

## ORIGINAL ARTICLE

# The relationship between mental workload and job performance among Iranian nurses providing care to COVID-19 patients: A cross-sectional study

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## Funding information

This study was conducted in the form of a project without financial support of the Student Research Committee of Semnan University of Medical Sciences, Semnan, Iran.

## Abstract

**Aims:** To evaluate the relationship between mental workload and job performance among nurses providing care to patients with COVID-19, and to explain the factors predicting their performance.

**Background:** The increased workload of health care workers in the COVID-19 pandemic affects their job performance, causes medical errors, contributes to patients' mortality and is a major concern for all health care organisations in the world.

**Methods:** This cross-sectional study recruited 139 nurses selected from the ICUs, infectious disease wards and emergency units of two hospitals in Iran. The NASA-Task Load Index and Paterson's job performance questionnaire were used.

**Results:** Mean scores of mental workload and job performance of the nurses were  $67.14 \pm 30.53$  and  $37.37 \pm 7.36$ , respectively. A total of 71.95% and 96.4% of the nurses had high mental workload and job performance levels, respectively. The results indicated a weak positive correlation between mental workload and the mean score of job performance ( $r = .057$ ). Unlike the mental demand ( $r = .175$ ,  $p = .04$ ) and temporal demand ( $r = .307$ ,  $p < .001$ ) that had a significant positive correlation with job performance, frustration had a significant negative correlation with job performance ( $r = -.183$ ,  $p = .032$ ). The following variables explained 33% of the variance of nurses' job performance: age, gender, type of ward, working shift, experience of providing care to patients with COVID-19 and frustration.

**Conclusion:** The nurses' mental workload increased during the COVID-19 pandemic. Given the negative effect of mental workload on the nurses' behaviour and performance, the rise in their job performance and its weak positive correlation with their mental workload should be further addressed.

**Implications for Nursing Management:** The present study results support the need for focusing on implementing strategies such as providing social and psychological support to moderate mental workload and improve job performance of nurses who provide care to patients with COVID-19.

## KEYWORDS

COVID-19, job performance, nurse, workload

## 1 | INTRODUCTION

The 2019 novel coronavirus disease (COVID-19) was first reported in Iran on 18 February 2020. The latest statistics (01 February 2021) show a total of 1,424,596 infected cases in Iran, 58,038 deaths, 1,216,305 recovered cases, 150,253 active cases and 3,896 seriously critical cases (Worldometers.info/coronavirus). In late January 2020, the WHO declared the outbreak of COVID-19 as a public health emergency and an international concern (Wilder-Smith et al., 2020). The spread of major pandemics such as COVID-19 creates an increasing demand on the health care workers (HCWs) (Chen et al., 2020). The constantly rising incidence and mortality rates, the lack of medications and vaccines, huge workload, inadequate personal protective equipment (PPEs) and inadequate support can implicate the health of HCWs (Lai et al., 2020). In such circumstances, despite severe pressures, HCWs were expected to work long hours (16–22 hr per day). Moreover, they were exposed to high risk of infection and increased workload while providing patient care (Dai et al., 2020). Other consequences of this pandemic included job burnout, increased health costs and psychological distress (fear, anxiety, depression, stress, insomnia, denial, anger, etc.) (Hassannia et al., 2020; Vizheh et al., 2020). High-risk situations plus constant contact with contaminated environments, inadequate PPEs, lack of contact with the family members, frustration, prejudice, loneliness and exhaustion have been blamed for increased mental health problems in HCWs. These problems not only affected the personnel's focus, perception and ability to make decisions, but also hindered their fight against the virus in some cases (Kang et al., 2020).

Control and management of COVID-19 was prioritized by Iran's Ministry of Health and Medical Education. Strategies to control the spread of the virus and mitigate the workload of HCWs were established on 20 March 2020. These strategies included the creation of the National Committee to Fight COVID-19, raising public awareness of viruses and protective methods through the national mass media, restriction on gatherings in crowded places, closure of educational institutions (schools and universities), reducing working hours of many offices, disinfecting crowded areas, controlling and identifying suspected cases at points of entry and exit (Abdi, 2020), and encouraging people to isolate themselves and observe social distancing.

