

ORIGINAL ARTICLE

Burnout Among Critical Care Personnel In Intensive Care Unit During COVID-19 Pandemic In A Malaysian Tertiary Hospital

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ABSTRACT

Introduction: During the early phase of Coronavirus disease (COVID-19), there were various uncertainties, which had a detrimental impact on the prevalence of burnout among critical care personnel worldwide. This study aims to investigate the prevalence of burnout and its associated factors in critical care personnel involved in the COVID-19 pandemic. **Methods:** This is a single-center, cross-sectional study with 81 critical care personnel for a survey using Copenhagen Burnout Inventory. Binary logistic regression analysis was conducted to identify factors associated with personal burnout. **Results:** More than half of the respondents were female (60.5%) over the age of 30 (61.7%), and 54.3% were medical doctors. A large number (72.8%) of the respondents experienced personal burnout, with two-thirds of them experiencing work-related (65.4%) and client-related burnout (59.3%). Personal burnout was found to be associated with those who had children [OR: 11.31 (1.90, 67.37), $p = 0.008$], stayed with family, relatives, or friends [OR: 9.40 (1.27, 69.46), $p = 0.028$], were medical doctors [OR: 26.52 (2.79, 252.22), $p = 0.004$], worked more than 45 hours per week [OR: 8.68 (1.45, 58.09), $p = 0.018$], and previously never had COVID-19 viral test [OR: 6.93 (1.17, 40.89), $p = 0.033$]. **Conclusion:** Overall, more than half of the critical care personnel experienced burnout. There were possible associations between personal burnout with social characteristics such as having children and living with family, relatives, or friends, and occupational characteristics such as being a medical doctor, long working hours, and previously never had COVID-19 viral test.

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Keywords: Burnout, Copenhagen Burnout Inventory, COVID-19, Critical care personnel, Intensive Care Unit

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INTRODUCTION

Burnout has evolved and is now described by ICD-11 as a syndrome characterized by continuous stress at a workplace, which showed as feelings of exhaustion or depletion of energy, increased mental detachment from one's work, or feelings of negativism or cynicism about one's profession, and decreased professional efficacy (1). The high levels of patient care, workload, stress, and task complexity involved with critical care medicine, it's no surprise that critical care personnel experience burnout.

Globally, burnout affected critical care workers at a rate ranging from 6 to 61% before the pandemic (2). The coronavirus disease (COVID-19) outbreak has been

plaguing the healthcare sector since December 2019. In the beginning phases of the pandemic, around 5 to 8% of all infected patients required intensive care (3), causing the average bed occupancy rate for adult intensive care units (ICU) in Western countries to surge (4–6) and resulting in burnout from a range of 49.3% to 58% among critical care personnel worldwide (7). Looking specifically at intensivists in Europe, 51% of them have experienced severe burnout as a result of the pandemic (8). Whereas in Malaysia, a burnout study using the Maslach Burnout Inventory (MBI) on anaesthetists, who are responsible for the care of critically ill patients in the ICU as well as those requiring surgery in the operating theatre, found that 55.3% of them suffered burnout during the early phase of the COVID-19 pandemic (9,10). These personnel were under a tremendous amount of stress attributed to uncertain outcomes for patients while fear of contracting COVID-19 (11).

The factors contributing to burnout among healthcare personnel have been researched in depth before the

COVID-19 pandemic. Heavy bureaucratic tasks, lengthy working hours, and lack of respect from colleagues were the common causes of burnout in the workplace (12). Differences in burnout were observed between Western and Asian countries. Burnout was caused by a variety of circumstances in Ethiopia, including employment and career prospects, physical health, interactions with superiors, and physical or verbal abuse (13). Religion, length of service in the current department, monthly stay-at-home night calls, shift work, and workdays per month, on the other hand, were all linked to burnout among Asian ICU doctors; whereas religious affiliation, having a bachelor's degree, and a lack of work-life balance were all linked to burnout among Asian intensive care nurses (14). Apart from the known associated factors of burnout, other factors that arose during this pandemic were closely related to the unpredictable circumstances imposed by a novel infectious disease. The concern for the scarcity of resources, worries about having this infectious disease and spreading to their families, stigma, unfamiliar work processes, large workload and depression due to unsuccessful recovery of critical care patients were common problems causing these professionals a great deal of stress and anxiety during this pandemic (7,15,16).

