

RELATIONSHIP BETWEEN PERCEIVED STRESS AND QUALITY OF LIFE OF NURSES WORKING IN COVID-19 WARDS

Tahereh Heidari^{1*}, Azar Jafari-Koulaee², Hamideh Azimi Lolaty³, Majid Khorram⁴, Soraya Rezaei⁵, Abolfazl Hosseinnataj⁶

1. Ph.D. Student of Nursing, Golestan University of Medical Sciences, Sari, Iran.
2. Ph.D. Student of Nursing, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran
3. Department of Psychiatric Nursing, Psychiatry and Behavioral Sciences Research Center, Addiction Institute, Mazandaran University of Medical Sciences, Sari, Iran.
4. MSc of Psychiatric Nursing, Mazandaran University of Medical Sciences, Sari, Iran.
5. Student Research Committee, Mazandaran University of Medical Sciences, Sari, Iran.
6. Assistant Professor, Department of Biostatistics, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran.

Correspondence: Taherehheidari59@gmail.com

ABSTRACT

BACKGROUND:

Stressors during the COVID-19 pandemic led to a lack of concentration and lack of energy to achieve career goals, fatigue, poor performance, burnout and reduced quality of life of many people, especially nurses.

METHODS:

This descriptive-analytical study was completed with the aim of determining the relationship between perceived stress and quality of life of nurses working in the care wards for patients with COVID-19 in hospitals affiliated with the Mazandaran University of Medical Sciences (Mazandaran, Iran) during 2020-2021. Inclusion criteria included willingness to participate in the study, having at least a bachelor's degree in nursing and working in care wards of patients with COVID-19. Data collection tools included a demographic information questionnaire, Cohen Perceived Stress Questionnaire and WHO Quality of Life Questionnaire. Frequency, percentage, Mean and standard deviation indices were used to describe the variables. Also, Mann-Whitney, Kruskal-Wallis and Spearman correlation coefficients were used to assess the relationship between variables.

RESULTS:

The Mean (SD) age of participants was 33.48 (6.64) years. Most were female (73.3%). The total scores of quality of life and perceived stress variables of nurses were 47.63 ± 24.31 and 27.62 ± 4.61 , respectively. Nurses' scores of quality-of-life domains included physical health, psychological, social relationships and environmental domain were $(46.52 \pm 12.69, 46.57 \pm 12.70, 46.39 \pm 19.45$ and $50.52 \pm 10.52)$, respectively. Nurses' quality of life had a direct significant relationship with the variables of sleep quality and job satisfaction ($P < 0.001$). Perceived stress score also had a significant inverse relationship with physical and social dimensions and total quality of life score ($P < 0.001$).

CONCLUSIONS:

Based on the results of this study, and the negative effects of nurses' perceived stress on their quality of life, it is necessary to pay serious attention to nurses' concerns in these work situations. It is recommended that considered appropriate interventions to reduce perceived stress and improve the quality of life in nurses who care for patients with COVID-19 be implemented.

KEYWORDS

stress, quality of life, nurses, coronavirus disease, COVID-19

INTRODUCTION

The outbreak of the novel coronavirus (COVID-19) disease in China in early December 2019 was rapidly transmitted to other countries in various ways, such as air travel and it developed into a pandemic by March 2020 [1-3]. Since the COVID-19 Declaration as a pandemic, 43 million cases have been reported worldwide [4]. The COVID-19 pandemic has created unprecedented challenges to healthcare professionals worldwide. In the face of this epidemic, health care staff as those at the forefront of care for COVID-19 patients and are exposed to mental health problems such as stress and anxiety [4, 5]. Iran's health system is also one of the nations affected by this pandemic and its disagreeable effects [6]. In Iran, from March 2019 to November 2020, COVID-19 has affected more than 60,000 nurses across the country, and unfortunately, around 100 nurses have lost their lives. These conditions lead to different psychological stresses amongst the Iranian frontline nurse workforce [7].

