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The relationship between mental fatigue and social responsibility among nurses who provided care to patients with coronavirus disease 2019: a cross-sectional study

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Abstract

Background and Aim Mental fatigue (MF) was a major challenge for nurses during the coronavirus disease 2019 (COVID-19) pandemic. Nurses' sense of responsibility towards their patients and societies may influence their MF. This study aimed to assess the relationship between MF and social responsibility (SR) among nurses who provided care to patients with COVID-19.

Methods This cross-sectional descriptive-analytical study was conducted in 2021. Participants were 258 nurses randomly selected from eleven COVID-19 care hospitals in Tehran, Iran. Data were collected using three self-report instruments, namely a demographic questionnaire, the Mental Fatigue Scale, and the Social Responsibility Questionnaire. The SPSS software (v. 16.0) was used to analyze the data at a significance level of less than 0.05.

Results The mean scores of MF and SR were 31.73 ± 7.35 and 3.45 ± 0.35 , respectively. The highest and the lowest scored SR subscales were ethical responsibilities with a mean of 3.67 ± 0.42 and economic responsibilities with a mean of 2.93 ± 0.62 . MF had a significant negative correlation with legal responsibilities and a significant positive correlation with economic responsibilities ($P < 0.05$). The only significant predictor of SR was financial status which significantly predicted 4.3% of the variance of SR ($P < 0.05$).

Conclusion More than half of the nurses who provided care to patients with COVID-19 suffered from MF and their mental fatigue had a significant correlation with their legal and economic responsibilities. Healthcare authorities and policymakers need to develop programs to reduce nurses' MF and improve their satisfaction.

Keywords Social responsibility, Mental fatigue, Nurses, COVID-19

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Background

Mental fatigue (MF) is a psychological status that is associated with mental exhaustion, reduced energy, and altered functioning during a course of cognitive activities [1, 2]. In the medical field, MF is the primary manifestation of fatigue among nurses [3, 4]. Nurses in different areas of the world suffer from high levels of fatigue [5]. A study reported that nurses with twelve-hour shifts had moderate to severe acute fatigue and low to moderate chronic fatigue [6]. Moreover, MF is associated with negative patient outcomes, low care quality, high risk of medication errors, and problems in nurses' social life [7, 8]. Therefore, considering the important role that nurses play in patient safety [9], it is importance to investigate the factors affecting MF.

Many different factors can affect MF. For example, long work shifts, shift schedule, age group, and work experience are known influential factors on MF [12]. Evidence also shows that MF is among the leading causes of job turnover [13]. Some studies reported that professional commitment and workload have a significant relationship with mental health, job satisfaction, and fatigue among nurses [10, 11]. Moreover, nurses' sense of responsibility towards patients and safe and quality care delivery can contribute to their MF [12, 13]. A sense of responsibility is one of the nursing professional values characterized by nurses' professional commitment and their respect for patients' rights [14].

Social responsibility (SR) is a main aspect of professional ethics in nursing [15, 16]. By definition, SR is engagement in socially responsible behaviors in response to social demands and public needs [17]. SR prevents nurses from negligence in the process of patient care and helps them provide comprehensive patient care, gain patient trust, and enhance patient satisfaction and peace [18, 19]. It also significantly improves the quality of patient care [16]. SR can keep nurses once hired, maintain their confidence and performance, and safeguard them from MF [20].

Epidemics, such as the coronavirus disease 2019 (COVID-19) pandemic, can also contribute to MF among nurses [21]. COVID-19 is a respiratory problem first diagnosed in 2019 in Wuhan, China, and rapidly spread throughout the world [22] so the World Health Organization reported it as the sixth leading health emergency in the world [23]. A major challenge in COVID-19 management was the shortage of competent healthcare providers, particularly nurses, which was associated with a significant increase in their workload and obliged them to suspend most of their personal plans and recreational activities [24, 25]. Moreover, lack of personal protective equipment, lack of an effective approach to COVID-19 management, media pressure, and poor perceived support had negative effects on healthcare providers'

performance and caused their high levels of stress and worry during the COVID-19 pandemic [26–28].