It's critical to understand the severity of burnout and the factors that contribute to it among critical care personnel during a pandemic to effectively address and manage the problem should another pandemic strike, as burnout can harm one's mental health and jeopardise the quality and safety of medical care (2). Given the variations in reasons for burnout in different countries due to the difference in pandemic distribution and severity, and a lack of burnout information in critical care personnel in Malaysia during COVID-19 (8), this study aims to investigate the prevalence of burnout and its associated factors in critical care personnel involved in the COVID-19 pandemic.

MATERIALS AND METHODS

Study design and population

This single-center, cross-sectional study for a survey on burnout among critical care personnel was undertaken in the ICU of a government-funded tertiary hospital in Perak, Malaysia, from August 2020 to February 2021. The ICU provides critical care to adult COVID-19 and non-COVID-19 patients, encompassing all medical and surgical disciplines. This study invited all critical care personnel, including doctors, nurses, and medical assistants, who were involved in clinical care, equipment management or administrative planning for COVID-19. Critical care personnel who were temporarily deployed to work in the ICU were excluded.

Sample size and sampling method

There was no sampling method involved as the study included all the critical care personnel who were eligible. All eligible critical care personnel were

approached by researchers during non-working hours to avoid disturbance during working hours. Those who gave verbal consent to join the study were given a link to a Google Form® where they would complete the online questionnaire immediately or in their free time. To avoid double entry, each participant was given a unique code to enter at the beginning of the Google® Form.

Instrument

The questionnaire was constructed with two sections: (i) sociodemographic characteristics, and (ii) Copenhagen Burnout Inventory (CBI). Variables in sociodemographic characteristics were determined from a literature review and expert opinions of an intensivist. CBI, a validated questionnaire developed by M Borritz and TS Kristensen which aimed to measure occupational burnout, was adopted upon getting permission from the originators (17). This questionnaire was used because it was found to be the most valid for assessing occupational burnout as compared to other tools like MBI, Pines' Burnout Measure (BM), Oldenburg Burnout Inventory (OLBI), and Psychologists Burnout Inventory (PBI) (18). Although the tools were created to assess occupational burnout, they do so by measuring different dimensions. For example, the MBI assessed emotional exhaustion, depersonalization, and personal accomplishment, whereas the BM assessed physical, emotional and mental exhaustion (18). Although the CBI has been validated in Malay (19), the researchers adopted the questionnaire in English because the target participants were healthcare personnel who were deemed capable of understanding the questionnaire in English. CBI consists of three domains, including personal burnout (six items), work-related burnout (seven items), and client-related burnout (six items). Personal burnout investigates the person's prolonged physical and psychological exhaustion; work-related burnout investigates the person's perception of prolonged physical and psychological exhaustion related to work; and client-related burnout investigates the person's perception of prolonged physical and psychological exhaustion related to working with clients, who may be referred to patients or colleagues. The term "clients" in CBI covers a broad concept and is suggested by the original authors of CBI to use the appropriate term for a specific group (17). In this study, "client" was referred to a patient with whom the critical care personnel (medical doctors and nurses) had direct interactions. "Client" also referred to coworkers with whom the ward sister primarily dealt with administrative tasks, while the medical assistants primarily dealt with medical equipment management and providing clinical support to other critical care personnel. For example, for staff who dealt directly with patients, the original question of "are you tired of working with clients?" was modified to "are you tired of working with patients?"; whereas for administrative staff, the question was modified to "are you tired of working with colleagues?". Participants were asked to respond to each item on a scale, with each response corresponding to a scoring

system: never/to a very low degree (score of 0), seldom/to a low degree (score of 25), sometimes/somewhat (score of 50), often/to a high degree (score of 75), and always/to a very high degree (score of 100) (17).

Ethics approval and consent to participate

The Medical Research and Ethics Committee of the Ministry of Health Malaysia granted official approval to perform this study [NMRR-20-1459-55681 (IIR)]. Online informed consent was obtained from participants before questionnaire administration. There was no personal identifiable information collected during data collection to protect participants' confidentiality.