For a long time, nurses, who make up the largest number of health care workers in all countries, have always been at the forefront of specific epidemics and risking their lives in the performance of their duties [8]. During the COVID-19 pandemic, nurses have been in close contact with COVID-19 patients and are prone to infection besides transmission to their fellows and family members [9]. The health of medical staff, especially nurses, during the COVID-19 pandemic is unfavourable and alarming. Studies have reported nurses experiencing high levels of stress during this pandemic [10, 11]. In a study undertaken in Iran, the rate of depression, anxiety and stress in the nurses working in COVID-19 related wards has been reported as medium [12]. The main factors associated with nurses perceived stress consist of perceived risk of infection to themselves and their families, patient mortality, lack of clear-cut medication for treating the disease, long working hours, inadequate personal protective equipment and inadequate training on infection control measures, prolonged quarantine, frustration, fatigue, financial loss, rumors, negative beliefs about vaccination [13-15]. Nursing staff who spend most of their time with the infected patients have come precariously close to disaster because the lack of nursing staff, chronic fatigue, and high rate of illness and death of them due to coronavirus pandemic [7]. Moreover, stressful factors during COVID-19 pandemic have resulted in distraction and loss of energy for completing job tasks,

fatigue, poor performance, burnout, and ultimately reduced quality of life for themselves [16, 17].

Quality of life is an important indicator to determine whether nurses have been able to successfully deal with stressful events induced challenges [18, 19]. Quality of life is a multidimensional concept affected by several stressor factors involved in the COVID-19 pandemic, including family concerns, the pressure about unclear health status of family members and reduced social interactions, the factors which both personally and professionally directly or indirectly affect the quality of life of health professionals [20]. Stress has been reported as one of the most valued factors in the nurses' quality of life as the studies derived results that have revealed that stress increase has had a negative impact on some of the dimensions of nurses' quality of life [21, 22]. The results of studies showed low quality of life among health professionals, especially among nurses who cared patients with coronavirus [7, 19, 23].

In this regard, reviewing the available research literature databases has shown that although some studies have been conducted throughout the world and Iran to investigate the relationship between stress and the quality of life of the nurses, but in considering the enormous impact of this newly emerged disease on all dimensions of human life and especially the health providers both in Iran and internationally. Studies completed during pre-COVID-19 outbreak cannot be generalized to the post-COVID-19 pandemic and it's necessary to perform specific research. Studies were undertaken on the perceived stress of nurses during the prevalence of COVID-19 pandemic [17], but so far no research in Iran has analyzed the relationship between the perceived stress and the quality of life of the nurses working in the care wards for COVID-19 patients. Therefore, the present study has been undertaken to determine the association between the perceived stress and the quality of life of nurses working in the wards for COVID-19 patients of medical educational hospitals in Sari. It is hoped that this study's results may be applied by the competent authorities for reducing stress, promoting the quality of life and ultimately, the quality of nursing care.

METHODS

The present study uses a descriptive-analytical method with the aim of determining how the perceived stress and the quality of life of the nurses working in COVID-19 patient care

wards are related in the setting of the medical-educational hospitals in Sari (Mazandaran-Iran) during 2020-2021. The research population consists of nurses working in the COVID-19 wards in these hospitals that are affiliated with the Mazandaran University of Medical Science in Sari (Imam Khomeini Hospital, Bu Ali Sina Hospital, Fatemeh Zahra Heart Hospital and Shahid Zare Hospital).

The inclusion criteria were willingness to participate in the study, and working in COVID-19 patient care wards.

Having acquired a permit from the Ethics Committee (The code of ethics: IR. MAZUMS.REC.1399.8322) and the Department of Research of the Mazandaran University of Medical Science and coordinating with the hospital management, the researcher attended the research environment and began sampling.

After selecting the research samples (participants) and obtaining the participants' written consent to participate in the study where due explanation was given about the study purpose and method to the participants. Prospective participants were assured about the information to be extracted through the questionnaire would remain completely confidential and their participation or non-participation in the study would not affect the job evaluation of the nurses and being part of this study was optional. All the personnel working in coronavirus specific wards were selected based on the inclusion criteria and were sampled using census data and entered into the study.

The instruments used in this study, were the Demographics Questionnaire, Cohen Perceived Stress Scale [24] and Quality of Life Questionnaire [26].

A) Demographics Questionnaire: This questionnaire is a researcher-built questionnaire being completed by the nurses, which includes the variables such as: age, gender, marital status, education, work experience [27], work shift, employment status and the history of stressful events for nurses.

B) Perceived Stress Scale: Perceived Stress Scale developed by Cohen et al. in 1983 [24] is made up of 14 options to measure the thoughts and feelings about stressful events, control, overcoming, coping with stress and the stress perceived by an individual during last month. In this questionnaire, the Likert scale (never, very low, medium, relatively high and high) was used and the subject

got the score ranging from 0 and 4 points, of which 0 and 56 are the lowest and the highest scores. Cohen et al. in 1983 [24] reported optimal validity and reliability for this scale and the internal consistency coefficients for each of the subscales and the questionnaire's overall score were estimated between 0.84 and 0.86 [24]. In a study in Iran, this questionnaire's validity was confirmed and Cronbach's alpha was calculated as 0.76 [25]. In the present study, Cronbach's alpha of the perceived stress questionnaire was estimated as 0.78.

