J Caring Sci, 2023, 12(2), 123-128
doi: 10.34172/jcs.2023.31742
https://jcs.tbzmed.ac.ir

Original Article

The Relationship between COVID-19 Exposure Risk and Burnout in Prehospital Emergency Medical Technicians

Karim Javanmardi[1], Neda Gilani[2], Mansour Ghafourifard[1], Abbas Dadashzadeh[1*], Javad Dehghannejad[1], Hossein Feyzollahzade[1]

[1]Department of Medical Surgical Nursing, School of Nursing & Midwifery, Tabriz University of Medical Sciences Tabriz, Iran
[2]Department of Statistics and Epidemiology, Faculty of Health, Tabriz University of Medical Sciences, Tabriz, Iran

Article Info
Article History:
Received: June 10, 2022
Accepted: August 19, 2022
e-Published: March 13, 2023

Keywords:
Burnout, COVID-19, Emergency medical service, Exposure, Prehospital emergency

***Corresponding Author:**
Abbas Dadashzadeh,
Email: ddshzd@yahoo.com

Abstract
Introduction: Exposure to coronavirus disease 2019 (COVID-19) has caused many physical and psychological effects on front-line healthcare workers (HCWs). This study aimed to assess the relationship between the exposure risk to COVID-19 disease and burnout in prehospital emergency medical technicians (EMTs).
Methods: In this correlational study, 335 prehospital EMTs were selected by random sampling method from the 49 stations of emergency medical services in the northwest of Iran. Data were collected using a questionnaire developed by the world health organization for the risk assessment and management of exposure of health care workers to COVID-19. Moreover, Pines burnout measure was used for the assessment of participants' burnout. Data were analyzed using SPSS version 13.
Results: Results showed that 30.7 % of prehospital EMTs had a high burnout score against COVID-19 disease. The prehospital EMTs who had a high occupational exposure risk experienced a high risk of burnout ($P=0.03$). The results of the linear regression analysis showed that prehospital EMTs who had a low exposure risk of COVID-19 had a low burnout score ($\beta=-9.30$; $P<0.001$), and those who had less than 10 years of work experience showed less burnout ($\beta=-10.54$; $P<0.001$).
Conclusion: According to the results, the exposure risk to COVID-19 increases the prehospital EMT's burnout. As a result, reducing the exposure risk to COVID-19 by providing adequate access to personal protective equipment (PPE), development of training and following standards and protocols can be effective in controlling burnout in HCWs.

Introduction

Healthcare workers (HCWs) are at high risk for coronavirus disease 2019 (COVID-19) due to prolonged exposure to large numbers of people infected with this virus.[1] Prehospital emergency medical technicians (EMTs) play a main role in initiating disease isolation precautions, providing emergency care, and transporting of patients to a hospital or medical center for receiving further treatment.[2] However, these personnel are potentially exposed to the COVID-19 virus[3] because of first contact with infected or suspected individuals,[4] performing aerosol-generating procedures such as cardiopulmonary resuscitation (CPR), suctioning, and tracheal intubation for infected patients.[5] Therefore, fear of infection with COVID-19 is considered a main concern for prehospital EMTs who have a contact with patients and provide the ambulance services.[1] In addition, working in the long shifts alongside with a shortage of personal protective equipment (PPE) could leads to the further stress and discomfort among them.[6] Therefore, working in this challenging context could result in physical, emotional and psychological problems and eventually leads to burnout.[7]

Burnout is a syndrome caused by chronic work-related stress, which is associated with symptoms such as physical and emotional fatigue, feeling of professional failure, and a negative attitude towards work.[8] It can lead to many negative consequences such as job dissatisfaction, poor quality of care, and decreased efficiency of healthcare services.[9]

In the caring field, burnout means loss of feeling and interest in the patients and providing improper and non-standard care for them.[10] The COVID-19 pandemic has raised many challenges for HCWs[1] and affected the performance and job satisfaction of the front-line HCWs.[11] In a study on prehospital emergency medical personnel, Heidari et al found that personnel who directly cared for the patients with COVID-19 had higher symptoms of burnout.[12] Another study conducted by Hadian et al showed that prehospital emergency medical

personnel caring for the COVID-19 patients are suffering from a range of psychiatric problems.[13] Also, a study in Taiwan showed that prehospital personnel who cared for COVID-19 patients had higher burnout scores.[14]