Mental tensions and strains due to the COVID-19 pandemic were associated with severe MF and negatively affected the quality of nursing care services [29]. The results of a study showed a significant correlation between COVID-19 stress, SR, and job burnout, while SR had mediating effects on the correlation between COVID-19 stress and job burnout [30]. Under the pressure of environmental changes, employees may frequently ignore SR and ethics and fail to utilize SR decision-making concepts to deal with their mental fatigue as well as address the expectations of stakeholders and shareholders [31]. Despite the significant effects of the COVID-19 pandemic as environmental changes on nurses' MF and SR, there are limited data about MF and its relationship with SR among nurses who provide care to patients with COVID-19, and it is necessary to pay attention. The Covid-19 pandemic affected the physical and mental aspects of nurses. On the other hand, SR is one of the essential responsibilities of nurses. Therefore, it is very necessary to investigate in challenging situations such as pandemics whether it can really be related to MF or not. In this regard, targeted interventions can be considered to improve the SR of nurses. Therefore, the present study was conducted to provide further evidence in this area. The study's aim was to assess the relationship between MF and SR among nurses who provided care to patients with COVID-19.

Methods and materials

Study design

This cross-sectional descriptive-analytical study was conducted in August–November 2021, during the fourth and fifth waves of COVID-19 in Iran.

Study population and setting

The study population consisted of all 2000 nurses who provided care to patients with COVID-19 in all eleven COVID-19 care hospitals affiliated with Tehran University of Medical Sciences, Tehran, Iran. Sampling in each hospital was done proportionally according to the population of nurses caring for COVID-19 patients in each hospital. So, a sample of 258 eligible nurses was randomly selected using a table of random numbers and the list of nurses' names. Considering that the sample size was about 13% of all eligible nurses, therefore about 13% of nurses who met the eligibility criteria were selected from each hospital. Eligibility criteria were a COVID-19 care experience of at least six months, no self-report affliction by chronic diseases or cognitive disorders, and consent for participation in the study. Participants who voluntarily withdrew from the study were excluded. The sample size was calculated with a confidence level of 95%, a

power of 80%, and an MF-SR correlation coefficient of at least 0.2 to be considered significant (Fig. 1). The sample size calculation formula indicated that at least 200 participants were needed. Yet, the sample size was increased to 258 to improve the power of the study.

Instruments and data collection

Data collection instruments were a demographic questionnaire, the Mental Fatigue Scale, and the Social Responsibility Questionnaire. The items of the demographic questionnaire were age, gender, marital status, educational level, financial status, history of affliction by COVID-19, employment status, and work experience.

The Mental Fatigue Scale was developed by Johansson and Starmark in 2010. It has fifteen items on the different aspects of MF, including general fatigue, lack of initiative, MF, mental recovery, concentration difficulties, memory problems, slowness of thinking, sensitivity to stress, increased tendency to become emotional, irritability, sensitivity to light and noise, decreased or increased sleep, and 24-hour symptom variations [32]. Items are scored on a four-point scale as follows: zero: “No problem”; 1: “Problem”; 2: “Relatively serious problem”; and 3: “Serious problem”. The possible total score of the scale is 0–45 with higher scores showing greater MF. In a previous study, seven Ph.D. students of occupational health assessed and confirmed the face and content validity of this scale. Its reliability was also assessed through the test-retest stability and the internal consistency assessment methods which revealed a two-week test-retest Pearson’s correlation coefficient of 0.727 ($P=0.002$) and a Cronbach’s alpha of 0.893 [33]. In the present study, ICC was calculated and its value was calculated as 0.94.