C) The World Health Organization Quality of Life Questionnaire (WHOQOL-BREF): This instrument measures four areas of physical health (7 options), mental health (6 options), social relationship (3 options) and the environmental health (8 options) with 24 options, where the first 2 do not belong to any of the areas and assess the quality of life in general. Thus, this questionnaire has 26 options, each of which is given a score of 1-5. Finally, a score of 4-20 is gained in each area, where score 4 signifies the worst and score 20 the best status in each area. These scores can also be converted into the range 0-100 [26]. This questionnaire's validity and reliability have been reported as optimal [28]. In a research done in Iran, this questionnaire's validity has been reported based on the homogeneity coefficient for the whole scale of 0.92 [26]. In the present study, the Cronbach's alpha for the World Health Organization questionnaire of the quality of life was calculated as 0.77.

In this study, SPSS-22 was used for analyzing the data. Frequency, percentage, mean and standard deviation indices were used to describe the variables. The scores of the dimensions, namely, the perceived stress and quality of life questionnaires did not have a normal distribution hypothesis (using Kolmogorov-Smirnov test). In this regard, Mann-Whitney, Kruskal-Wallis and Spearman correlation coefficients were used to examine the relationship between the variables. The significance level less than 5 % was considered.

RESULTS

In the present study, 195 nurses working in the COVID-19 patients' care wards in the medical-educational hospitals affiliated with Mazandaran University of Medical Science in Sari participated in this study. The Mean (SD) age of the participants was 33.48 ± 6.46 years. The majority of the participants were women (73.3%) with a BSc degree

(86.2%). Other details about the subjects' demographics are demonstrated in Table 1.

gained as 27.62 ± 4.61 . Other details regarding the scores of the quality of life and their dimensions besides the perceived stress scale are reported in Table 2.

The Mean (SD) score of the subjects' perceived stress was

TABLE 1: DEMOGRAPHIC PROFILE OF THE PARTICIPANT

Variable		Frequency [Percentage]
Gender	Female	143 [73.3]
	Male	52 [26.7]
Education level	Bachelor	168 [86.2]
	Master and PhD	27 [13.8]
Marital Status	single	43 (22.1)
	Married	146 [74.8]
	Divorced	6[3.1]
Shift work	Only morning	7 [3.6]
	Only evening	3[1.5]
	Morning & evening	17[8.7]
	Permanent nightshifts	2[1.0]
	Internal rotation [mix of night and day shifts]	166[85.2]
History of a specific disease	Yes	66 [33.8]
	no	129 [66.2]
Impaired sleep quality	Yes	106[54.4]
	No	89[45.6]
Having job satisfaction	Yes	52[26.7]
	No	143[73.3]
History of COVID-19	Yes	118[60.5]
	No	77[39.5]
Nurse Work Experience	<2	17 [8.7]
	2-5	40 [20.5]
	5-10	80 [41.1]
	>10	58 [29.7]
Employment status	formal	79 [40.8]

TABLE 2: MEAN [SD] SCORE OF QUALITY OF LIFE AND THAT OF PERCEIVED STRESS AMONG NURSES WORKING IN COVID-19 PATIENTS' CARE WARDS

Variable	Variable domain	Mean [SD]	Cronbach's α
Quality of life	physical health	46.52[12.69]	0.77
	psychological health	46.57[12.70]	
	social relationships	46.39[19.45]	
	environment	50.52[10.52]	
Perceived stress	-----	27.62[4.61]	0.78