Healthcare providers who directly care for COVID-19 patients often see patients' suffering and dying which could lead to their emotional distress and fatigue.[15] Moreover, it could have harmful effects on the physical health and quality of life of healthcare providers and can lead to their absenteeism. Finally, these challenges reduce the quality of care delivered to the patients.[16]

There are two large cities (Tabriz and Urmia) in the northwest of Iran. In these two cities, the emergency medical service (EMS) systems annually receive more than 700,000 calls which more than 150,000 of them lead to ambulance services. With the COVID-19 outbreak, the number of EMSs were increased very sharply. In this regard, Natalzia et al reported that 63.7% of the patients during this pandemic suffered from an unstable situation.[17]Another study showed that cardiopulmonary arrests had increased by 77.4% during the COVID-19 pandemic. These patients needed the EMS personnel help to start CPR as soon as possible.[18]

During the COVID-19 pandemic, controlling the exposure risk of the disease and improving the job satisfaction of personnel is of great importance. Due to the novelty of the disease and since there is no evidence about the relationship between exposure risk to the COVID-19 disease and burnout in prehospital EMTs, this study aimed to assess the relationship between the exposure risk to the COVID-19 disease and burnout among prehospital EMTs.

Materials and Methods

This correlational study was conducted in two large cities (Tabriz and Urmia) located in the northwest of Iran. This study was conducted between May 2020 and April 2021. A total of 335 prehospital EMTs were selected by random sampling method from the 49 stations of EMS. The main inclusion criteria included working for at least six months as an emergency care provider to the COVID-19 patients.

Data collection tools consisted of three tools. The first tool is related to the demographic and job characteristics. The second questionnaire was adapted from a questionnaire developed by the World Health Organization (WHO) for the assessment of exposure risk and management of COVID-19 by HCWs. The questionnaire consists of three parts: community exposure to the COVID-19 virus, occupational exposure to the COVID-19 virus, and infection prevention and control (IPC) measure in contact with suspected or infected COVID-19 patients.[19,20] The questionnaire assesses the type of activity in which the HCW is engaged. Moreover, it measures the level of risk based on the low-risk or high-risk events.

In a subscale of community exposure and occupational exposure, if an HCW responds "yes" to any of the activities reported in the scale, the person is considered to high exposure risk to the COVID-19 virus. If an HCW select the response of "always, as recommended" to any of the IPC measures when caring for a confirmed COVID-19 patient, the person was considered at the low risk of the COVID-19 virus infection. If an HCW responds to other options, the person was considered high risk for the COVID-19 virus infection.[21]

The burnout measure which has 21 items was used to assess the physical, emotional, and mental exhaustion of the participants.[22] Each item is scored based on a 7-point Likert scale ranging from 1 "Never" to 7 "Always". The higher scores indicate more severe symptoms of burnout. The burnout score is obtained from the mean of the responses to all items. Burnout scores are categorized into four groups: no burnout (≤ 2.9), risk of burnout (3-3.9), burnout present (4- 4.9), and clinically depressed (≥ 5). Moreover, burnout score was classified into two levels: low risk (score less than 50%) and high risk (score above 50%).

The content validity of the questionnaire was confirmed by 30 different samples. The reliability of the questionnaire was calculated in the range of 0.91-0.93 through Cronbach's alpha coefficient.[23] The present questionnaire was used in the study of Johns to measure the burnout of caregivers of patients with HIV and AID.[24]

The collected data were analyzed using descriptive and inferential statistics such as ANOVA, chi-square, Pearson correlation coefficient and regression using SPSS version 13 (SPSS Inc., Chicago, Ill., USA) software. A P value < 0.05 was considered as significant.

Results

In terms of demographic and job characteristics, most of the prehospital EMTs (44.8 %) were between 30-39 years old with a mean (SD) age of 32.81(6.81). The mean work experience of prehospital EMTs was 8.41 (6.15) years. During 13 months after the onset of the pandemic, 60.3% of the prehospital EMTs were infected with COVID-19. The average number of prehospital services related to suspected or infected COVID-19 patients was less than 3 service in 24 hours, with an average of 30 minutes of contact with each COVID-19 patient (Table 1).

In 55.2% of prehospital EMTs, the exposure risk of the COVID-19 disease was high and 30.7 % of the personnel had high burnout score. The standardized mean of the total exposure risk and the total burnout score was 53.71% and 39.83 %, respectively (Table 2). The mean and standard deviation of the burnout was 3.62 ± 0.93. According to the results, 41.9 % of personnel were at risk of burnout, and 32.7 % had burnout (Table 3).

