwide [2]. Consequently, more isolation facilities and critical care unit were needed and had to be created over a short period of time to meet with the increasing demand. As the COVID-19 pandemic continues, health care systems globally and locally have become overwhelmed, thus leading to high psychological and physical stress on nurses working in the acute care setting such as emergency department and inpatient wards.

"Pandemic stress" is a term coined by a group of Italian researchers to reflect the evolving nature of stress that developed through different phases; from acute to subsequent chronic stress [3]. The hallmark of pandemic stress is characterized by adaptation to lifestyle changes such as safe distancing, limit in social gatherings, wearing a mask in public and frequent hand hygiene. Additionally, concerns relating to the aftermath of the pandemic due to uncertainties such as when life would return to normal, the long-term side effects of the virus, economic impact and adapting to the new ways of living and working while waiting for a safe and effective vaccine to be developed.

The working condition for most health care workers, especially nurses, have changed unprecedently since the COVID-19 pandemic. Many nurses are being deployed and trained overnight to care for the suspected or confirmed cases. Nurses working in primary care or outpatient settings had to take up additional roles and adapt to the new working environment quickly. Due to the sheer volume of infected or suspected cases, nurses are subjected to long working hours, wearing personal protective gears, and working under high pressure and psychological fear of contracting the virus. A study done

in Wuhan City, where the virus originates, reported that the intensive care nurses experienced poor appetite or indigestion, fatigue, insomnia, nervousness, frequent crying, and even suicidal thoughts [4]. In Italy, a nurse committed suicide from the fear of spreading COVID-19 [5].

Stressful working environment can have a psychological impact on workers [6]. In a study done by Tuna and colleagues; found that there is a correlation between job stress and burnout level [7]. Burnout is commonly described as a state of physical and emotional depletion as a result of prolonged exposure to stressful working environments [8]. Burnout, particularly among nurses, has been reported to be higher than other health professionals owing to the nature of their work. A well-established body of evidence demonstrates that the practice environment for nurses influences their job dissatisfaction, and intention to leave [9]. Inherently, the shortage of nurses has an inverse relationship between nursing staffing and patient's outcomes [10]. Therefore, during the pandemic, it is even more crucial that hospital administrators pay more attention to the wellbeing of nurses in order to prevent burnout and attritions.

Background

Like other countries, Singapore was not spared from the COVID-19 pandemic. The hospital where this study was carried out sees 40 to 50 suspected Covid-19 patients each day and has about 100 isolations beds [11]. Drawing from our hospital's previous experience with the severe acute respiratory syndrome (SARS), our hospital has a dedicated task force that oversees the daily operation that includes communication and staff's wellbeing. Like most countries, we also had to be in a 'lockdown' period that we called the "circuit breaker" (CB) which started on 3 April 2020 and was extended to 1 June 2020 [12]. During this period, there was a significant restriction on movements and interactions in public and private places. Schools went on full home-based learning, work and business activities were carried out via telecommuting. Only essential workers in essential services were allowed to work on-site.

Essential workers like the health care workers continue to work during the pandemic at an intensity unimaginable. Health care workers experience both physical and psychological pressure due to COVID-19 pandemic [13]. A large cross-sectional survey done in China reported a high prevalence of mental health symptoms, i.e. depression, anxiety, insomnia, and distress among health care workers treating patients with COVID-19 [14]. A recent review found more than a third of the hospital staffs experience a mild to moderate stress symptoms and interestingly, it also affected those who do not directly work with COVID-19 patients. The review also found that the psychological symptoms experienced was influenced by age, gender, specialization, motivation, self-awareness and above all the type of activity and proximity to COVID-19 patient [15]. However, among the fourteen studies in the review, no studies had examined factors relating to the work environment (e.g., degree of exposure to COVID-19 cases, night shift work, work locations) on the burnout experience during a pandemic.

The sudden surged in workload and working in emotionally charged environments would lead to many untoward effects such as increase patient safety incidents, medical errors, lower-quality service provision and psychological ill-health [16]. Studies have shown that work environments are associated with burnout experiences among nurses [8,17]. Nurses working in critical care and emergency department often experience high levels of burnout [18]. However, burnout has not been thoroughly examined during a pandemic. Only one paper that examined provider burnout and fatigue in the intensive care setting, however, it was a discussion paper that provides recommendations to prevent burnout and mitigate occupational stress, especially among intensive care providers during a pandemic. It does not examine the impact of the work environment factors and individual-related factors on burnout experience during COVID-19 pandemic.

This study aimed to examine the impact of the work environment, workplace support and individual-related factors on burnout experience among nurses in a tertiary care setting during the COVID-19 pandemic.