The Social Responsibility Questionnaire was developed based on Carroll’s questionnaire with 35 items in four subscales, namely legal responsibilities (seven items), economic responsibilities (seven items), ethical responsibilities (nine items), and discretionary responsibilities (twelve items). Item scoring is done on a five-point scale from 1 (“Completely agree”) to 5 (“Completely disagree”) [34]. A study confirmed the content validity of this questionnaire by seeking the comments of several nursing faculties and confirmed its reliability with a Cronbach’s alpha of 0.86 [18]. Another study also confirmed the construct validity of the questionnaire through the exploratory factor analysis and its reliability with a Cronbach’s alpha of 0.75 [35]. Moreover, a study found that Cronbach’s alpha of the questionnaire was 0.95 [36]. In the

current study, ICC was calculated and its value was calculated as 0.87.

In the present study, participants personally completed the printed instruments. This research was approved in the session of the ethics committee of Tehran University of Medical Sciences, with the ethics code IR.TUMS.FNM.REC.1400.027. The researcher went to the department where the nurse was present and when the nurse was ready to complete the questionnaire, the research tool was given to her/him. The purpose and method of research were explained to the nurses, then they were invited to participate in the study, and the written informed consent form was completed by them. Data collection was performed with close adherence to COVID-19 prevention guidelines.

Data analysis

Data were described through the measures of descriptive statistics (namely frequency, mean, and standard deviation) and were analyzed through the one-way analysis of variance, Pearson’s correlation analysis, and linear regression analysis. Independent variables in the regression analysis were those variables with a significant relationship with MF at a significance level of less than 0.2 [37]. Data analysis was performed using the SPSS software (v. 16.0) and at a significance level of less than 0.05.

Results

Participants were 258 nurses who provided care to patients with COVID-19 and the response rate was 100%. Most participants were female (69%), had a bachelor’s degree (86%), had average financial status (72.5%), and reported a history of affliction by COVID-19 (54%). Almost half of them were married (50.5%) and had contractual or conditional official employment (48.5%). The means of their age and work experience were 31.5 ± 6.71 and 7.31 ± 5.89 years, respectively (Table 1).

The mean scores of MF and SR were 31.73 ± 7.35 and 3.45 ± 0.35 , respectively. The highest-scored SR subscale was ethical responsibilities with a mean of 3.67 ± 0.42 and the lowest-scored SR subscale was economic responsibilities with a mean of 2.93 ± 0.62 (Table 2).

MF had a significant negative correlation with the legal responsibilities subscale of SR ($r = -0.135$) and a significant positive correlation with its economic responsibilities subscale ($r=0.186$) ($P<0.05$). The correlation of MF with total SR and its ethical and discretionary responsibilities subscales was not significant ($P>0.05$) (Table 3).

$$n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2}{w^2} + 3 \quad w = \frac{1}{2} \ln \frac{1+r}{1-r}$$

Fig. 1 Sample size calculation formula

Table 1 The demographic characteristics of participants

Characteristics		N (%)
Gender	Female	178 (69)
	Male	80 (31)
Marital status	Single	128 (49.5)
	Married	130 (50.5)
Educational level	Bachelor's	221 (86)
	Master's and higher	37 (14)
Financial status	Poor	42 (16.5)
	Average	187 (72.5)
	Good	29 (11)
History of affliction by COVID-19	Yes	139 (54)
	No	119 (46)
Employment status	Official permanent	48 (18.5)
	Contractual/Conditional	125 (48.5)
	Agency-affiliated	29 (11)
	Post-graduation service	56 (22)
Age (Years)	Mean \pm SD (Range)	31.50 \pm 6.71 20–55
	Mean \pm SD (Range)	7.31 \pm 5.89 1–30

Table 2 The mean scores of mental fatigue and social responsibility

Variables	Range	Mean	SD	Confidence interval
Mental fatigue	0–44	31.73	7.35	32.83–41.63
Legal responsibilities	1.14–5	3.47	0.56	3.4–3.54
Economic responsibilities	1.43–5	2.93	0.62	2.86–3.01
Ethical responsibilities	2.25– 4.89	3.67	0.42	3.62–3.72
Discretionary responsibilities	2.5–5	3.58	0.42	3.53–3.64
Total social responsibility	2.09– 4.83	3.45	0.35	3.41–3.5