Unfortunately, at least 40 HCWs have died of COVID-19 in Iran. Job burnout and staff shortage have had serious consequences for the patients and can debilitate health care system (Shoja et al., 2020). At the front line of the fight against COVID-19, nurses have suffered the most adverse consequences of this pandemic (Garosi et al., 2020).

Nurses comprise the largest group of HCWs in any country and play a vital role in the prevention of COVID-19, responding to its spread and providing care to the patients (Choi et al., 2020). While concerned about the health and safety of hospital nurses, societies

should not forget that patients with COVID-19 still need nurses to recover and continue treatment (D'Antonio et al., 2020). Therefore, nurses' work efficiency is very important in this pandemic.

A workload is defined as a general task performed by an individual or a team over a period. Nurses' workload includes both their practical duties and their cognitive tasks, such as thinking, decision-making, calculating, remembering and searching (Destiani et al., 2020).

Nurses face a high mental workload in the performance of their duties (Sarsangi et al., 2015; Abazari et al., 2020). The US National Institute for Occupational Safety and Health (NIOSH) ranks the nursing profession among the top-40 professions with a high prevalence of diseases caused by a heavy workload (Safari et al., 2013). Because of the particular nature of their occupation, nurses are burdened with a great responsibility, a heavy workload, extreme work pressure and the need to work in rotating shifts (Huang et al., 2018). Also, about 18% of nurses are forced to leave their job due to their heavy workload (Kaewboonchoo et al., 2014). Research findings indicate that a heavy workload leads to less-than-optimal care for the patients (Arghami et al., 2015). Therefore, an increased workload can affect job performance as one of the major indicators of success in all organisations (Ardestani-Rostami et al., 2019).

Job performance is defined as one's efficiency to carry out roles and responsibilities relating to direct patient care. It can also be defined as the effective performance of one's specified roles and responsibilities (Al-Makhaita et al., 2014). Generally, job performance is a multidimensional phenomenon affected by many variables such as personal characteristics, workload, job satisfaction, personal competencies, social support and organisational atmosphere (Foy et al., 2019).

Few studies have investigated the relationship between nurses' workload and job performance. In a descriptive correlational study by Ardestani-Rostami et al. (2019) on 371 nurses to determine the relationship between workload and clinical performance in nurses at the ICUs of hospitals affiliated to Tehran University of Medical Sciences, 75% of the nurses rated their performance as average. A negative correlation was observed between different dimensions of workload and clinical performance. According to the results of this study, workload can predict the performance of nurses with a variance of 39% (Ardestani-Rostami et al., 2019). The results of another study also showed that the level of patient safety decreases as the workload of nurses increases (Akbari, 2017). Nurses are also the first line of care for patients with COVID-19 in need of hospitalization. Nurses' workload increased extensively in 2020 due to the rise in the number of patients with COVID-19 (Rothan and Byrareddy, 2020) and their need for nursing care. Nurses not only provide therapeutic care to patients with COVID-19, but also give them primary health care and psychological care. The results of a study conducted in Iran showed that HCWs who had been in contact with COVID-19 patients suffered higher

workloads compared with those who had no contact with these patients (Shoja et al., 2020). The role of nurses' performance in combating this virus is therefore of paramount importance (Jiang et al., 2020).

Studies on the relationship between workload and job performance during the COVID-19 pandemic are still limited. The present research was thus conducted to determine (1) the relationship between the mental workload of nurses taking care of patients with COVID-19 and their job performance, and (2) explain the factors predicting their job performance.