Methods

This cross-sectional online study utilizes a subset of data from a larger project that prospectively follows healthcare workers during the COVID-19 pandemic in Singapore's largest public healthcare cluster. Specifically, baseline data from nurses was utilized in this study. The data was collected between 12 March and 25 May 2020, which included the peak of the pandemic and nationwide CB period. Registered nurses working in a tertiary hospital in Singapore were invited to participate. Nurses who were not working due to maternity or training leave during the study period and trainees were excluded. Approximately 3600 nurses were invited by email or online staff portals to participate. The online survey was made available on the Qualtrics platform, which was accessed either via a web link or QR code. A reminder email was sent out at about three weeks interval to increase the response rate. Participants provided informed consent online before completing the survey in English, which took approximately 15 minutes to complete.

The factors that measure individual-related factors were age, perceived risk of getting COVID-19, job dedication and self-rated health. Perceived risk of getting COVID-19 was assessed by the statement "I feel that my job puts me at great risk of exposure to COVID-19" where responses ranged from "strongly agree" to "strongly disagree" on a 6-point scale which was later recoded into a binary variable (agree vs disagree) [19]. Job dedication was measured using the subscale from the Utrecht Work Engagement Scale-9 (UWES) [20], where higher scores (ranging from 0-6) indicate high job dedication. Self-rated health was using the validated, 1-item general self-rated health question, where the scores were reverse-coded so that higher scores (ranging from1-5) indicated better health [21].

Workplace support includes factors relating to communication such as the availability of information, the clarity and trustworthiness of the information shared, teamwork and perceived appreciation by the organization. Workplace communication was assessed using three items: availability/ timeliness of updates, the trustworthiness of information, and clarity of policies and protocols while teamwork was assessed via the statement "My work team has been working well together". The

response options were Yes, Neutral and No. Perceived appreciation was assessed by the statement "I feel appreciated by my department/hospital/employer" with scores ranging from 0= Never to 3= Always. These workplace support questions were considered to have face validity and adapted from a previous study of a viral outbreak [22].

Factors relating to work environment were based on having night-shift work (coded Yes/No), location of work (Emergency Department (ED), wards designated for isolation and acute respiratory infections and "Low Risk" for others, i.e. not directly involved in the care of COVID-19 confirmed or suspected cases), any change in working condition due to deployment (coded Yes/No), and whether the staff has a supervisory role (coded Yes/No).

We measured burnout using a validated, non-proprietary one-item burnout question from the Physician Work-Life Scale. The question conceptually captures the emotional exhaustion aspect of burnout and has been validated on different groups of health care workers, including registered nurses [23]. The question asks respondents to rate their level of burnout on a five-category ordinal scale ranging from 1= "I enjoy my work, I have no symptoms of burnout" to 5= "I feel completely burned out and often wonder if I can go on. I am at the point where I may need some changes or may need to seek some sort of help." A score of ≥3 is indicative of burnout symptoms.

Descriptive data on the sample's sociodemographic and occupational characteristics, as well as study variables of interest, were tabulated. Chi-squared and t-tests were used to examine univariate differences between nurses who reported No burnout vs Burnout for categorical and continuous variables, respectively. Subsequently, a multivariable logistic regression model was estimated via maximum likelihood, including all variables of interest, controlling for gender, age, race, and marital status. Statistical significance was set at $p< 0.05$. Analyses were conducted using STATA version 15.1 [24].

Results

Eight hundred fifty-five nurses responded to the survey. Most of the respondent were female (86%), and plurality were Chinese (49%). Majority of the nurses are currently married (52%) (Table 1).

Table 1: Demographic information

Variable	Count (percentage%) / Mean (SD)
Gender	
Female	735 (86%)
Male	120 (14%)
Age	34.88 (10.55)
Race	
Chinese	422 (49%)
Indian	88 (10%)
Malay	197 (23%)
Others	148 (17%)
Religion	
Buddhism/ Taoism	161 (19%)
Christianity/ Catholicism	252 (29%)
Hinduism/ Sikhism	55 (6%)
Islam	236 (28%)
Free thinker/ Atheist	143 (17%)
Others	8 (1%)
Marital Status	
Single[1]	314 (48%)
Currently Married	441 (52%)
Sample Size	855

[1]Inclues those that were married previously (divorced, widowed etc.)