Table 3 The correlation of mental fatigue with social responsibility

Social responsibility	Mental fatigue
Legal responsibilities	$r = -0.135$; $P^* = 0.030$
Economic responsibilities	$r = 0.186$; $P^* = 0.003$
Ethical responsibilities	$r = -0.092$; $P = 0.139$
Discretionary responsibilities	$r = 0.013$; $P = 0.835$
Total	$r = -0.002$; $P = 0.980$

*: The results of Pearson's correlation analysis

The results of the linear regression analysis illustrated that the only significant predictor of SR was good financial status which significantly predicted 4.3% of the variance of SR ($P < 0.05$). Moreover, no relationship was seen between SR and MF ($P > 0.05$) (Table 4).

Discussion

The study aimed to assess the relationship between MF and SR among nurses who provided care to patients with COVID-19. Findings indicated that the score of MF among these nurses was more than mean score of

MF. In the current research, more than half of the nurses who provided care to patients with COVID-19 suffered from MF. This is in agreement with the findings of some previous studies. For example, a cross-sectional study among 2267 nurses on the frontline of COVID-19 care in Wuhan, China, found that 35% of them suffered from fatigue [21]. Another study on 3557 Chinese healthcare workers during the COVID-19 pandemic reported moderate to severe fatigue and showed that the level of fatigue among healthcare workers in the frontline of COVID-19 care was 53% more severe than fatigue among other healthcare workers [38]. Similarly, a study on 442 nurses in Iran showed that COVID-19-related fatigue and anxiety among nurses on the frontline of COVID-19 care were slightly higher than among other nurses, though the difference was insignificant [39]. Care provision in the frontline of epidemic management has always been a risk factor for mental health problems among healthcare workers [40]. Evidence shows that the increased mental workload of nurses during the COVID-19 pandemic negatively affected their performance and behaviors [41]. Moreover, the lack of personal protective equipment, continuous changes in COVID-19 care protocols, and lack of experience in care provision to patients with COVID-19 confronted nurses with great stress [42]. These problems together with fear over affliction by COVID-19 or its transmission to others increased nurses' MF [43].

Study findings also indicated that the mean score of SR was high. The highest and lowest scored SR subscales were ethical responsibilities and economic responsibilities respectively. In agreement with this finding, a study in Hamadan, Iran, reported an SR mean score of 3.7 ± 0.4 and the lowest and the highest scored SR subscales were economic SR and discretionary responsibilities with a mean of 4 ± 0.4 , respectively. That study also showed that 70% of nurses had great SR [18]. Another study on 270 primary healthcare providers in Isfahan, Iran, found that the lowest and the highest scored SR subscales were respectively economic responsibilities and discretionary responsibilities and nurses valued the spiritual aspects of work more than its material aspects [44]. The high mean score of the discretionary responsibilities subscale of SR may be since Iranians are mostly altruistic and their thoughts, behaviors, culture, and lifestyle are greatly influenced by religious beliefs [45, 46]. A study also reported that nurses' adherence to professional ethics, meaning-seeking, and spiritualities at work can positively affect their SR [47].

We also found that MF had no significant relationship with SR; however, the results showed MF had a significant positive correlation with economic responsibilities. Economic responsibilities are the core of all other aspects of SR [48]. A study showed that the breadwinning role can

Table 4 The results of the linear regression analysis to determine the predictors of social responsibility