TABLE 3: RELATIONSHIP BETWEEN DIMENSIONS OF QUALITY OF LIFE AND PERCEIVED STRESS & DEMOGRAPHIC VARIABLES

Variable		Quality of life domains					Perceived stress
		physical	psychological	social	environmental	Total score	
Gender	Female	45.98±12.52	45.69±13.83	45.36±19.74	50.46±10.98	45.28±26.40	28.24±4.29
	Male	48.01±13.16	49.02±8.48	49.20±18.54	50.66±9.25	54.09±15.80	25.9±5.05
	P-value	0.36	0.39	0.27	0.83	0.16	0.004
Education level	Bachelor	46.85±12.68	46.01±12.93	46.56±16.60	50.93±10.96	47.39±25.25	27.80±4.70
	Master and PhD	44.44±12.81	50.00±10.78	45.37±18.82	47.92±6.82	49.07±17.65	26.48±3.89
	P-value	0.31	0.08	0.67	0.06	0.59	0.03
Marital status	Single	44.93±13.66	47.58±12.44	45.04±17.94	53.20±10.33	46.51±28.39	28.70±4.27
	Married	46.57±12.45	46.12±12.86	46.23±19.91	49.57±10.53	47.35±23.03	27.30±4.76
	Divorced	56.55±6.55	50.00±11.78	59.72±15.29	54.17±8.98	62.50±22.36	27.50±1.76
	P-value	0.09	0.45	0.21	0.12	0.51	0.35
Nurse Work Experience	<2	42.65±13.09	50.73±8.62	50.98±19.96	52.39±8.45	52.94±25.97	27.06±4.97
	2-5	44.37±11.99	45.52±14.48	45.51±21.87	49.69±10.66	49.06±26.00	26.57±6.14
	5-10	48.26±13.14	45.62±13.29	44.79±19.64	51.64±11.86	44.84±26.21	28.71±3.43
	<10	46.73±12.25	47.37±11.48	47.84±17.42	48.98±8.85	48.92±19.63	26.98±4.51
	P-value	0.21	0.38	0.54	0.22	0.63	0.10
Employment status	Formal	48.73±12.01	48.42±10.54	47.89±18.22	50.04±10.15	50.63±18.55	27.46±3.65
	Informal	44.07±14.52	45.09±15.11	40.96±18.46	50.66±10.88	42.82±28.16	28.68±4.21
	p-value	0.246	0.580	0.096	0.839	0.032	0.234
Shift work	Morning	45.92±13.43	45.83±12.03	44.05±19.67	53.57±9.79	48.21±24.40	27.86±3.85
	evening	41.67±16.88	47.22±15.77	44.44±17.35	54.17±6.51	41.67±38.19	28.00±2.65
	Morning & evening	43.70±13.03	54.45±8.72	39.22±17.86	45.22±7.66	44.85±25.02	28.41±1.97
	nightshifts	46.43±5.05	58.33±5.89	45.83±5.89	54.56±11.05	50.0±0.0	28.00±4.24
	Internal rotation	46.92±12.70	45.83±12.96	47.27±19.74	50.85±10.77	47.97±24.36	27.51±4.88

	P-value	0.87	0.04	0.67	0.14	0.94	0.97
History of a specific disease	Yes	41.61±13.50	44.23±15.43	40.28±18.92	47.73±10.72	38.45±24.64	27.82±2.94
	No	49.03±11.51	47.75±10.94	49.54±19.03	51.93±10.17	52.32±22.84	27.51±5.27
	P-value	<0.001	0.59	0.004	0.01	<0.001	0.75
History of COVID-19	Yes	45.40±12.92	44.07±14.47	44.63±20.69	50.90±11.38	43.96±28.29	27.83±4.86
	No	48.24±12.20	50.32±8.19	49.12±17.14	49.92±9.08	53.25±14.96	27.29±4.21
	P-value	0.09	0.006	0.09	0.31	0.07	0.38
Impaired sleep quality	Yes	43.80±13.15	42.95±15.05	41.67±19.89	50.0±11.64	39.62±27.08	28.44±3.93
	No	49.76±11.37	50.80±7.29	52.08±17.38	51.12±9.03	57.16±16.09	26.63±5.16
	P-value	0.001	0.002	<0.001	0.62	<0.001	0.03
Job satisfaction	Yes	49.72±11.18	50.08±7.31	55.22±16.66	51.44±8.74	57.93±16.97	25.98±5.24
	No	45.35±13.04	45.27±13.98	43.24±19.45	50.17±11.11	43.88±25.52	28.21±4.22
	P-value	0.04	0.05	<0.001	0.492	<0.001	0.01
Perceived stress	R	-0.21	-0.13	-0.31	0.01	-0.31	-
	P-value	0.003	0.06	<0.001	0.99	<0.001	

Table 3, analyzes the relationship between the dimensions of quality of life and perceived stress questionnaires and the demographic variables of the study participants. The scores of the physical dimension of the quality of life questionnaire were significantly associated with the variables of chronic disease, sleep quality disorder and job satisfaction. The nurses without the history of a specific disease and with no sleep disorder and with job satisfaction had higher quality of life scores. Also, a meaningful relationship was observed between the variables as work shift, the history of suffering from COVID-19 disease and sleep disorder and the psychological dimension of the quality of life. Besides, the variables, namely, the history of disease, sleep disorder and job satisfaction were significantly related to the social dimension of quality of life and the variables of disease history and the environmental dimension of quality of life were significantly associated. The total score of the quality of life was also related to the variables, i.e., the employment type, the history of disease, sleep disorder and job satisfaction. The perceived stress score also had an inverse and significant relationship with the variables as gender, education, sleep disorder and job satisfaction. Also, the perceived stress score revealed a significant inverse relationship with the physical and social dimensions and the total score of the quality of life.