In the univariate analysis, the following variables were associated with burnout: working in a high-risk area (p=0.041); working the night shift

in the past month (p=0.017), nurses who perceived that their job put them at greater risk of exposure to contracting COVID-19 (p=0.030); low job dedication (p <0.001); and those who had lower self-rated health (p<0.001). Whereas, trustworthy information (p=0.003); updates that were readily available and communicated timely (p= 0.004); policies protocols that were clear and easy to follow (p<0.001); team working well together (p <0.001); perceived feeling of appreciation (p <0.001) and high job dedication (p<0.001) were associated with no burnout (Table 2).

Table 2: Univariate analysis of burnout

Variable	Total	No burnout	Burnout[1]	P-value[2]
Sample Size	855	612	243	
Working Location (Low Risk[3])	569 (67%)	420 (69%)	149 (61%)	0.041
High Risk	286 (33%)	192 (31%)	94 (39%)	
Deployed to current location due to COVID-19 (No)	788 (92%)	566 (92%)	222 (91%)	0.581
Yes	67 (8%)	46 (8%)	21 (9%)	
Night Shift in Last Month (No)	321 (38%)	245 (40%)	76 (31%)	0.017
Yes	534 (62%)	367 (60%)	167 (69%)	
Worked in healthcare during SARS? (No)	788 (92%)	566 (92%)	222 (91%)	0.581
Yes	67 (8%)	46 (8%)	21 (9%)	
Manager/Supervisory role[4] (No)	678 (79%)	475 (78%)	203 (84%)	0.054
Yes	177 (21%)	137 (22%)	40 (16%)	
Updates readily available and timely (Yes)	724 (85%)	532 (87%)	192 (79%)	0.004
No	131 (15%)	80 (13%)	51 (21%)	
Information is trustworthy (Yes)	698 (82%)	515 (84%)	183 (75%)	0.003
No	157 (18%)	97 (16%)	60 (25%)	
Policies protocols clear & easy to follow (Yes)	550 (64%)	425 (69%)	125 (51%)	<0.001
No	305 (36%)	187 (31%)	118 (49%)	
Team working well together (Yes)	612 (72%)	478 (78%)	134 (55%)	<0.001
No	243 (28%)	134 (22%)	109 (45%)	
I feel appreciated (Never)	26 (3%)	3 (0%)	23 (9%)	<0.001
Rarely	123 (14%)	64 (10%)	59 (24%)	
Sometimes	470 (55%)	342 (56%)	128 (53%)	
Always	236 (28%)	203 (33%)	33 (14%)	
Perceived job risk (of COVID-19)[5] (Disagree)	178 (21%)	139 (23%)	39 (16%)	0.030
Agree	677 (79%)	473 (77%)	204 (84%)	
Self-rated Health	2.69 (0.84)	2.50 (0.78)	3.16 (0.78)	<0.001
UWES Dedication Sub-scale	3.31 (0.84)	3.50 (0.78)	2.84 (0.78)	<0.001

For continuous scores, mean (standard deviations) are shown while count (percentage%) are shown for categorical variables.

[1]High burnout is defined as the those choosing option 3 and above on the burnout symptom question

[2]P-value of a chi-square test for differences for categorical responses and t-test for differences for continuous responses

[3]Low risk locations are defined as work locations with low chances of being in contact with COVID-19 patients in their work environment

[4]This was a self-reported answer to whether they felt they were holding on to managerial/supervisory responsibilities

[5]This was a question asking the nurses agreed that their job put them at great risk of exposure to contracting COVID-19

In the multivariate analysis, we found that those working in high-risk areas were 1.62 times more likely to report burnout (95% CI: 1.072 – 2.454; p=0.022) compared to those working in low-risk areas. Nurses who felt that their team are not working well together were 1.63 times more likely to experience burnout (95% CI: 1.067; 2.492; p=0.024) than those who had good teamwork. Compared to nurses who reported feeling always appreciated by their department/hospital, nurses who reported they never felt appreciated was 14.81 times more likely to report burnout (95% CI: 3.520- 62.328; p<0.001) while those who reported rarely feeling appreciated were 3.168 times more likely to report burnout (95% CI: 1.736-5.781;

p<0.001). Meanwhile, those with better self-rated health were less likely to report burnout, with every point increase resulting in about three times less likely to report burnout (OR 0.348; 95% CI: 0.264-0.460; p<0.001) (Table 3).