Independent variables		B	Beta	t	P value	Confidence interval	R ²
Gender	Female	-2.417	-0.089	-1.384	0.168	-5.857, 1.022	0.43
	Male	Reference					
Financial status	Moderate	1.332	0.047	0.593	0.554	-3.094, 5.758	
	Good	6.136	0.154	1.981	0.049	0.035, 12.238	
	Poor	Reference					
Employment status	Contractual/Conditional	2.383	0.095	1.112	0.267	-1.839, 6.604	
	Company affiliated	-2.316	-0.058	-0.770	0.442	-8.241, 3.610	
	Post-graduation service	-0.650	-0.021	-0.264	0.792	-5.500, 4.201	
	Official permanent	Reference					
Mental Fatigue		0.077	0.045	0.699	0.485	-.0141, 0.295	
		Reference					

be associated with mental health problems such as stress and concern over receiving adequate income to afford all family expenses [49]. The positive correlation of MF with economic responsibilities in the present study may be since more than half of the participants were female, while COVID-19-related restrictions caused great role conflict for employed women and were a great shock for them [50]. Moreover, our findings showed that MF had a significant negative correlation with legal responsibilities. A study in Poland revealed that chronic fatigue and stress among healthcare providers could cause them legal problems and hence, improvement of their work conditions was necessary [51]. Nurses are accountable for their care services and hence, legal responsibilities are among the main attributes of professional nursing [52]. A systematic review also showed that not only clinical and organizational factors, but also legal factors can contribute to occupational stress among healthcare providers [53]. Study findings also indicated that MF had no significant correlation with ethical and discretionary responsibilities. Ethical responsibilities refer to adherence to ethical principles, right practice, justice at work, and respect for others' rights, while discretionary responsibilities refer to being a good citizen [34]. Although workers in all careers should have ethical practice, ethical principles are more important in the nursing profession due to the significant effects of nursing care on patients' health and recovery. In other words, the nursing profession is based on ethics and nurses need to attempt to provide safe and quality care [54]. Altruism is also a social and ethical value that can improve nursing care quality in any condition [55]. The insignificant correlation of ethical and discretionary responsibilities with MF in the present study may be since these responsibilities are based on internal values and can exert their effects even in difficult conditions. Of course, ethical and discretionary behaviors can also be affected by external factors such as the availability of a good source of financial support [56].

Study limitations.

Among the limitations of this study were the overcrowdedness of hospital wards and the heavy workload of nurses during the COVID-19 epidemic which negatively affected eligible nurses' tendency towards participation in the study. The fatigue and mental condition of the nurses can affect the results, so it was tried to distribute the questionnaires when the nurses are in a stable state.

Conclusion

This study shows that nurses who provided care to patients with COVID-19 suffered from MF and MF was not related to their SR, and their level of SR was still high during the COVID-19 pandemic. MF had a significant negative correlation with their legal responsibilities and a significant positive correlation with their economic responsibilities. Healthcare authorities and policymakers need to develop programs for the regular assessment of nurses' MF and continuous improvement of their mental health. It is suggested that the planners of the health system by designing interventions related to promoting the level of financial and legal independence of nurses provide a basis for satisfaction and reduce the effects of MF. In addition, nurses and health providers can use the results of this study in training sessions with hospital managers and officials, while informing about the importance of SR and its various dimensions, and emphasize their MF. It is recommended to conduct more research on the relationship between the physical, mental and social health of nurses and their SR in challenging situations. More evidence can help design targeted and effective interventions to promote the responsibility of nurses in society.

List of abbreviations

MF Mental fatigue
SR Social responsibility

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Author contributions

Research idea and study design: SS, AS, Sh P; data acquisition: MSE, SS; data analysis/interpretation: Sh H, Sh P; drafting the article: SS, MSE, ShP; review and editing: ShP; project administration: ShP. All authors reviewed, critically commented and approved the final version of the manuscript.