In this study, the prehospital EMTs who had a high occupational exposure risk had a high risk of burnout (P = 0.03). Participants who followed the infection prevention measures more (46.57%), were at a lower risk

Table 1. Demographic characteristics of the participants (N = 335)

Variable	No. (%)
Age	
29≥	128 (38.2)
30-39	150 (44.8)
40-49	49 (14.6)
50≤	8 (2.4)
Mean (SD)	32.81(6.81)
Work experience (years)	
≤10	225 (67.2)
>10	110 (32.8)
Mean (SD)	8.41(6.15)
Marital status	
Single	95 (28.4)
Married	230 (68.7)
Divorced	10 (3)
History of COVID-19 infection	
Yes	202 (60.3)
No	133 (39.7)
Average number of suspected or infected COVID-19 patients admitted during a 24-hour shift	
3>	151 (45.5)
3-5	96 (28.7)
6-10	78 (23.3)
10<	10 (3)
Mean duration of contact with each COVID-19 patient	
15 min	56 (16.7)
30 min	104 (31)
45 min	85 (25.4)
1 h	63 (18.8)
Over 1 h	27 (8.1)

of burnout ($P = 0.005$). 19.70 % of participants who had a high total exposure risk score to COVID-19 showed a high risk of burnout ($P = 0.001$). However, there was no significant difference in the community exposure risk (Table 4).

The analysis by Pearson's correlation showed a positive and significant association between occupational exposure score, following infection prevention measures score, and total exposure risk score of the COVID-19 disease and burnout. The correlation between the total exposure risk score of the COVID-19 disease and burnout was $r = 0.27$ ($P < 0.001$) (Table 4).

The results of the linear regression showed that prehospital EMTs who had a low exposure risk of COVID-19 showed a low burnout score ($\beta = -9.30$; $P < 0.001$), and those who had less than 10 years of work experience had less burnout ($\beta = -10.54$; $P < 0.001$). Moreover, burnout was higher in those who had a COVID-19 history ($\beta = 4.85$; $P = 0.02$) (Table 5).

Discussion

According to the results, the majority of the prehospital EMTs infected with COVID-19, which is similar to studies conducted in this regard.[12,14] In line with previous studies, the prehospital EMTs had a high exposure risk to COVID-19.[19,25] Since these personnel are at the frontline of the medical system against the pandemic[3] and they provide care in uncertain environments for patients with unclear medical histories,[26] they have a high exposure risk in the workplace. However, COVID-19 disease can be controlled with adequate access to PPE and providing a high-quality care.

In this study, 30.7% of prehospital EMTs were at high risk of burnout during the COVID-19 pandemic. In this regard, a study by Kakemam et al showed that 31.5% of nurses had a high risk of burnout against COVID-19.[6] In another study conducted in Japan, the rate of burnout in HCWs who were in close contact with COVID-19 patients was reported at 31.4%.[27] Another study in Wuhan, China, showed that physicians and nurses experienced high levels of burnout symptoms, anxiety, and insomnia during the COVID-19 pandemic. [28] These findings are similar to our study and it can be explained by the negative physical and psychological effects of the disease on the personnel health.

According to a study done in Iran, 64.6% of nurses

Table 2. Distribution of the exposure risk of COVID-19 and burnout (N = 335)

Variable	N (%)	Mean (SD)
Community exposure		
Low risk	105 (31.3)	82.39 (27.68)
High risk	230 (68.7)	
Occupational exposure		
Low risk	47 (14)	73.97 (23.73)
High risk	288 (86)	
Adherence to infection prevention measures		
Low risk	203 (606)	46.50 (24.13)
High risk	132 (39.4)	
Total score of exposure risk		
Low risk	150 (44.8)	53.71 (19.24)
High risk	185 (55.2)	
Total burnout score		
Low risk	232 (69.3)	39.83 (19.80)
High risk	103 (30.7)	

Table 3. Distribution of burnout levels (N = 335)