Data analysis

The data were analyzed using IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp, 2011. The median and interquartile range (IQR) were calculated for each domain. A score of 50 and above was treated as burnout for each domain (20). The original authors recommended that each domain shall be evaluated independently and that if an overall burnout scale is required, the personal burnout scale be used, especially if the study population has a variety of occupational responsibilities (17). This study comprised medical doctors, nurses, and administrative personnel, who are referred to collectively as "healthcare professionals", yet each of these jobs has different responsibilities and is subject to different stresses (21,22). Since the participants had varied job responsibilities, the researchers opted for personal burnout as the main outcome for regression analysis in discovering the common factors contributing to burnout in critical care personnel (17). The relationship between variables and personal burnout was analyzed using simple logistic regression, presenting regression coefficient and odds ratio (OR) with a 95% confidence interval (CI). Variables with a $p < 0.25$ were then examined using backward stepwise binary logistic regression to identify variables associated with personal burnout among critical care personnel, with the regression coefficient and OR with a 95% CI presented (23). Variables with $p < 0.05$ were deemed statistically significant. Multicollinearity between the variables was not found. The Hosmer-Lemeshow goodness-of-fit test was used to assess model fitness.

RESULTS

Eighty-one of the 167 critical care personnel approached agreed to take part in the study. The great majority of the respondents were young to middle-aged adults, with a median age of 32 years old (IQR: 8.0). The respondents were mostly Muslim women. The majority of those who were staying with family, friends or relatives were married (73.2%) and 54.9% of them had children. The respondents had a median of 8 years (IQR: 9.0) of working experience. During the early days of the pandemic, approximately nine out of ten of the respondents worked more than 45 hours per week, with

a median working hours of 65.0 hours (IQR: 24.0). The working hours were almost identical to the week before the questionnaire administration, in which about eight out of ten respondents worked more than 45 hours per week, with a median working hour of 56.0 hours (IQR: 22.0) (Table I). The respondents scored a median of 58.3 (IQR: 23.0) for personal burnout, 53.6 (IQR:

Table I: Sociodemographic characteristics of respondents (n=81)

Characteristics	n (%)	Personal burnout, n (%)	Work-related burnout, n (%)	Client-related burnout, n (%)
Age in years				
≤30	31 (38.3)	23 (74.2)	20 (64.5)	17 (54.8)
>30	50 (61.7)	36 (72.0)	33 (66.0)	31 (62.0)
Sex				
Male	32 (39.5)	20 (62.5)	17 (53.1)	16 (50.0)
Female	49 (60.5)	39 (79.6)	36 (73.5)	32 (65.3)
Religion				
Islam	52 (64.2)	38 (73.1)	32 (61.5)	33 (63.5)
Non-Islam ^a	29 (35.8)	21 (72.4)	21 (72.4)	15 (51.7)
Marital Status				
Single	24 (29.6)	15 (62.5)	14 (58.3)	15 (62.5)
Married	54 (66.7)	42 (77.8)	38 (70.4)	32 (59.3)
Divorced	3 (3.7)	2 (66.7)	1 (33.3)	1 (33.3)
Had children				
Yes	39 (48.1)	33 (84.6)	28 (71.8)	27 (69.2)
No	42 (51.9)	26 (61.9)	25 (59.5)	21 (50.0)
Stayed				
Alone	10 (12.3)	4 (40.0)	5 (50.0)	5 (50.0)
With family/relatives/friends	71 (87.7)	55 (77.5)	48 (67.6)	43 (60.6)
Occupation				
Staff nurse	24 (29.6)	17 (70.8)	13 (54.2)	13 (54.2)
Medical doctor ^b	44 (54.3)	36 (81.8)	35 (79.5)	31 (70.5)
Supportive and administrative staff ^c	13 (16.0)	6 (46.2)	5 (38.5)	4 (30.8)
Working experience in years				
≤10 years	54 (66.7)	40 (74.1)	36 (66.7)	33 (61.1)
>10 years	27 (33.3)	19 (70.4)	17 (63.0)	15 (55.6)
Working experience in ICU in months, n=79				
≤40 months	41 (51.9)	31 (75.6)	29 (70.7)	27 (65.9)
>40 months	38 (48.1)	27 (71.1)	24 (63.2)	20 (52.6)
Working hours for past one week in hours				
≤45 hours	14 (17.3)	6 (42.9)	7 (50.0)	4 (28.6)
>45 hours	67 (82.7)	53 (79.1)	46 (68.7)	44 (65.7)
Longest working hours during early phase of pandemic in hours				
≤45 hours	9 (11.1)	8 (88.9)	7 (77.8)	5 (55.6)
>45 hours	72 (88.9)	51 (70.8)	46 (63.9)	43 (59.7)
Relationship with colleague				
Moderate ^d	16 (19.8)	11 (68.8)	12 (75.0)	9 (56.2)
Good	65 (80.2)	48 (73.8)	41 (63.1)	39 (60.0)
Worried own self might get infected with COVID-19				
Yes	74 (91.4)	54 (73.0)	49 (66.2)	44 (59.5)
No	7 (8.6)	5 (71.4)	4 (57.1)	4 (57.1)
Worried might infect family members with COVID-19				
Yes	79 (97.5)	57 (72.2)	52 (65.8)	47 (59.5)
No	2 (2.5)	2 (100.0)	1 (50.0)	1 (50.0)
Previously had COVID-19 viral test				
Yes	18 (22.2)	11 (61.1)	9 (50.0)	12 (66.7)
No	63 (77.8)	48 (76.2)	44 (69.8)	36 (57.1)
Quarantined before				
Yes	19 (23.5)	13 (68.4)	10 (52.6)	12 (63.2)
No	62 (76.5)	48 (74.2)	43 (69.4)	36 (58.1)