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Data availability

The datasets used and analyzed during the present study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was performed in line with the principles of the Declaration of Helsinki. Ethical approval for this study was obtained from the Ethics Committee of Tehran University of Medical Sciences, Tehran, Iran (code: IR.TUMS.FNM.REC.1400.027). All instruments of the study were anonymous and study participants were provided with written information about the study's aim. Informed consent was also obtained from all participants.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

- Marcora SM, Staiano W, Manning V. Mental fatigue impairs physical performance in humans. *J Appl Physiol*. 2009;106(3):857–64.
- Shen K-Q, Li X-P, Ong C-J, Shao S-Y, Wilder-Smith EP. EEG-based mental fatigue measurement using multi-class support vector machines with confidence estimate. *Clin Neurophysiol*. 2008;119(7):1524–33.
- Jin H, Xiao M, Gong Z, Zhao Y. Influence of different Protection States on the Mental fatigue of Nurses during the COVID-19 pandemic. *Risk Manage Healthc Policy*. 2022;19:17–29.
- Sikaras C, Ilias I, Tselebis A, Pachi A, Zyga S, Tsironi M, et al. Nursing staff fatigue and burnout during the COVID-19 pandemic in Greece. *AIMS public health*. 2022;9(1):94.
- Azmoon H, Nodoooshan HS, Jalilian H, Choobineh A, Shouroki FK. The relationship between fatigue and job burnout dimensions in hospital nurses. *Health Scope*. 2018;7(2).
- Sagherian K, Clinton M, Geiger-Brown J, Fatigue. Work schedules, and Perceived Performance in Bedside Care Nurses. *Workplace Health & Safety*. 2016;65(7):304–12.
- Gander P, O'Keefe K, Santos-Fernandez E, Huntington A, Walker L, Willis J. Development and evaluation of a matrix for assessing fatigue-related risk, derived from a national survey of nurses' work patterns. *Int J Nurs Stud*. 2020;112:103573.
- Kunert K, King ML, Kolkhorst FW. Fatigue and sleep quality in nurses. *J PsychoSoc Nurs Ment Health Serv*. 2007;45(8):30–7.
- Thompson BJ. Fatigue and the female nurse: a narrative review of the current state of research and future directions. *Women's Health Reports*. 2021;2(1):53–61.
- Chiara P, Luca C, Annalisa P, Chiara R. Emotional exhaustion among healthcare professionals: the effects of role ambiguity, work engagement and professional commitment. *Acta Bio Medica: Atenei Parmensis*. 2019;90(Suppl 6):60.
- Raižiene S, Endriulaitiene A. The relations among empathy, occupational commitment, and emotional exhaustion of nurses. *Medicina*. 2007;43(5):425.
- ANA. Addressing Nurse Fatigue to Promote Patient Safety and Health: Joint Responsibilities of Registered Nurses and Employers to Reduce Risks. 2014. Available from: <https://www.nursingworld.org/practice-policy/nursing-excellence/official-position-statements/id/addressing-nurse-fatigue-to-promote-safety-and-health/>.
- Neishabory M, Raeisdana N, Ghorbani R, Sadeghi T. Nurses' and patients' viewpoints regarding quality of nursing care in the teaching hospitals of Semnan University of Medical Sciences. *Koomesh*. 2011;134 – 43.
- Shahriari M, Mohammadi E, Abbaszadeh A, Bahrami M. Nursing ethical values and definitions: a literature review. *Iran J Nurs midwifery Res*. 2013;18(1):1.
- Ghaffari M. The relationship of empathy and spiritual intelligence with nurses attitude toward patient's right: the mediating role of social responsibility. *J Nurs Educ*. 2017;6(2):49–56.
- Hassanian ZM, Bagheri A, Sadeghi A, Moghimbegi A. Relationship between nurses' social responsibility and the quality of delivered nursing services to patients in Hamadan University of Medical Sciences, Iran. *Iran J Pak Med Assoc*. 2019;69(1):99–102.