## 2 | METHODS

### 2.1 | Research design, setting and participants

This cross-sectional study was conducted on a target population consisting of nurses providing care to patients with COVID-19 in ICUs, infectious disease wards and emergency units. The eligible nurses were selected by census sampling from those working at hospitals affiliated to Urmia and Hamadan Universities of Medical Sciences, Iran, from April to May 2020. There are 10 and 11 hospitals in the cities of Urmia and Hamedan, respectively, of which, five hospitals are affiliated to the universities of medical sciences in their respective cities. Of these five hospitals, only one in Urmia (Shahid Taleghani) and one in Hamedan (Besat) were designated as referral centres for patients with COVID-19, with emergency units, infectious disease wards and ICUs specified for their admission. Eighty nurses provide care to patients with COVID-19 in Urmia Shahid Taleghani Hospital and 120 in Hamadan Besat Hospital. We needed at least 138 subjects in order to run a multiple regression to achieve 95% power and a medium effect size (0.15) at  $\alpha = 0.05$  for the six selected predictor variables of age, gender, type of ward, working shift, experience of providing care to patients with COVID-19 and frustration. The researchers began sampling with prior arrangements made with the hospital authorities and head nurses of the wards involved in providing care to patients with COVID-19. A total of 161 nurses were recruited by census and non-probability sampling based on the inclusion criteria. The inclusion criteria were as follows: (a) willingness to participate in the research, (b) history of providing clinical care to patients with COVID-19 for at least one month and (c) clinical work experience for more than six months. The nurses' unwillingness to continue cooperation with the study and complete the questionnaires was considered the exclusion criterion. Before distributing the questionnaires, researchers explained the study objectives to the participants and assured them of confidentiality of their personal data, and then obtained their informed consents. The questionnaires were completed face-to-face in the hospital over ten minutes in the presence of researchers during nurses' break.

### 2.2 | Data collection

Data were collected using three questionnaires, including (1) a demographic questionnaire, (2) the NASA-Task Load Index (1988) (Hart

& Staveland, 1988) and (3) Patterson's job performance questionnaire (1970) (Paterson & Husband, 1970).

#### 2.2.1 | The demographic questionnaire

The demographic questionnaire inquired about age, gender, marital status, clinical work experience, ward of work, number of children, work shifts and place of work.

#### 2.2.2 | NASA-Task Load Index (NASA-TLX)

The NASA-Task Load Index (NASA-TLX), developed at the NASA-Ames Research Laboratory by Hart and Staveland, provides a subjective mental workload (MWL) based on the weighted average of six dimensions: mental demand (MD), which signifies the amount of mental and/or perceptual activity required, such as thinking, calculating and deciding; physical demand (PD), which indicates the amount of physical activity required, such as pushing, pulling, turning and controlling; temporal demand (TD), defined as the amount of pressure felt due to the rate at which tasks or task elements occur; overall performance (OP), which is how successful and satisfied one has been in performing a given task; effort (EF), taken to indicate how hard one has had to work to accomplish a certain level of performance; and frustration (FR), which denotes how discouraged versus content one has felt while completing the task (Hart & Staveland, 1988).

All the dimensions of NASA-TLX were presented to the nurses in this study. NASA-TLX is administered in two steps. First, participants think about the task they are asked to do (for instance, admitting patients to the emergency ward) and look at each pair of the six dimensions to decide which one better fits their personal definition of workload as related to the task. They should therefore make 15 paired comparisons. For example, they need to decide whether performance or frustration 'represents the more important contributor to the workload for the specific task you recently performed'. In the second step, the participants should rate each dimension on scales from low to high or from good to poor. Then, the overall workload score for each task is calculated by multiplying the raw score for each item by the weight from step 1. The weight of each item from step 1 was calculated by dividing the frequency of each dimension of the 15 paired comparisons by 15 (Hart & Staveland, 1988). Finally, the total workload value was calculated as the mean score, ranging from 0 to 100. Based on the work conditions of the nurses and the Subjective Workload Assessment Technique (SWAT), the overall workload was divided into five levels, namely low (0 to 9), medium (10 to 29), somewhat high (30 to 49), high (50 to 79) and very high (80–100) (Madadzadeh et al., 2018). The NASA-TLX was translated into Persian, culturally adapted and validated for the first time by Mohammadi et al. (2013). The face and content validities of the English version of this scale had already been confirmed. The split-half reliability of NASA-TLX was more than 0.80, and the

item–total correlation coefficients were all more than 0.60 (Hart & Staveland, 1988). The reliability coefficient of this scale, measured by the test–retest method, was reported as 0.746 (Mohammadi et al., 2013). The reliability of the questionnaire was also confirmed among 30 nurses with Cronbach's alpha of 0.847 (Safari et al., 2013). This study confirmed the reliability of the NASA-TLX in a pilot study on ten nurses with Cronbach's alpha of 0.89.