DISCUSSION

This study was conducted with the aim of determining the relationship between the perceived stress and the quality of life of the nurses working in COVID-19 wards. The findings showed the perceived stress level in the nurses working in COVID-19 care wards as relatively moderate. In other words, considering that the maximum score obtained from the perceived stress questionnaire can be 56 and the average score obtained by the subjects studied in this research is 27.62 ± 4.61 , so the subjects were suffering from a moderate level of stress. Consistent with the results of the present study, the findings of other studies in China and Turkey indicated those nurses working in COVID-19 wards experience high levels of stress [11, 29]. A study in Iran also reported the anxiety, stress, and depression in frontline nurses critically getting higher during the COVID-19 pandemic [30]. Findings in another study in Iran, conducted to evaluate and compare the mental health of the nurses in COVID-19 wards with those of other wards, also revealed COVID-19 ward nurses suffering from lower mental health, but no significant difference was spotted between the nurses of COVID-19 wards and those of other wards [31]. In a study conducted in the United States and Georgia, it was reported that during COVID-19 outbreak, the nurses only occasionally consider their stress as too severe and believe

that they are usually able to cope with stress in their lives [32]. Of possible reasons for the mentioned studies' results being different in terms of the subjects' stress levels, we can state be the study setting, and the questionnaires used to measure stress in the studies. In the present study, the perceived stress questionnaire developed by Cohen et al. was employed; while in other studies, the Mental Health Survey [31], Depression, Anxiety, Stress Scale [30], the Post-Traumatic Stress Disorder Test [32], and the Perceived Stress Scale [11] were used. In addition, some studies [32] were conducted in countries outside of Iran. Since Iran is a developing country, and when compared to other countries (especially developed countries) it has different culture, policy making and health care systems. These differences can affect the planning and management and the adoption of appropriate measures by the health care system. Also, these differences can affect nurses in areas such as protective resources, financial and psychological support, which ultimately affects their mental health as well as their stress level [33]. For other results in this study - quality of life of 64.6% of the nurses working in COVID-19 was at low level. In accord with the present study, research completed in India reported that according to the total quality of life among hospital staff based on WHOQOL BREF scores, 4.3% of the physical domain, 16.6% of the psychological domain, 65.4% of the social domain and 21.7% of the environmental health domain of the quality of life of the hospital staff were at a poor level [34]. The results of some other studies were in agreement with those in the present study [10, 35]. While in a study done in Qatar, the quality of life of the nurses was at a positive level and no significant difference was found between the quality of life of the nurses in COVID-19 wards and non-COVID-19 wards [36]. The probable reasons behind the differences in the results could be the cultural differences of the individuals, the financial, psychological and social supports and the protective equipment being supplied for the health systems and different conditions of COVID-19 pandemic in these countries. Also, differences in some demographic characteristics such as gender in the studies can be a possible cause behind the differences in the results. So that in the study conducted in Qatar [36], the gender of the majority of the subjects was male while in this study and other studies [10, 35], most were female. In this line, some studies reported men with better quality of life than women [35, 37]. As a result, regarding this point that the majority of the participants in the study done in Qatar were men, this might be one of the possible reasons for the difference in the results of the mentioned studies. Of noticeable results of the present study, we can point out

the negative and significant relationship between the perceived stress and quality of life, which is consistent with those found in other studies in different countries [18, 38]. The perceived stress brings about physical, emotional, and social reactions that, if persistent and ineffectively adapted to it, can lead to some outcomes such as poor health which threatens the quality of life [18]. In addition, as the levels of stress increase following exposure to the virus-infected workplace and its obscure nature, the process of burnout may be intensified and their quality of life gets impaired [16].