- O'Connor A, Meister M. Corporate social responsibility attribute rankings. *Public relations review*. 2008;34(1):49–50.
- Hassanian ZM, Sadeghi A, Bagheri A, Moghimbeighi A. Nurses' social responsibility and its relationship with their demographic profiles. *Avicenna J Nurs Midwifery Care*. 2017;25(2):45–53.
- mahmoodi A, khani, Ghaffari I. M. The Relationship of empathy and Spiritual Intelligence with nurses Attitude toward Patient's Right: The mediating role of social responsibility. *2 Journal of Nursing Education*. 2017;6(2):49–56. eng.
- Wang D, Xie X, Tian H, Wu T, Liu C, Huang K, et al. Mental fatigue and negative emotion among nurses during the COVID-19 pandemic. *Curr Psychol*. 2022;41(11):8123–31.
- Zhan Y-x, Zhao S-y, Yuan J, Liu H, Liu Y-f, Gui L-l, et al. Prevalence and influencing factors on fatigue of first-line nurses combating with COVID-19 in China: a descriptive cross-sectional study. *Curr Med Sci*. 2020;40(4):625–35.
- Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA*. 2020;323(11):1061–9.
- Guan W-j, Ni Z-y, Hu Y, Liang W-h, Ou C-q, He J-x, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med*. 2020;382(18):1708–20.
- Mascha EJ, Schober P, Schefold JC, Stueber F, Luedi MM. Staffing with disease-based epidemiologic indices may reduce shortage of intensive care unit staff during the COVID-19 pandemic. *Anesth Analg*. 2020.
- Shamsi V, Mahmoudi H, Nir MS, Darzi HB. Effect of job specialization on the hospital stay and job satisfaction of ED nurses. *Trauma monthly*. 2016;21(1).
- Moayed MS, Mahmoudi H, Ebadi A, Salary MM, Danial Z. Effect of education on stress of exposure to sharps among nurses in emergency and trauma care wards. *Trauma monthly*. 2015;20(2).
- Nogee D, Tomassoni AJ. Covid-19 and the N95 respirator shortage: closing the gap. *Infect Control Hosp Epidemiol*. 2020:1-.
- Shrestha GS. COVID-19 pandemic: shortage of personal protective equipment, use of improvised surrogates, and the safety of health care workers. *J Nepal Health Res Council*. 2020;18(1):150.
- Rassouli M, Zandiye S, Noorian M, Zayeri F. Fatigue and its related factors in pediatric and adult oncology nurses. *Iran J Nurs*. 2011;24(72):37–47.
- So-hee H. The relationship between COVID-19 stress and burnout in nurses of Tertiary General Hospitals: mediating effect of social responsibility. *College of Nursing*; 2021.
- Zheng L, Li W, Addis AK, Ye D, Dong Y. Impacts of corporate social responsibility on employees' Mental fatigue: employees' ethical perspective. *Front Psychol*. 2022;13.
- Johansson B, Starmark A, Berglund P, Rödholm M, Rönnbäck L. A self-assessment questionnaire for mental fatigue and related symptoms after neurological disorders and injuries. *Brain Injury*. 2010;24(1):2–12.
- Bakhshi E, Mazlomi A, Hosseini SM. Investigation of Mental fatigue and validity and reliability its instrument among nursing in one of the hospital in Kermanshah City. *J Saf Promotion Injury Prev*. 2019;7(1):29–35.
- Carroll AB. A three-dimensional conceptual model of corporate performance. *Acad Manage Rev*. 1979;4(4):497–505.
- Haghighatian M, Hashemianfar SA, Moradi G. The survey of the effect of organizational socialization on social responsibility of employee's in Kermanshah Oil Company. *J Appl Sociol*. 2013;24(3):71–96.
- Siu NY-M, Zhang TJ-F, Kwan H-Y. Effect of corporate social responsibility, customer attribution and prior expectation on post-recovery satisfaction. *Int J Hospitality Manage*. 2014;43:87–97.
- Bujang MA, Baharum N. Sample size guideline for correlation analysis. *World*. 2016;3(1):37–46.