^aNon-Islam religion, n (%) inclusive of Buddhist 6 (7.4), Christian 8 (9.9); Hindu 9 (11.1); Sikh 2 (2.5); Free-thinker 4 (4.9)

^b Medical doctor, n (%) inclusive medical officer 34 (42.0); specialist 9 (11.1); consultant 1 (1.2)

^c Non-clinical, n (%) inclusive medical assistant 11 (13.6); ward sister 2 (2.5)

^d Moderate include one who had poor relationship with colleague

23.0) for work-related burnout, and 50.0 (IQR: 21.0) for client-related burnout. More than half (72.8%) of the respondents experienced personal burnout. Around two-thirds of them experienced work-related burnout (65.4%) and client-related burnout (59.3%).

With personal burnout as the main outcome, the study discovered that those who had children [OR: 11.31 (1.90, 67.37); $p = 0.008$], staying with family, relatives or friends [OR: 9.40 (1.27, 69.46); $p = 0.028$], being medical doctor [OR: 26.52 (2.79, 252.22); $p = 0.004$], worked more than 45 hours a week [OR: 8.68 (1.45, 58.09); $p = 0.018$] and previously never had COVID-19 viral test [OR: 6.93 (1.17, 40.89); $p = 0.033$] were significantly associated with higher odds of burnout (Table II) (Fig. 1).

DISCUSSION

To the best of the researchers' knowledge, this is the first study in the country to use CBI to assess burnout in critical care personnel during a pandemic in Malaysia. This study indicated a serious burnout condition during the initial phases of the COVID-19 pandemic, in which about three-quarters of critical care staff reported personal burnout, and two-thirds had work-related burnout and client-related burnout. The safety of critical care personnel and patients are strongly intertwined with burnout (24,25). This study served as a baseline for this crucial concern during the pandemic in this country.

Overall, with about 70% of staff experiencing personal burnout, the prevalence of burnout among critical care personnel in this tertiary hospital was slightly higher than the rate of burnout observed in Italian (60.3%) and Asian (51.8%) ICU (8,26). However, when zooming in on China, burnout has been far higher, with up to 82.1% of intensivists experiencing burnout using MBI as the assessment tool (27). Burnout among critical care workers has long been a concern; the situation worsen during this pandemic. Burnout among critical care personnel was higher during the pandemic

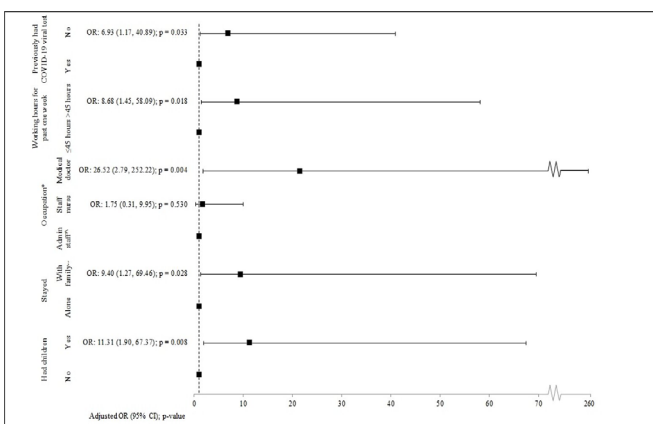


Figure 1: Significant factors of personal burnout (multivariate binary logistic regression). *Occupation: $p = 0.011$; ^Admin staff: Supportive and administrative staff; ~With family: With family/relatives/friends