### 2.2.3 | Paterson's job performance questionnaire

Paterson's job performance questionnaire (JPQ) has 15 items, which are scored on a 4-point Likert scale, from 0 (rarely) to 3 (always). The range of scores for each subject is 0 to 45, and a score above 22 indicates a better job performance (Paterson & Husband, 1970). Paterson and Husband (1970) confirmed the reliability of the questionnaire with Cronbach's alpha of 0.91. Arshadi et al., (2012) translated Patterson's JPQ into Persian. The reliability coefficient of this scale was measured among twenty nurses using the split-half method ( $r = .82$ ). Cronbach's alpha value was also reported in Iranian clinical staff as 0.78 (Mosafarchi et al., 2018). The face and content validities of the questionnaire were also confirmed in Hosseini et al. (2017). This study confirmed the reliability of Paterson's JPQ in a pilot study on ten nurses with a Cronbach's alpha of 0.80.

## 2.3 | Data analysis

The collected data were analysed in IBM SPSS Statistics for Windows, version 23.0 (IBM Corp.), using descriptive and inferential statistics. The descriptive statistics included mean, standard deviation, percentage and frequency. Pearson's correlation coefficient was utilized for evaluating the relationship between mental workload and its dimensions with job performance. The One-way ANOVA test and the independent  $t$  test were used to compare the differences between the mental workload and job performance based on the demographic variables. Furthermore, the stepwise multiple linear regression analysis was used to examine the prediction role of mental workload dimensions and demographic characteristics in job performance during the COVID-19 pandemic.  $P$ -values less than 0.05 were considered statistically significant.

## 2.4 | Ethical considerations

After obtaining the approval of the Ethics Committee of Semnan University of Medical Sciences (Approval code: IR.SEMUMS.REC.1399.010), all the eligible nurses were invited to a reception. The lead researcher explained the purpose of the study to these potential candidates, and the research team answered any possible questions raised by the audience. The nurses who wished to

**TABLE 1** Baseline characteristics of participants

Demographic characteristics	n (%)
Age (years)	
20–29	69 (49.6)
30–39	56 (40.3)
40–49	11 (7.9)
≥50	3 (2.2)
Gender	
Male	64 (46)
Female	75 (54)
Marital status	
Married	84 (60.4)
Single	55 (39.6)
Working shift	
Morning	8 (5.8)
Evening	6 (4.3)
Night	20 (14.4)
Rotational	105 (75.5)
The number of children	
Without	89 (64)
1	30 (21.6)
2	20 (14.4)
Ward of work	
ICU	30 (21.6)
Infectious	45 (32.4)
Emergency	64 (46)
Hospital location	
Urmia city	59 (42.4)
Hamadan city	80 (57.61)
Total	139 (100)

Note: n (%): number (per cent).

participate in the research then signed a consent form and completed the questionnaires.

## 3 | RESULTS

### 3.1 | Baseline characteristics of participants

Table 1 presents the distribution of demographic variables in the participating nurses. Of 200 nurses working in the emergency units, infectious disease wards and ICUs in Urmia Shahid Taleghani and Hamedan Besat hospitals, 30 were excluded for not meeting the inclusion criteria, and 9 for being infected with COVID-19. Of the remaining 161 participants, 22 nurses refused to take part in this research for personal reasons, and finally, 139 nurses (86% response rate) completed the questionnaires (59 nurses from Urmia and 80

from Hamadan). The mean age of the nurses was  $31.92 \pm 7.33$  years. Most of them were female (54%), married (60.4%), had no children (64%) and worked in the rotational shifts (75.5%). The mean total work experience and COVID-19 nursing care experience were  $9.45 \pm 10.34$  years and  $2.12 \pm 1.28$  months, respectively. Also, most participants worked in the emergency department (46%).