Based on the results of the present study, the perceived stress score showed an inverse and significant relationship with the variables as gender, education, sleep disorder and job satisfaction. Consistent with the study done by Nabavi and et al. in 2021 [40], a significant relationship was reported between gender and education of the nurses [39]. While in another study, no significant relationship was observed between gender and stress. Of the possible reasons behind the different results, we can mention the different study location. This study was done in Iran while the above study [40] was done in the US. Thus, the issues such as the cultural and social differences among the countries can be of the probable reasons behind the differences. In addition, in another study, unlike the results of this study, no relationship was reported among stress, education and gender [41]. Of the reasons behind different results is the time allocated for the study. This research was conducted during COVID-19 outbreak while the mentioned study was performed in 2014 when there was no COVID-19 pandemic. Moreover, in the present study, it was found that the variables as work shift, the history of COVID-19 disease and sleep disorder were meaningfully associated with the psychological dimension of the quality of life, and the variables, namely, disease history, sleep disorder and job satisfaction were significantly related to the social dimension of the quality of life and the variable as disease history was significantly associated with the environmental dimension of the quality of life [42]. In another study, a significant relationship was seen between the quality of life and job satisfaction of the psychiatric nurses [43]. In the present study, the results showed no significant relationship between marital status, age and the quality of life, while in another research, a significant relationship was found between the nurses' marital status, age and the quality of life [44]. Among the possible reasons for the different results, we can mention different study time (diverse conditions of the current pandemic) and also the workplace ward of the nurses. In this study, the study nurses

were working in COVID-19 wards, while in the mentioned research, the nurses were working in non-COVID-19 wards.

LIMITATIONS

The present study had some limitations such as being cross-sectional and confined to the nurses working in COVID-19 wards and the data being collected by a self-report tool. In addition, a census sampling method was used but some of the nurses working in COVID-19 wards were reluctant to take part in the study. On the other hand, this study has been performed several months after the first peak of COVID-19 that might have produced different results if done in the early stages of the pandemic. Also, the coping strategies the individuals employed for coping with stress are not included in the research. Therefore, it is proposed to do some would-be studies with higher sample size and analyze the effects of the physiological methods and stress coping strategies on stress level and the quality of life of the nurses working in COVID-19 wards.

CONCLUSIONS

The results of this study revealed that the perceived stress of frontline nurses during the outbreak of COVID-19 was moderate but at the same time, their quality of life was at a low level. Because nurses are mostly interacting with patients and compared to other health system staff, they have the highest frequency and make up the main body of the health system; consequently, being threatened in terms of their mental health can result in negative outcomes. Therefore, paying serious attention to addressing the concerns of frontline nurses is necessary, and it is recommended to consider appropriate interventions to reduce the perceived stress and improve the quality of life of nurses in the COVID-19 wards. Health managers and policy makers should attention to provide comprehensive care involving frontline nurses and their families. Psychosocial support strategies such as counseling, training and strategies for coping with stress need to be implemented to improve well-being of nurses who care for patients with COVID-19. Furthermore, it would be useful to conduct face-to face interviews with Health staff with the aim to inquire their needs and provide integrated support in times of crisis such as epidemic.

ACKNOWLEDGEMENT

This paper has been prepared under the support of the Deputy of Research of Mazandaran University of Medical Science. Hereby, cherishing the memory of all the martyrs as the health system protectors, the researchers feel

obliged to highlight their appreciation to all the honorable nurses working in the medical-educational hospitals' COVID-19 wards based in Sari, for sincerely co-operating in this respect.

DISCLOSURE

The authors report no conflicts of interest in this work.

References

1. Ebrahim S-H, Ahmed QA, Gozzer E, Schlagenhaut P, Memish Z. Covid-19 and community mitigation strategies in a pandemic. *BMJ*. 2020; 368:m1066.
2. Kyprianidou M, Christophi CA, Giannakou K. Perceived Stress During the COVID-19-Related Confinement in Cyprus. *Frontiers in Public Health*. 2021;9.
3. Li Z, Ge J, Yang M, Feng J, Qiao M, Jiang R, et al. Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. *Brain, behavior, and immunity*. 2020;88:916-9.
4. Çınar D, Kılıç-Akça N, Zorba-Bahçeli P, Bağ Y. Perceived stress and affecting factors related to COVID-19 pandemic of emergency nurses in Turkey. *J Nurs Manag*. 2021;29:1916-23.
5. Lai J, Ma S, Wang Y, Cai Z, Jianbo Hu, Wei N, et al. Factors Associated with Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Network Open*. 2020;3(3): e203976.
6. Maher A, Malmir R, Toghyani R, Safari M. COVID-19 Crisis Management: Reengineering the Health Care System in Iran. *Journal of Medical Council of Islamic Republic of Iran*. 2020;38(1):8-11.
7. Amjadi S, Mohammadi S, Khojastehrad A. Perceived stress and quality of life among frontline nurses fighting against COVID-19: A web-based cross-sectional study. *Journal of Education and Health Promotion*. 2020; 11:1-7.
8. Lin C, Peng Y, Wu Y, Chang J, Chan C, Yang D, et al. The psychological effect of severe acute respiratory syndrome on emergency department staff. *Emergency Medicine Journal*. 2007;24(1):7-12.
9. Heidari A, Abdollahi M., Fear of Covid-19 in Nurses: A Concept Analysis with a Walker-Avant Approach. *Journal of Torbat Heydariyeh University of Medical Sciences*. 2021;9(2):81-90.
10. Peñacoba C, Catala P, Velasco L, Carmona-Monge FJ, Garcia-Hedrerera F, Gil-Almagro F. Stress and quality of life of intensive care nurses during the COVID-19