38. Zou X, Liu S, Li J, Chen W, Ye J, Yang Y et al. Factors Associated With Healthcare Workers' Insomnia Symptoms and Fatigue in the Fight Against COVID-19, and the Role of Organizational Support. *Front Psychiatry*. 2021;652717-.
39. Dehkordi AH, Gholamzad S, Myrfendereski S, Dehkordi AH. The effect of COVID-19 on anxiety, quality of work life and fatigue of health care providers in health care centers. 2020.
40. Lee YW, Dai YT, Park CG, McCreary LL. Predicting quality of work life on nurses' intention to leave. *J Nurs Scholarsh*. 2013;45(2):160–8.
41. Pourteimour S, Yaghmaei S, Babamohamadi H. The relationship between mental workload and job performance among iranian nurses providing care to COVID-19 patients: a cross-sectional study. *J Nurs Adm Manag*. 2021;29(6):1723–32.
42. Labrague LJ, De Los Santos JAA. Prevalence and predictors of coronaphobia among frontline hospital and public health nurses. *Public Health Nurs*. 2021;38(3):382–9.
43. Labrague LJ. Pandemic fatigue and clinical nurses' mental health, sleep quality and job contentment during the covid-19 pandemic: the mediating role of resilience. *J Nurs Adm Manag*. 2021;29(7):1992–2001.
44. Najimi A, Doustmohamadi P, Omid A. The relationship between emotional intelligence, social responsibility, and job performance in health service providers. *J Educ Health Promotion*. 2021;10.
45. Faseleh Jahromi M, Dehghani A. Development and validation of the social responsibility questionnaire for iranian nurses. *Nurs Midwifery Stud*. 2020;9(3):171–7.
46. Jazi ZH, Peyrovi H, Zareiyan A. Designing and psychometric evaluation of nurses' social responsibility instrument: a mixed-method study. *Iran J Nurs midwifery Res*. 2020;25(2):166.
47. Heydari A, Vafaei SM, Aghbati N. A Concept analysis of nursing responsibility. *J Clin Nurs Midwifery*. 2016;4(4):80–92. eng.
48. Glavandi H, Kabiri A, Soltanzadeh V. The relationship between social responsibility and teamwork of Urmia University Staff. *Appl Soc*. 2014;53:111–20.
49. Arias-de la Torre J, Molina AJ, Fernández-Villa T, Artazcoz L, Martín V. Mental health, family roles and employment status inside and outside the household in Spain. *Gac sanit(Barc, Ed impr)*. 2019;33(3):235–41.
50. Xia C-L, Wei A-P, Huang Y-T. The COVID-19 Lockdown and Mental Wellbeing of Females in China. *Int J Environ Res Public Health*. 2022;19(9):4960.
51. Rosiek A, Gronowska B, Szlendak T, Paroń T, Śliwiński M. Stress and Excessive Fatigue of Healthcare Employees and Medical Errors and their Negative Consequences for the Health and Safety of Hospitalized Patients, with Particular Emphasis on the Legal and Ethical Issues of Medical Personnel Employed Under Civil-Legal Contracts. *ICHMR 2020 Proceeding*. 2020:16.
52. Kim K-K, Kim I-S, Lee W-H. Perception of legal liability by registered nurses in Korea. *Nurse Educ Today*. 2007;27(6):617–26.
53. da Silva JPN, Furtado MP, Magalhães CMC, da Silva Pedroso J. Legal Factors and Psychological Stress of Health Professionals in the Forensic Area: A Systematic Review Protocol. 2021.
54. Gholamhosseini L, Hanafiye Moghadas M, Vandae O. Value and status of professional morality in the providing nursing services. *Paramedical Sci Military Health*. 2015;10(1):55–62.
55. Ghaffari M. The relationship Moral Intelligence and altruism with nurses attitude to the rights of patients. *J Nurs Educ*. 2016;5(2):49–56.
56. Ranaei Kordshouli H, Allahyari Bouzanjani A. Nurses' empathy with patient: the effect of perceived social supports and ethical responsibility to patient. *Q J Nurs Manage*. 2016;5(1):29–39.

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