### 3.2 | The relationship between mental workload and its dimensions with job performance

The mean scores of mental workload and job performance were  $67.30 \pm 14.53$  and  $37.37 \pm 7.36$ , respectively. Also, 10.07%, 71.95% and 17.98% of the nurses had somewhat high, high and very high workloads, respectively. Moreover, the classification of grades indicated that 96.4% of the nurses had a high job performance. There was no statistically significant correlation between the mental workload and the mean score of job performance ( $r = .057$ ,  $p = .510$ ). In contrast to mental demand and temporal demand that had a significant positive correlation with job performance ( $r = .175$ ,  $p = .04$ ;  $r = .307$ ,  $p < .001$ , respectively), the frustration had a significant negative correlation with job performance ( $r = -.183$ ,  $p = .032$ ) (Table 2).

### 3.3 | The multiple linear regression analysis of the prediction role of the demographic characteristics and mental workload dimensions in job performance

A multiple linear regression model was used to investigate the predictor variables (the demographic characteristics and mental workload dimensions) that had a significant effect on global job performance based on the stepwise model. To evaluate the extent of the correlation of job performance score with each predictive variable, we used stepwise linear regression and the 'margins' post-estimation command to obtain estimated marginal means and associated confidence intervals. The Kolmogorov–Smirnov test was used to test predictive variables for multicollinearity and the residuals for normal distribution. The results of the regression indicated the six predictors explained 33% of the variance ( $R^2 = .365$ ,  $F(6, 131)=12.568$ ,  $p < .001$ ). It was found that gender (male) ( $\beta = 4.20$ ,  $p = .001$ ), age ( $\beta = 3.47$ ,  $p < .001$ ), COVID-19 nursing care experience ( $\beta = 2.11$ ,  $p < .001$ ), frustration ( $\beta = -0.13$ ,  $p = .024$ ) and working shift (night) ( $\beta = -3.80$ ,  $p = .017$ ) significantly predicted

nurses' job performance as did ward of work (emergency department) ( $\beta = -5.13$ ,  $p < .001$ ) (Table 3).

### 3.4 | Mean and standard deviation of the mental workload and job performance based on the demographic variables in nurses working at COVID-19 care wards

No significant differences were observed between the mean mental workload and demographic characteristics ( $p > .05$ ). Furthermore, there were no significant differences between the mean job performance and variables of gender ( $p = .292$ ), hospital location ( $p = .142$ ), ward of work ( $p = .691$ ) and the number of children ( $p = .145$ ), but there were differences between this mean value and age ( $p < .001$ ), clinical work experience ( $p < .001$ ) and COVID-19 nursing care experience ( $p = .021$ ). A significant difference was also observed in the mean score of job performance in terms of marital status ( $p = .002$ ) and working shift ( $p = .001$ ) (Table 4).

## 4 | DISCUSSION

The present study was conducted to assess the correlation between mental workload and job performance in nurses providing care to patients with COVID-19, and explain the factors predicting their job performance.

In the present study, most nurses providing care to patients with COVID-19 had high levels of mental workload. This finding was consistent with the results of most studies in critical conditions (Shoja et al., 2020; Judek et al., 2018); however, the score was medium to low in similar studies among different nurses in non-critical situations (Destiani et al., 2020; Mohammadi et al., 2016; Asamani et al., 2015). Malekpour et al. (2014) stated that nurses are responsible for 80% of all tasks in health care settings and have a generally heavy workload. As attested by the findings, the workload of nurses increased significantly due to the stressful nature of their job in the COVID-19 pandemic.

The main findings of this study show that, during the COVID-19 pandemic, job performance had no significant correlation with mental workload in COVID-19 care units. Sutarto et al. (2016) in Indonesia reported no significant correlation between nurses' workload and their performance in general hospitals. Meanwhile, many studies in different countries have reported different findings (Yamin et al., 2020;

**TABLE 2** The relationship between mental workload and its dimensions with job performance

Workload Dimensions Variable	Mental demand	Physical demand	Temporal demand	Overall Performance	Effort	Frustration	Mental workload (overall)
Job performance	$r = .175$ $p = .04$	$r = -.24$ $p = .783$	$r = .307$ $p < .001$	$r = .032$ $p = .711$	$r = -.079$ $p = .355$	$r = -.183$ $p = .032$	$r = .057$ $p = .510$

Note: Pearson's correlation coefficient.