Table 3: Logit regression with burnout as outcome

Variables	Burnout (Coefficient)	Burnout Odds Ratio
Location (Ref = Low Risk)		
High Risk	0.483**	1.622**
	(0.069 - 0.898)	(1.072 - 2.454)
Deployed to current location due to COVID-19 (Ref = No)		
Yes	-0.043	0.958
	(-0.709 - 0.623)	(0.492 - 1.865)
In the past month, have you worked night shifts? (Ref = No)		
Yes	0.098	1.103
	(-0.319 - 0.516)	(0.727 - 1.675)
Worked in healthcare during SARS? (Ref = No)		
Yes	0.219	1.245
	(-0.541 - 0.979)	(0.582 - 2.661)
Do you have a managerial/ supervisory role? (Ref = No)		
Yes	0.301	1.352
	(-0.219 - 0.821)	(0.804 - 2.274)
The official Covid-19 updates are readily available and timely (Ref = Yes)		
No/Neutral	0.061	1.062
	(-0.517 - 0.638)	(0.596 - 1.893)
The information shared with staff is trustworthy. (Ref = Yes)		
No/Neutral	-0.222	0.801
	(-0.772 - 0.327)	(0.462 - 1.387)
The policies and protocols have been clear and easy to follow. (Ref = Yes)		
No/Neutral	0.045	1.046
	(-0.378 - 0.468)	(0.685 - 1.597)
My work team has been working well together. (Ref = Yes)		
No/Neutral	0.489**	1.630**
	(0.064 - 0.913)	(1.067 - 2.492)
I feel appreciated by my department/hospital. (Ref = Always)		
Never	2.695***	14.811***
	(1.258 - 4.132)	(3.520 - 62.328)
Rarely	1.153***	3.168***
	(0.552 - 1.755)	(1.736 - 5.781)
Sometimes	0.437*	1.548*
	(-0.040 - 0.914)	(0.961 - 2.495)
Perceived job risk (of COVID-19) (Ref = Disagree)		
Agree	0.097	1.102

	(-0.349 - 0.543)	(0.706 - 1.721)
Self-rated Health (Continuous)	-1.055***	0.348***
	(-1.333 - -0.777)	(0.264 - 0.460)
UWES Dedication sub-scale (Continuous)	-0.043	0.958
	(-0.108 - 0.021)	(0.898 - 1.022)
Gender (Ref = Female)		
Male	0.219	1.245
	(-0.315 - 0.753)	(0.730 - 2.122)
Age (as of last birthday)	-0.046***	0.955***
	(-0.080 - -0.013)	(0.923 - 0.987)
Race (Ref = Chinese)		
Indian	0.721**	2.056**
	(0.122 - 1.320)	(1.129 - 3.744)
Malay	0.447**	1.564**
	(0.014 - 0.881)	(1.014 - 2.413)
Others	-0.339	0.713
	(-0.882 - 0.204)	(0.414 - 1.227)
Marital Status (Ref = Single)		
Currently married	-0.230	0.795
	(-0.630 - 0.171)	(0.532 - 1.186)
Constant	3.361***	28.824***
	(1.672 - 5.051)	(5.322 - 156.102)
Observations	855	855
95% Confidence intervals in parentheses		

*** p<0.01, ** p<0.05, * p<0.1

Demographic variables age and race also had a significant effect. Older participants are less likely to experience burnout (OR=0.955; 95% CI: 0.923-0.987; p=0.007). Indians (OR=2.056; 95% CI: 1.129; 3.744; p=0.018) and Malays (1.564; 95% CI: 1.014; 2.413; p=0.043) are more likely than Chinese to experience high burnout.

Discussion

To the best of the authors' knowledge, this is the first study that examines the work environment, workplace support and individual-related factors on burnout experience during the COVID-19 pandemic.

In our study, the individual-related factors such as age and race were associated with the experience of burnout but not gender; however, studies done in China, reported that female nurses had reported more severe symptoms on all outcomes, particular those working in Wuhan province where the virus originate [13,25]. The increase in psychological demand during the pandemic may have resulted in the experience of burnout among older nurses. This finding is supported by a study done on nurses by Hatch and colleagues, whereby it found decrements in psychological work ability with older age at higher levels of burnout [26].

Singapore is a multiracial and multicultural country with ethnic Chinese (76% of the population), Malays (15%), and ethnic Indians (7.5%) and others (1.5%) [27] (Singapore Population in Brief, 2019). In this study, the Malays and Indian experience burnout compared to the Chinese; some possible explanations could be due to the smaller sample of Malays and Indians in this sample population or the effect of the minorities on workplace stress which is well-discussed in the literature [28].

Marital status was not associated with burnout in our study, but in China, hospital workers who are single were associated with high-level depression, somatic symptom, and self-harm ideation [25]. In our study, we found poor self-rated health was associated with burnout which is consistent with the literature [25,29]. Interestingly, there was no significant association between those who worked versus did not work during SARS; one possible reason may be due to a higher proportion of nurses who had no experience working during SARS. It would be interesting to explore if the experience with the previous pandemic would make one more resilient to pandemic stress.