Table II: Univariate analysis of factors associated with personal burnout among critical care personnel during COVID-19 pandemic (n=81)

Variables	Simple Logistic Regression		
	Crude OR	95% CI	p-value ^a
Age (years)			
≤30	1.00		
>30	0.89	0.32, 2.47	0.829
Sex			
Male	1.00		
Female	2.34	0.86, 6.34	0.095
Religion			
Islam	1.00	0.35, 2.68	0.949
Non-Islam ^b	0.97		
Marital status			0.371
Single	1.00		
Married	0.83	0.06, 10.55	0.888
Divorced	1.75	0.15, 21.00	0.659
Had children			
Yes	1.00		
No	3.385	1.16, 9.87	0.026
Stayed			
Alone	1.00		
With family/relatives/friends	5.16	1.29, 20.54	0.020
Occupation			0.051
Staff nurse	1.00		
Medical doctor ^b	2.83	0.70, 11.51	0.145
Supportive and administrative staff ^c	5.25	1.39, 19.90	0.015
Working experience (years)			
≤10 years	1.00		
>10 years	0.83	0.30, 2.32	0.724
Working experience in ICU (months)			
≤40 months	1.00		
>40 months	0.79	0.29, 2.15	0.647
Working hours for past one week (hours)			
≤45 hours	1.00		
>45 hours	5.05	1.50, 16.95	0.009
Longest working hours during early phase of pandemic (hours)			
≤45 hours	1.00		
>45 hours	0.30	0.04, 2.58	0.275
Relationship with colleague			
Moderate ^d	1.00		
Good	1.28	0.39, 4.23	0.682
Worried own self might get infected with COVID-19			
Yes	1.00		
No	1.08	0.19, 6.02	0.930
Previously had COVID-19 viral test			
Yes	1.00		
No	2.04	0.67, 6.19	0.210
Quarantine before			
Yes	1.00		
No	1.33	0.43, 4.08	0.621

OR: Odd ratio; CI: Confidence interval

^a Variables with $p < 0.25$ were selected for multiple logistic regression analysis

^b Non-Islam religion inclusive of Buddhist, Christian, Hindu, Sikh and Free-thinker

^c Supportive & administrative staff inclusive medical assistant and ward sister

^d Medical doctor inclusive medical officer, specialist and consultant

^e Including one response of poor relationship with colleague

than before the pandemic in a few countries, such as the Netherlands (36.1% versus 23.0%) and China (81.1% vs 61.2%) (14,27). Despite the lack of a study reporting the prevalence of burnout among critical care personnel in Malaysia before the pandemic, the burnout rate of critical care personnel in Asia's upper-middle-income countries was 58.9% in 2018 (14). This can be extrapolated to Malaysia, which is classified as an upper-middle-income country by the World Bank (28). In contrast to other countries' findings, research conducted during the early phase of the pandemic

among anaesthetists in Malaysia (55.3%) using MBI as the assessment tool, revealed an almost similar burnout rate as pre-pandemic (10). However, the burnout rate in this study appears to be consistent with a global trend in which the prevalence is higher during pandemics than in pre-pandemic periods. The different findings between this study and the study by Tsan SEH could be attributed to the different pandemic time frames in which the research were conducted. Nonetheless, the high rate of burnout among critical care workers must be addressed, with effective strategies in place to help them cope with the pandemic, such as stress management initiatives, self-care training, and improving work processes and working environments (29).