Variables	B	Standard Error	Standardized coefficients		95.0% CI for beta	
			$\beta$	p-Value	Lower bound	Upper bound
Frustration	-0.13	0.05	-0.16	.024	-0.25	-0.18
COVID-19 nursing care experience	2.11	0.53	0.28	<.001	1.05	3.16
Gender						
Male	4.20	1.28	0.28	.001	1.66	6.74
Age	3.47	0.77	0.34	<.001	1.93	5.01
Ward of work						
Emergency	-5.13	1.17	-0.35	<.001	-7.46	-2.80
Working shift						
Night	-3.80	1.57	-0.18	.017	-6.92	-0.68
Constant	29.33	1.85		<.001	25.65	33.00

Note:  $R = .60$ ,  $R$ -square = .36, adjusted  $R$ -square = .33, Durbin-Watson = 1.85.

Rusdi et al., 2020; Yosiana et al., 2020). Also in contrary to the present findings, Asamani et al. (2015) in Ghana reported that moderate to high workloads among HCWs improve their job performance in hospitals significantly. In contrast, the results of another study showed that high workload reduces performance (Baethge et al., 2016). These disparate findings in different groups can result from the varying abilities of nurses in hospital settings. This result can probably be attributed to nurses' inner efforts to deal with the current crisis and the external encouragement received from organisations and the positive view of the community on nurses' performance during this crisis.

The current study showed different results for the correlation between the dimensions of mental workload and job performance in nurses. The temporal and mental dimensions of mental workload had a greater significant positive correlation with the job performance of nurses working in COVID-19 units, respectively, while the workload caused by frustration had a statistically significant weak negative correlation with job performance. Ardestani-Rostami et al. (2019) in Iran reported a negative correlation between all the dimensions of mental workload (including mental, physical and temporal demands, performance, effort and frustration) and job performance in ICU nurses, and this workload could predict 39% of their performance. Furthermore, Rusdi et al. (2020) examined a general hospital in Indonesia and found that workload variables positively affect performance, duration of work and fatigue. Judek et al. (2018) observed that some dimensions of mental workload, such as temporal demand, effort and mental demand, should be higher and are more important than others during a crisis. There was also a positive correlation between the effort produced by an individual and the perception of mental demand.

Furthermore, the results of another study among bank employees showed that the various dimensions of workload also have a positive effect on the performance of this group of workers as a motivating mechanism (Siswanto et al., 2019). The perceived workload of nurses predicts their stress and also the quality of time they

**TABLE 3** The multiple linear regression analysis of the prediction role of the demographic characteristics and mental workload dimensions in job performance

allocate to patients in terms of mental, physical and time demands regardless of the disease severity (Yen et al., 2020). Therefore, people react differently in critical work situations based on their personality, culture and employment status.

According to the present findings, an increase in the clinical experience of providing care to patients with COVID-19, being a male nurse and older age lead to a high level of job performance, while frustration, taking more night shifts and being a nurse at emergency units reduce job performance during the ongoing COVID-19 pandemic. In line with the present findings, in another study conducted on the COVID-19 pandemic in Iran, Shoja et al., (2020) observed that there was a significant positive correlation between job performance, age and care experience of patients with COVID-19. In relation to the emergency ward, Vasli and Dehghan-Nayeri's study in Iran showed that crisis management is integral for emergency nurses and requires financial, welfare, emotional and legal support, especially in critical emergencies (Vasli & Dehghan-Nayeri, 2016). Bolghanabadi et al. (2018) in Iran also stated that mental workload and musculoskeletal disorders are higher among night shift workers than day shift workers. Extremely long work hours in bank employees correlated negatively and significantly with their performance (Siswanto et al., 2019). Nevertheless, Malekpour et al. (2014) found that working shift and the number of patients to whom each nurse provides care have a significant positive correlation with the workload level, although there was no such correlation with the other variables. Another study also showed that an interrupted worker needs more time to restart work and to reach his proper performance (Asamani et al., 2015). These contradictory findings demonstrate that work processes, organisational structure and differences in rules or protocols can significantly affect employees' workload and impact their performance during critical conditions such as the COVID-19 pandemic.