Variable	No. (%)
Total burnout score	
No burnout (≤2.9)	84 (25.3)
Risk of burnout (3–3.9)	139 (41.9)
Burnout present (4–4.9)	83 (25.0)
Clinically depressed (≥5)	26 (7.8)
Mean (SD)	3.62(0.93)

working in the hospitals of Shiraz during COVID-19 pandemic had severe burnout.[29] Another study in India found a higher prevalence of burnout (44.6%) among HCWs during the pandemic[30] as compared with our study. In addition to the physical and psychological effects of the COVID-19 pandemic. It seems that the lack of health information and inadequate access to PPE could lead to increasing burnout.[11] Therefore, due to the high rate of burnout in prehospital EMTs in the COVID-19 crisis, emotional support and psychological counseling could play an important role in minimizing it. Also, providing self-care techniques, financial support, training and employment of staff, can be effective in maintaining nurses' mental health.[27,31] Xiong et al showed that improving nurses' self-efficacy in dealing with infectious diseases such as COVID-19 is an important factor in reducing their psychological stress.[32]

Our study also showed that personnel who were at high exposure risk of COVID-19 disease had higher burnout. This result is similar to a study conducted in Saudi Arabia by Al Sulais et al.[33] Moreover, another study in Iran showed that nurses' burnout have been increased by 39% during the outbreak of the COVID-19 pandemic, and their efficiency and job performance have been decreased by 20%.[34] This may be attributed to the fear of infection with COVID-19. Thus, paying attention to the psychological needs of healthcare providers is recommended. Contrary to our findings, the results of a study in China showed that front-line HCWs caring for COVID-19 patients experienced lower burnout than those working in the usual wards.[7]

According to the literature review, providing basic safety requirements and an adequate access to PPE could reduce the exposure risk of COVID-19. Moreover, early identification of HCWs with lower job satisfaction and higher burnout and providing supportive measures for them could help to decrease the personnel's burnout.[35,36]

In this study, prehospital EMTs with professional experience and who had a COVID-19 history showed a higher burnout score. In this regard, Zhang et al showed that when the staffs' work experience is increased, their job satisfaction is decreased.[36] Similar to our findings, a study by Hoseinabadi et al showed that burnout was high among those who cared for infected patients for a long time and among those who had a history of COVID-19.[37] These results could be attributed to the psychological stress caused by this. This research was conducted in the Northwest of Iran. Therefore, the findings could not be generalizable to the whole country. Conducting other studies in other cities is recommended. Moreover, we only studied the personnel working in prehospital emergency services. It is suggested to compare the attitudes of personnel working in the prehospital and hospital settings.

Table 4. The relationship between exposure risk levels to COVID-19 and burnout (N = 335)

Variable	Low risk	High risk	*r*	*P* value
	No. (%)	No. (%)		
Community exposure				
Low risk	79 (23.58)	159 (47.46)	0.06	0.23
High risk	26 (7.76)	68 (20.30)		
Occupational exposure				
Low risk	39 (11.64)	199 (59.40)	0.161[a]	0.03
High risk	7 (2.09)	87 (25.97)		
Following infection prevention measures				
Low risk	156 (46.57)	82 (24.48)	0.244[a]	0.001
High risk	46 (13.73)	48 (14.33)		
Total exposure risk score				
Low risk	121 (36.12)	117 (34.92)	0.272[a]	0.001
High risk	28 (8.35)	66 (19.70)		

r = Pearson's correlation coefficient, [a] Significant correlation at the level of 0.05.

Conclusion

Prehospital EMTs are at high risk of burnout against COVID-19 disease. According to the results, the exposure risk to this disease increases the prehospital EMT's burnout. As a result, reducing the exposure risk to COVID-19 with providing adequate access to PPE, development of training and following standards and

Table 5. Univariate and multivariate linear regression between the exposure risk of COVID-19 and socio-demographic features with burnout

Variable	Univariate		Multivariate	
	β (CI: 95%)	*P* value	β (CI: 95%)	*P* value
Exposure risk of COVID-19				
High risk	Reference			
Low risk	-9.30 (-13.48- -5.11)	<0.001	-8.54 (-12.60- -4.49)	<0.001
Work experience				
>10	Reference			
≤10	-10.54(43.30-50.53)	<0.001	-10.23(-14.52 - -5.95)	<0.001
COVID-19 history				
No	Reference			
Yes	4.85 (0.50-9.21)	0.02	4.64 (0.52- 8.77)	0.02

Research Highlights

What is the current knowledge?