- pandemic: Self-efficacy and resilience as resources. *Nursing in Critical Care*. 2021;26(6):493-500.
11. Bilgic S, Celikkalp U, Mısırlı C. Stress level and sleep quality of nurses during the COVID-19 pandemic. *Work*. 2021 (Preprint);70:1021–9
 12. Sarboozihosein-Abadi T, Askari M, Miri K, Namazi Nia M. Depression, stress and anxiety of nurses in COVID-19 pandemic in Nohe-Dey Hospital in Torbat-e-Heydariyeh city, Iran. *Journal of Military Medicine*. 2020;22(6):526-33.
 13. Sarfika R, Huriani E, Mailani F, Muthia R. Perceived Stress and Intention to Work during the COVID-19 Pandemic among Nurses in West Sumatra Indonesia. *Open Access Maced J Med Sci*. 2022;10(G):318-24.
 14. Ornell F, Halpern S-C, Henrique-Paim Kessler F, Corrêa-deMagalhães-Narvaez J. The impact of the COVID-19 pandemic on the mental health of healthcare professionals. *Cadernos de saude publica*. 2020;36:e00063520.
 15. Chen Q, Liang M, Li Y, Guo J, Fei D, Wang L, et al. Mental health care for medical staff in China during the COVID-19 outbreak. *The Lancet Psychiatry*. 2020;7(4): e15-e6.
 16. Bahmani A, Investigating the Effect of Work Shifts in Coronavirus Conditions on Employee Burnout with the Mediating Role of Coronavirus Stress. *Quarterly Journal of Nursing Management (IJNV)*. 2021;9(4):21-6.
 17. Ali-Chekole Y, YimerMinaye S, Semagn Mekonnen-Abate, Mekuriaw B. Perceived stress and its associated factors during COVID-19 among healthcare providers in Ethiopia: a Cross-Sectional Study. *Advances in Public Health*. 2020;2020:1-7.
 18. Alhawatmeh H, Alsholol R, Dalky H, Al-Ali N, Albatatineh R. Mediating role of resilience on the relationship between stress and quality of life among Jordanian registered nurses during COVID-19 pandemic. *Heliyon*. 2021;7(11):e08378.
 19. Stojanov J, Malobabic M, Stanojevic G, Stevic M, Milosevic V, Stojanov A. Quality of sleep and health-related quality of life among health care professionals treating patients with coronavirus disease-19. *International Journal of Social Psychiatry*. 2021;67(2):175-81.
 20. Kandula U-R, Wake A-D. Assessment of Quality of Life Among Health Professionals During COVID-19: Review. *Journal of Multidisciplinary Healthcare* 2021; 14:3571-85.
 21. Layali I, Ghajar M, Abedini E, Emadian S, Joulaei M. Role of Job Stressors on Quality of Life in Nurses. *Journal of Mazandaran University of Medical Sciences*. 2019;29(180):129-33(Persian).
 22. Jafari M, Habibi-Houshmand B, Maher A. Relationship of occupational stress and quality of work life with turnover intention among the nurses of public and private hospitals in selected cities of Guilan Province, Iran, in 2016. *Journal of health research in community*. 2017;3(3):12-24.
 23. Nie A, Su X, Zhang S, Guan V, Li J. Psychological impact of COVID-19 outbreak on frontline nurses: A cross-sectional survey study. *J Clin Nurs*. 2020; 29:4217-26.
 24. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *Journal of health and social behavior*. 1983;24.
 25. Safaei M, Shokri O. Assessing stress in cancer patients: Factorial validity of the perceived stress scale in Iran. *Iranian Journal of Psychiatric Nursing (IJPN)*. 2014;2(4):13-22(persian).
 26. Nejat S, Montazeri A, Holakouee-Naini C, Mohammad K, MajdZadeh S. Standardization of the World Health Organization Quality of Life questionnaire (WHOQOL-BREF): translation and psychometric Iranian species. *School Health and Health Research Institute*. 2006;4(4):71-6.
 27. Heidari T, Azimilolaty H, Khorram M, Rezaei S, Mousavinasab S-N, Nikbakht R. Association between moral intelligence, burnout and quality of nursing care. *Clinical Ethics*. 2021;1:1-12.
 28. Usefy A, Ghassemi GR, Sarrafzadegan N, Mallik S, Baghaei A, Rabiei K. Psychometric properties of the WHOQOL-BREF in an Iranian adult sample. *Community Mental Health Journal*. 2010;46(2):139-47.
 29. Wu W, Zhang Y, Wang P, Zhang I, Wang G, Lei G, et al. Psychological stress of medical staffs during outbreak of COVID-19 and adjustment strategy. *Journal of Medical Virology*. 2020;29(10):1962-70.
 30. Zakeri M, Rahiminezhad E, Salehi F, Ganjeh H, Dehghan M. Burnout, Anxiety, Stress, and Depression Among Iranian Nurses: Before and During the First Wave of the COVID-19 Pandemic. *Frontiers in Psychology*. 2021;12.
 31. Davarinia-Motlagh-Quchan A, Tajabadi A, Borzoei F, Heshmatifar N, Mohamadzadeh-Tabrizi Z, Rastaghi S, et al. Comparison of Mental Health of Nurses Working in COVID-19 Reference Hospitals with Other Hospitals. *Journal Mil Med*. 2020;22(11):1145-52.
 32. Moore KS, Hemmer C, Ma JT, Icom A. Nursing Professionals' Stress Level During Coronavirus Disease 2019: A Looming Workforce Issue. *The Journal for Nurse Practitioners*. 2021;17(6):702-6.