The present study results showed that nurses' job performance was different based on the variables of age, marital status,

**TABLE 4** Mean and standard deviation of the mental workload and job performance based on the demographic variables in nurses working at COVID-19 care wards

Demographic characteristics		Mental workload	Job performance
		Mean (SD)	Mean (SD)
Age (years)	20–29	68.9 (15.29)	34.24 (8.03)
	30–39	66.73 (13.14)	40.38 (5.11)
	40–49	61.63 (16.88)	43.18 (1.60)
	≥50	61.77 (11.35)	33.00 (0.00)
<i>p</i> -value*		( <i>F</i> = 1.45, <i>p</i> = .414)	( <i>F</i> = 4.36, <i>p</i> < .001)
Gender	Male	65.73 (14.73)	37.50 (8.51)
	Female	68.64 (14.32)	37.26 (6.29)
<i>p</i> -value**		( <i>t</i> = 1.17, <i>p</i> = .192)	( <i>t</i> = -0.191, <i>p</i> = .292)
Marital status	Married	67.69 (15.58)	39.01 (5.90)
	Single	66.70 (12.88)	34.83 (8.64)
<i>p</i> -value**		( <i>t</i> = -0.39, <i>p</i> = .708)	( <i>t</i> = -3.37, <i>p</i> = .002)
Working shift	Morning	68.75 (19.46)	41.12 (2.10)
	Evening	76 (16.17)	35.83 (8.70)
	Night	63.46 (10.66)	32.8 (5.08)
	Rotational	67.42 (14.63)	38.05 (7.59)
<i>p</i> -value*		( <i>F</i> = 0.98, <i>p</i> = .357)	( <i>F</i> = 1.86, <i>p</i> = .001)
The number of children	without	67.25 (13.62)	35.55 (7.74)
	1	70.4 (16.22)	40.13 (5.47)
	2	62.9 (15.41)	41.25 (5.29)
<i>p</i> -value*		( <i>F</i> = 0.93, <i>p</i> = .075)	( <i>F</i> = 3.61, <i>p</i> = .145)
Ward of work	ICU	67.4 (12.30)	37.76 (6.74)
	Infectious	70.74 (14.31)	38.36 (5.53)
	Emergency	64.84 (15.34)	36.51 (8.64)
<i>p</i> -value*		( <i>F</i> = 0.90, <i>p</i> = .136)	( <i>F</i> = 2.77, <i>p</i> = .691)
Hospital location	Urmia city	68.13 (16.75)	38.54 (5.96)
	Hamadan city	66.69 (12.73)	36.50 (8.19)
<i>p</i> -value**		( <i>t</i> = 0.57, <i>p</i> = .793)	( <i>t</i> = 1.61, <i>p</i> = .142)
Clinical work experience	Under 1 years	64.94 (13.16)	33.41 (3.87)
	1 to 3 year	82.06 (14.18)	36.10 (7.80)
	3 to 6 year	66.31 (12.16)	36.94 (10.71)
	6 to 9 year	69.2 (14.13)	37.10 (5.94)
	9 to 12 year	67.29 (14.88)	38.2 (5.17)
	12 to 15 year	63.75 (18.74)	43.45 (1.43)
	Over 15 year	62.95 (14.32)	38.52 (5.92)
<i>p</i> -value*		( <i>F</i> = 2.82, <i>p</i> = .062)	( <i>F</i> = 3.08, <i>p</i> < .001)
COVID-19 nursing care experience	1 month	65.97 (15.58)	35.62 (9.03)
	2 month	69.89 (13.69)	37.05 (6.09)
	3 month	67.55 (12.37)	40.34 (5.25)
	4 month	63.69 (18.80)	37.54 (6.02)
<i>p</i> -value*		( <i>F</i> = 1.29, <i>p</i> = .369)	( <i>F</i> = 1.60, <i>p</i> = .021)

\*One-way ANOVA test (*F* test).