- Occupational burnout in prehospital EMTs reduces the efficiency and causes physical and psychological complications.
- Because of first contact with infected or suspected individuals, performing the high risk activities such as CPR, tracheal intubation or suctioning for infected, prehospital EMTs are potentially exposed to the COVID-19 virus.
- Fear of infection is considered a main concern for these personnel and has caused more physical and psychological side effects in them.

What is new here?

- Half of the prehospital EMTs showed a high exposure risk of the COVID-19 disease. Moreover, one-third of them had high burnout scores.
- There was a significant correlation between the exposure risk to COVID-19 and burnout among prehospital EMTs.

protocols can be effective in controlling burnout in HCWs. Moreover, emotional support of the prehospital EMTs by managers alongside with engaging in mindfulness techniques, such as breathing exercises and meditation could be helpful.

Acknowledgments

This project was derived from the master's thesis conducted at Tabriz University of Medical Sciences, Faculty of Nursing and Midwifery. Hereby, the authors would like to thank all participants in this study.

Authors' Contribution

Conceptualization: Karim Javanmardi, Abbas Dadashzadeh, Javad Dehghannejad.
Data curation: Karim Javanmardi, Javad Dehghannejad.
Formal analysis: Karim Javanmardi, Neda Gilani, Mansour Ghafourifard, Abbas Dadashzadeh.
Funding acquisition: Abbas Dadashzadeh.
Investigation: Karim Javanmardi, Abbas Dadashzadeh.
Methodology: Karim Javanmardi, Neda Gilani, Mansour Ghafourifard, Abbas Dadashzadeh.
Project administration: Abbas Dadashzadeh, Hossein Feyzollahzade, Neda Gilani.
Supervision: Neda Gilani, Mansour Ghafourifard, Abbas Dadashzadeh.
Validation: Karim Javanmardi, Neda Gilani, Mansour Ghafourifard, Abbas Dadashzadeh, Javad Dehghannejad, Hossein Feyzollahzade.
Visualization: Karim Javanmardi, Neda Gilani, Mansour Ghafourifard, Abbas Dadashzadeh, Javad Dehghannejad, Hossein Feyzollahzade.
Writing–original draft: Karim Javanmardi, Neda Gilani, Mansour Ghafourifard, Abbas Dadashzadeh, Javad Dehghannejad, Hossein Feyzollahzade.
Writing–review & editing: Karim Javanmardi, Neda Gilani, Mansour Ghafourifard, Abbas Dadashzadeh, Javad Dehghannejad, Hossein Feyzollahzade.

Competing Interests

The authors have no conflicts of interest to declare.

Data Availability

The datasets are available from the corresponding author on reasonable request.

Ethical Approval

The approval was obtained from the ethical review board of Tabriz University of Medical Sciences (IR. TBZMED.REC.1399.1079). The objective of the study was explained to all participants and they were assured of the confidentiality of collected data. The written consent form was obtained from all participants.

Funding

This research was funded by the Master Research Project from Tabriz University of Medical Sciences.