Respondents who lived with family and friends, and had children were more likely to have burnout. Although seeking assistance from family and friends is an important source of support during this pandemic, the critical care personnel could be afraid of the risk of bringing the infectious disease home to their family members (30). Furthermore, parenting during the pandemic was stressful especially since schools and day care centers were closed due to lockdowns, and they were having a hard time keeping the kids occupied and safe at home (31,32). Moreover, most of the healthcare workers had a career similar to their spouses, hence both parents were required to work throughout the pandemic, complicating childcare (32). Undeniably, the strict lockdowns aggravated the situation. To address this issue, the government and organisations could look towards creating a more stable childcare system and promoting workplace collegiality, which would encourage a supportive working culture for critical care employees who have other dependents at home (33,34). Medical doctors significantly experience more burnout in comparison with administrative and support staff in ICU, as observed in this study. Congruent to the findings conducted in the Netherlands, physicians had a greater proportion of burnout (26.7%) than nurses (21.9%) (35). A multinational study showed that doctors were associated with two times more odds of experiencing burnout than their counterparts (36). Medical doctors, regardless of seniority, are frequently called upon to lead patient management and have the greatest impact due to the constantly changing working standard of practice during this pandemic emergency (20,37). In addition, given the novelty of the disease with limited knowledge and evolving scientific data, medical doctors could have been facing more difficulties in patient care. This contributed to the high level of distress and, as a result, burnout (24). Measures had been taken to address the rapid changes in COVID-19 disease information and working standard of practice, a social media group was formed to help with the timely dissemination of new information as well as provide a platform for answering questions about patient management (38). Apart from boosting communication and information exchange among medical doctors, creating a blame-

free environment to communicate experiences, ethical or emergency issues, obstacles, and advice is critical in maintaining a positive working environment during this stressful period (39).

Notably, this study found that critical care workers who worked more than 45 hours per week were more likely to experience burnout. The same trend was noted in other studies in the South East Asia region (20,40,41). However, studies in China and Portugal showed otherwise (27,42). When it comes to the concept of workload, the contradictory evidence suggests that it is more than just working hours. Workload is a multi-dimensional concept that must be analysed independently for each profession because each has its own set of work system features, including administrative burden, workflow and time pressure, that contribute to burnout, which potentially exacerbated the condition during the pandemic (24). Even though working hours was only one of the dimensions used to represent workload, this research showed a significant relationship between burnout and this dimension, which should be included in future burnout studies alongside other dimensions of workload. Nonetheless, the issue of extended working hours could be addressed by organisational changes such as time limits on shift durations and, whenever possible, alternating shifts with days off (39).

During the pandemic, it was unavoidable that some personnel be subjected to COVID-19 viral testing due to exposure from the community, workplace or COVID-19 patients (43). Personnel who were subjected to COVID-19 viral testing and subsequently quarantined experienced psychological stress and burnout (20,44). Despite that, this study demonstrated a piece of conflicting evidence that critical care personnel who had never been tested for the COVID-19 virus experienced significantly higher burnout than those who had COVID-19 viral test. Unfortunately, the reasons were not explored in this study. The possible explanations for this could be attributed deal with the workload of the affected personnel being quarantined (20,43). Besides, a substantial number of COVID-19 infections were asymptomatic (45,46), making the critical care personnel unknown of their COVID-19 infection status when co-workers around them were diagnosed with COVID-19 infection. Hence, not getting the COVID-19 viral testing done may result in increased burnout, as shown in this study. It was recommended that sufficient personal protective equipment, accelerated access to occupational health for evaluation and testing if symptoms develops and resources and information to avoid infecting family members be provided to combat the anxiety among critical care personnel of possible contracting COVID-19 (47).

There are several limitations to this study. Firstly, it was an online questionnaire with a 48.5% of response rate. A lower response rate was predicted as there was

another surge of COVID-19 cases in Malaysia during data collection, and this rendered it difficult to achieve desired response rate when the personnel was busy with clinical work. The research team attempted to address this by extending the data collection period; however, Malaysia's pandemic condition remained dire during that period. The low response rate in this study is similar to other study surveys on the burnout rate of critical care personnel, with some recording a 20% of response rate (8). The poor response rate could also be the reflection of burnout among critical care personnel, therefore refusing to participate (48). Due to the low response rate, the study was underpowered. In the future, larger research will be needed to confirm the contributing factors to burnout in critical care personnel during the pandemic. Secondly, the reason for higher burnout among personnel who had never been tested for the COVID-19 virus was not explored in this study. Further studies should explore the association of getting COVID-19 viral testing done with burnout and its reasons. Lastly, the study did not look into the respondents' emotional intelligence or other probable COVID-19 psychological impacts, such as depression, which could be investigated further in the future when researching burnout during a pandemic (49,50).

CONCLUSION

In conclusion, more than half of the critical care personnel experienced personal, work-related and client-related burnout during this COVID-19 pandemic. The study demonstrated that there were possible associations between personal burnout and having children, staying with family, relatives, or friends, working more than 45 hours per week, and never had COVID-19 viral testing. Larger studies are needed to determine the association between factors and burnout in critical care personnel.

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