\*\*independent *t* test; ICU, intensive care unit.

working shift, work experience and providing care to patients with COVID-19. In agreement with the present study results, Al-Makhaita et al., (2014) reported that nurses' job performance had a significant correlation with working shift and work experience, but age and marital status had no significant correlation with job performance. The results of a study by Kouhnavard et al., (2020) showed that job performance had a significant correlation with age, work experience and marital status. In contrast, Mosafarchi et al. (2017) reported that nurses' job performance had no significant correlation with working shift, work experience, marital status, age and gender. These conflicting results can be due to conducting the above studies in different wards and under non-critical conditions.

## 5 | LIMITATIONS

There were a few limitations and potential biases in this study. Although the researchers tried to avoid tiring out the participants by long questionnaires, their mental state when completing the questionnaires may have influenced their answers to the items. The sample size was small for achieving a correct inference and suitable generalizability. Furthermore, a few participants contracted COVID-19 and dropped out. This sample loss was random and out of researchers' control. However, since this study was conducted with a limited number of nurses in a small region of Iran, the results should be cautiously interpreted and applied to nurses in other countries considering the context and culture in Iran. The researchers thus suggest a larger-scale replication of this study so as to be able to generalize the findings with greater certainty.

## 6 | CONCLUSION

According to the present study results, nurses' mental workload may increase during the COVID-19 pandemic. Other studies show that workload creates a negative experience in the personnel. Moreover, the negative effects of workload on the nurses and the organisation can directly and indirectly affect the nurses' ability to provide patient care. Therefore, workload should be better addressed in this group. Variables such as age, gender, type of ward, working shift, experience of providing care to patients with COVID-19 and frustration demand explain 33% of the variance of nurses' job performance. Thus, it is recommended to moderate working shifts, to increase the number of older and married nurses with high levels of work experience to improve job performance, and to provide social and psychological support for moderating mental workload and improving performance of nurses providing care to patients with COVID-19.

## 7 | IMPLICATIONS FOR NURSING MANAGEMENT

Given that the COVID-19 pandemic is still an ongoing crisis and that the emergence of similar crises is possible, the current study

may have several implications for policymakers and nursing managers. Unlike other studies, since nurses' mental workload had a weak positive correlation with job performance, workload management programmes can help reduce mental workload and subsequently enhance nurses' job performance. Through effective management of human resources, support, communications, training, identifying optimal job performance, and rewarding, managing workload and creating a positive working atmosphere, these programmes can empower and motivate nurses, and ultimately improve their job performance and patient care.

By considering the prediction of nurses' job performance by variables such as age, experience of providing care for patients with COVID-19 and gender, as well as their lower performance at night shifts and in emergency departments, some strategies should be considered by hospital human resource managers and planners in COVID-19 care units, including adjusting the number of night shifts and adding male nurses to the mix of workers in the units and also improving the conditions at emergency departments.

Maximum efforts are needed to review nurses' work schedules, provide them with periodic consultations and physical examinations, and improve the staff's performance in future similar crises.

Since frustration can be negatively predicted job performance, nursing managers should be aware that psychological and social support for nurses can increase their performance in the current conditions.

## ACKNOWLEDGEMENTS

The authors would like to express their gratitude to the research deputy of Semnan University of Medical Sciences for their approval of the project and also to all the nurses participating from Hamedan and Urmia hospitals despite their heavy workload during the current crisis, and finally, to Dr. Mohammad Heidari, for his review of the article and assistance in analysing the data.

## CONFLICT OF INTEREST

No actual or potential conflict of interest has been declared by the authors.

## AUTHOR CONTRIBUTIONS

Sima Poutreimour, Safura Yaghmaei and Hassan Babamohamadi designed the study and wrote the research protocol. Sima Poutreimour and Safura Yaghmaei did the acquisition of data. Sima Poutreimour and Hassan Babamohamadi did the statistical analysis. Sima Poutreimour, Safura Yaghmaei and Hassan Babamohamadi prepared the manuscript draft. Hassan Babamohamadi supervised the survey and checked the data. All authors contributed to the revisions in depth for the manuscript and approved the final manuscript.

## ETHICAL APPROVAL

This study was approved by the Ethics Committee of the Semnan University of Medical Sciences (Approval code: IR.SEMUMS.REC.1399.010). Informed written consent was obtained from each participant.



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**How to cite this article:** 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 Manag.* 2021;29:1723–1732. <https://doi.org/10.1111/jonm.13305>