References

1. Labrague LJ, de Los Santos JAA. Fear of COVID-19, psychological distress, work satisfaction and turnover intention among frontline nurses. J Nurs Manag. 2021; 29(3): 395-403. doi: 10.1111/jonm.13168
2. Baru A, Sultan M, Beza L. The status of prehospital care delivery for COVID-19 patients in Addis Ababa, Ethiopia: The study emphasizing adverse events occurring in prehospital transport and associated factors. PLoS One. 2022; 17(2): e0263278. doi: 10.1371/journal.pone.0263278
3. Gibson C, Ventura C, Collier GD. Emergency medical services resource capacity and competency amid COVID-19 in the United States: preliminary findings from a national survey. Heliyon. 2020; 6(5): e03900. doi: 10.1016/j.heliyon.2020.e03900
4. Sprague RM, Ladd M, Ashurst JV. EMS resuscitation during contamination while wearing PPE. In: StatPearls. Treasure Island, FL: StatPearls Publishing; 2022.
5. Al-Shaqsi S. Models of international emergency medical service (EMS) systems. Oman Med J. 2010; 25(4): 320-3. doi: 10.5001/omj.2010.92
6. Kakemam E, Chegini Z, Rouhi A, Ahmadi F, Majidi S. Burnout and its relationship to self-reported quality of patient care and adverse events during COVID-19: a cross-sectional online survey among nurses. J Nurs Manag. 2021; 29(7): 1974-82. doi: 10.1111/jonm.13359
7. Wu Y, Wang J, Luo C, Hu S, Lin X, Anderson AE, et al. A comparison of burnout frequency among oncology physicians and nurses working on the frontline and usual wards during the COVID-19 epidemic in Wuhan, China. J Pain Symptom Manage. 2020; 60(1): e60-e5. doi: 10.1016/j.jpainsymman.2020.04.008
8. Cocchiara RA, Peruzzo M, Mannocci A, Ottolenghi L, Villari P, Polimeni A, et al. The use of yoga to manage stress and burnout in healthcare workers: a systematic review. J Clin Med. 2019; 8(3): 284. doi: 10.3390/jcm8030284
9. Ogresta J, Rusac S, Zorec L. Relation between burnout syndrome and job satisfaction among mental health workers. Croat Med J. 2008; 49(3): 364-74. doi: 10.3325/cmj.2008.3.364
10. Sheini-Jaberi P, Baraz-Pordanjani S, Beiranvand S. Relationship between self-esteem and burnout in nurses. J Clin Nurs Midwifery. 2014; 3(3): 52-62. [Persian].
11. De los Santos JAA, Labrague LJ. Impact of COVID-19 on the psychological well-being and turnover intentions of frontline nurses in the community: a cross-sectional study in the Philippines. medRxiv [Preprint]. August 6, 2020. Available from: https://www.medrxiv.org/content/10.1101/2020.08.05.20167411v1.
12. Heidari M, Heydarpoor S, Yadollahi S, Sheikhi RA, Aliakbari