Working during the COVID-19 pandemic is undeniably stressful for nurses and getting enough rest and sleep is challenging during peacetime let alone during a pandemic [30]. Interestingly, we did not find working on night shifts had any impact on burnout in this study. During this pandemic, the working schedule nurses working in the high-risk areas were changed to a 12-hours shift and a rest day every alternate day. Therefore, this change in working hours may have allowed sufficient time for the nurses to rest after their night duty.

In this study, we also found that nurses working in high-risk areas such as the emergency department, isolation, and acute respiratory wards were more likely to experience burnout compared to those working in the low-risk areas. This is likely due to nurses working in high-risk areas needing to be more vigilant to infection control practices and working longer hours; thus, they are more likely to experience burnout. A systematic review also supports that adverse job characteristics such as high workload, low staffing levels, long shifts, and low control are associated with burnout among nurses [31].

Effective communication is essential during any pandemic. However, the challenge in this pandemic was what to communicate especially in the initial period when there is so much uncertainty about the virus. Our results from the univariate analysis showed trustworthy and timely information was associated with no burnout. Other authors have also concluded that those who received frequent, evidence-based information from hospital leadership expressed less anxiety about the pandemic [32]. During our previous experience with the SARS pandemic, we recognize the need for frequent, clear, and consistent communication; therefore, our senior management provided information on COVID-19 daily to all staffs via work email and intranet. The daily update on COVID-19 by our senior management may have helped our nurses to stay calm and be up to date with the latest COVID-19 situation in Singapore. Consequently, this may provide some element of control, given the knowledge they had. The helpline, peer support programme and outreach by medical social workers and psychologists for nurses working in the high-risk clinical areas may have provided an avenue for them to voice out concerns and feel supported emotionally.

Limitations

This study has a few limitations. Firstly, due to the cross-sectional study design, we are unable to examine the effect of time over the course of the pandemic. When considering the risk factors, it is particularly important to consider the time course of the exposure; however, only one study examined the effect of time, but it could only measure the time before and during the outbreak [33].

Secondly, the data was collected over ten weeks period; thus, it might not be representative of the nurses' burnout experience throughout the pandemic period. Future research should consider following a cohort of nurses prospectively during a pandemic to observe the "pandemic stress" trajectory over time.

Thirdly, traditionally the Maslach Burnout Inventory (MBI) tool, is used when measuring occupation burnout in nursing studies; however, in this study, we used the Physician Work-Life Scale (PWLS). The reasons behind this were this was part of a larger prospective study of the healthcare workers in Singapore and PWLS is non-proprietary, as well as shorter and less burdensome to administer compared to MBI, especially when needing to answer multiple surveys during this pandemic. The burnout item we use is reported to be closest to the concept of emotional exhaustion as measured by the MBI tool.

Finally, the responses to our survey may not be generalizable to all nurses in our setting, given our response rate of approximately 24%. However, other authors have concluded that the response rate tended to be inversely proportional to the number of surveys sent out, i.e. the larger the nursing population, the worse the response rates [34]. Nevertheless, our sample population's distribution of race and gender are representative of our population. Aside from the response rate, our sample size is relatively large for a study like this during a time of high-stress, and we believe our findings may offer valuable insight into the wellbeing of our nurses.

Conclusion

Nurses working in high-risk areas such as wards that are designated for isolation and acute respiratory infections patients are at higher risk of experiencing burnout. Perceptions of good teamwork and feeling appreciated emerged as important mitigating factors of burnout. Therefore, administrators and nurses will need to co-design interventions on how to show care and appreciation and create an environment that encourages teamwork. Especially for nurses working in high-risk areas, they require immense support and interventions that build esprit de corps in order to prevent burnout during the pandemic.

The working environment during the pandemic is incredibly stressful for all health care workers. Therefore, teamwork and showing appreciation to our nursing colleagues is vital as it helps to mitigate the experience of burnout. Nurses working in high-risk areas such as emergency department, isolation, and acute respiratory wards need to be well-supported physically and emotionally. Interventions should be directed towards creating an organizational structure that cares and shows appreciation through both intangible and tangible rewards. And developing a sense of team spirit, pride and honour among its members.

More research is needed to understand how nurses cope during a pandemic; how social and organization structure contributes to mitigating the experience of burnout during the pandemic.

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Ethical Statements

This study conformed to the ethical guidelines of the 1975 Declaration of Helsinki. The study was approved by the SingHealth Centralized IRB (2020/2160) and the National University of Singapore IRB (S-20-081).

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