33. Giplaye H. Healthcare Delivery System in Developed, Developing and Underdeveloped Countries. *Texila International Journal of Nursing*. 2019; 2019:1-7.
34. Ranjan L, Gupta P, Gujar N, Baraik S. Psychological distress and quality of life among hospital staff in India during COVID-19 pandemic. *Shanlax Int J Arts Sci Humanit*. 2021; 8:55-60.
35. MohamadzadehTabrizi Z, Mohammadzadeh F, Davarinia-Motlagh A, Quchan A, Bahri N. COVID-19 anxiety and quality of life among Iranian nurses. *BMC nursing*. 2022;21(1):1-10.
36. Nashwan AJ, Villar RC, Al-Qudimat AR, Kader N, Alabdulla M, Abujaber AA, et al. Quality of Life, Sleep Quality, Depression, Anxiety, Stress, Eating Habits, and Social Bounds in Nurses during the Coronavirus Disease 2019 Pandemic in Qatar (The PROTECTOR Study): A Cross-Sectional, Comparative Study. *Journal of Personalized Medicine*. 2021; 11:918.
37. Ko H, Park Y-H, Cho B, Lim K-C, Chang S, YM Y, et al. Gender differences in health status, quality of life, and community service needs of older adults living alone. *Archives of Gerontology and Geriatrics*. 2019; 83:239-45.
38. Kim W-J, Lee K-H, Yoon B-H, Jong-Hun Lee, Kim M-D, Jung Y-E, et al. Occupational Stress and Quality of Life in Mental Health Welfare Center Workers. *Mood Emot* 2020;18(1):28-36.
39. Nabavi A, Sheyklo S, Sarabi N, Fouroghi S, Moosavi A. The association between job stress and health-related quality of life in the nurses of Dezful Grand Hospital in 2020. *Nursing Development in Health*. 2021;11(2):63-77.
40. Wu T-Y, FOX D, Stokes C, Adam C. Work-related stress and intention to quit in newly graduated nurses. *Nurse Education Today*. 2012;32(6):669-74.
41. Alipoor R, Ebrahimi A, Omid R, Hedayati A, Ranjbar H, Hosseinpour S. Depression, anxiety, stress and related demographic variables in nurses of Valiasr hospital in Fasa University of Medical Sciences in 2014. *Pajouhan Scientific Journal*. 2015;13(4):51-9.
42. Moradi T, Maghaminejad F, Azizi-Fini I. Quality of working life of nurses and its related factors. *Nursing and Mmidwifery Studies*. 2014;3(2).
43. Falahi K-M, Karimlou M, Rahgoy A, Moghadam F. Quality of life and factors related to it among psychiatric nurses in the university teaching hospitals in Tehran. *HAKIM RESEARCH JOURNAL*. 2007;9(4):24-30.
44. Khoshnudi M, Safari A, Nejat-Parvaz M. Quality of Life and Demographic Characteristics in Nurses of hospitals of Kashmar in 2018: Cross sectional study. *Journal of Nursing Education*. 2019;7(6):60-6.