F. Evaluation of anxiety and professional competence of prehospital emergency medical personnel in COVID-19 pandemics. Disaster Emerg Med J. 2022; 7(3): 150-6. doi: 10.5603/DEMJ.a2022.0012
13. Hadian M, Jabbari A, Abdollahi M, Hosseini E, Sheikhbardsiri H. Explore pre-hospital emergency challenges in the face of the COVID-19 pandemic: a quality content analysis in the Iranian context. Front Public Health. 2022; 10: 864019. doi: 10.3389/fpubh.2022.864019
14. Chang YT, Hu YJ. Burnout and health issues among prehospital personnel in Taiwan fire departments during a sudden spike in community COVID-19 cases: a cross-sectional study. Int J Environ Res Public Health. 2022; 19(4): 2257. doi: 10.3390/ijerph19042257
15. Alharbi J, Jackson D, Usher K. The potential for COVID-19 to contribute to compassion fatigue in critical care nurses. J Clin Nurs. 2020; 29(15-16): 2762-4. doi: 10.1111/jocn.15314
16. Shariati A, Rahmani Anaraki H, Parvareshmasoud M, Hesam M, Asayesh H, Mousavi SM, et al. Relationship between burnout and nurses' job characteristics. J Res Dev Nurs Midwifery. 2022; 12(1): 47-55.
17. Natalzia P, Murk W, Thompson JJ, Dorsett M, Cushman JT, Reed P, et al. Evidence-based crisis standards of care for out-of-hospital cardiac arrests in a pandemic. Resuscitation. 2020; 156: 149-56. doi: 10.1016/j.resuscitation.2020.07.021
18. Baldi E, Sechi GM, Mare C, Canevari F, Brancaglione A, Primi R, et al. Out-of-hospital cardiac arrest during the COVID-19 outbreak in Italy. N Engl J Med. 2020; 383(5): 496-8. doi: 10.1056/NEJMc2010418
19. Ashinyo ME, Dubik SD, Duti V, Amegah KE, Ashinyo A, Larsen-Reindorf R, et al. Healthcare workers exposure risk assessment: a survey among frontline workers in designated COVID-19 treatment centers in Ghana. J Prim Care Community Health. 2020; 11: 2150132720969483. doi: 10.1177/2150132720969483
20. Bani-Issa WA, Al Nusair H, Altamimi A, Hatahet S, Deyab F, Fakhry R, et al. Self-report assessment of nurses' risk for infection after exposure to patients with coronavirus disease (COVID-19) in the United Arab Emirates. J Nurs Scholarsh. 2021; 53(2): 171-9. doi: 10.1111/jnu.12625
21. Do BN, Tran TV, Phan DT, Nguyen HC, Nguyen TTP, Nguyen HC, et al. Health literacy, eHealth literacy, adherence to infection prevention and control procedures, lifestyle changes, and suspected COVID-19 symptoms among health care workers during lockdown: online survey. J Med Internet Res. 2020; 22(11): e22894. doi: 10.2196/22894
22. Takai M, Takahashi M, Iwamitsu Y, Ando N, Okazaki S, Nakajima K, et al. The experience of burnout among home caregivers of patients with dementia: relations to depression and quality of life. Arch Gerontol Geriatr. 2009; 49(1): e1-5. doi: 10.1016/j.archger.2008.07.002
23. Malakh-Pines A, Aronson E, Kafry D. Burnout: From Tedium to Personal Growth. New York: Free Press; 1981.
24. Johns BR. The relationship between personality hardiness and burnout among informal caregivers of people with HIV and AIDS. University of Cincinnati; 1998.
25. Lee J, Kim M. Estimation of the number of working population at high-risk of COVID-19 infection in Korea. Epidemiol Health. 2020; 42: e2020051. doi: 10.4178/epih.e2020051
26. Alshammaria A, Baila JB, Parilloa SJ. PPE misuse and its effect on infectious disease among EMS in Saudi Arabia. J Stud Res. 2019; 8(1): 51-8. doi: 10.47611/jsr.v8i1.592
27. Matsuo T, Kobayashi D, Taki F, Sakamoto F, Uehara Y, Mori N, et al. Prevalence of health care worker burnout during the coronavirus disease 2019 (COVID-19) pandemic in Japan. JAMA Netw Open. 2020; 3(8): e2017271. doi: 10.1001/jamanetworkopen.2020.17271
28. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw Open. 2020; 3(3): e203976. doi: 10.1001/jamanetworkopen.2020.3976
29. Kamali M, Kalateh Sadati A, Khademi MR, Ghahramani S, Zarei L, Ghaemi SZ, et al. Burnout among nurses during coronavirus disease 2019 outbreak in Shiraz. Galen Med J. 2020; 9: e1956. doi: 10.31661/gmj.v9i0.1956
30. Khasne RW, Dhakulkar BS, Mahajan HC, Kulkarni AP. Burnout among healthcare workers during COVID-19 pandemic in India: results of a questionnaire-based survey. Indian J Crit Care Med. 2020; 24(8): 664-71. doi: 10.5005/jp-journals-10071-23518
31. Chegini Z, Arab-Zozani M, Rajabi MR, Kakemam E. Experiences of critical care nurses fighting against COVID-19: a qualitative phenomenological study. Nurs Forum. 2021; 56(3): 571-8. doi: 10.1111/nuf.12583
32. Xiong H, Yi S, Lin Y. The psychological status and self-efficacy of nurses during COVID-19 outbreak: a cross-sectional survey. Inquiry. 2020; 57: 46958020957114. doi: 10.1177/0046958020957114
33. Al Sulais E, Mosli M, AlAmeel T. The psychological impact of COVID-19 pandemic on physicians in Saudi Arabia: a cross-sectional study. Saudi J Gastroenterol. 2020; 26(5): 249-55. doi: 10.4103/sjg.SJG_174_20
34. Karimi Johani R, Taghilou H, Karimi Johani F, Jafarzadeh Gharajag Z, Babapour Azam L. Investigating the relationship between burnout and job performance in the corona epidemic from the perspective of nurses. Quarterly Journal of Nursing Management. 2020; 9(4): 27-33. [Persian].
35. Zhang SX, Liu J, Afshar Jahanshahi A, Nawaser K, Yousefi A, Li J, et al. At the height of the storm: healthcare staff's health conditions and job satisfaction and their associated predictors during the epidemic peak of COVID-19. Brain Behav Immun. 2020; 87: 144-6. doi: 10.1016/j.bbi.2020.05.010
36. Zhang SX, Chen J, Afshar Jahanshahi A, Alvarez-Risco A, Dai H, Li J, et al. Succumbing to the COVID-19 pandemic-healthcare workers not satisfied and intend to leave their jobs. Int J Ment Health Addict. 2022; 20(2): 956-65. doi: 10.1007/s11469-020-00418-6
37. Sarboozi Hoseinabadi T, Kakhki S, Teimori G, Nayyeri S. Burnout and its influencing factors between frontline nurses and nurses from other wards during the outbreak of coronavirus disease COVID-19 in Iran. Invest Educ Enferm. 2020; 38(2). doi: 10.17533/udea.iee.v38n2e03