



Research Paper

Anxiety, Resilience and Occupational Fatigue in Nurses During the COVID-19 Pandemic in Iran



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ABSTRACT

Background: The COVID-19 virus epidemic has caused a major physical and psychological burden on nurses in Iran and around the world.

Objectives: The purpose of this study was to investigate the role of anxiety and resilience in predicting occupational fatigue in nurses during the COVID - 19 virus epidemic in Iran.

Materials & Methods: This cross-sectional online survey was conducted on the nurses of Razi and Porsina public hospitals in Rasht, north of Iran. A total of 160 nurses were selected using simple random sampling method. Data were collected using the Swedish occupational fatigue inventory (SOFI), the corona disease anxiety scale (CDAS) and the Connor-Davidson resilience scale (CD-RISC).

Results: Participation rate was 87.5%. The score level of most nurses in CDAS was low to moderate. The CDAS score was higher in women and those who work in the COVID units than those who work in both the COVID and non-COVID units. The CD-RISC score was higher in married people than singles and in people with permanent employment status than in contract and temporary employment status. SOFI was positively correlated with CDAS and negatively correlated with CD-RISC; But CDAS and CD-RISC were not significantly related ($P < 0.05$). In multivariate linear regression model. Anxiety was the only significant independent predictor of occupational fatigue ($B = 1.16, P < 0.001$).

Conclusion: Despite the COVID-19 epidemic crisis in the fourth wave and high mortality, anxiety level in nurses was low and moderate, which can be attributed to the COVID-19 vaccine. But the anxiety score still played an important role in occupational fatigue. It is suggested that appropriate interventions be developed and implemented to improve nurses' anxiety to stressful epidemic conditions of Covid-19 and thereafter.

Keywords: COVID-19, Anxiety, Resilience, Occupational Fatigue, Nurses

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1. Introduction

Since late December 2019, an outbreak of coronavirus (COVID-19) has been reported in Wuhan, China [1]. Iran, like most countries in the world, was infected with the coronavirus in February 2020 [2]. Iran is currently in the fourth wave of this epidemic in April and May 2021 (the date this manuscript is being compiled). The pandemic has created many challenges for the health care system and health workers [3]. Around the world, much attention has been focused on vaccine production and how the health care system copes with the prevalence of COVID-19 [4]. However, the debate over how health care workers cope with epidemic distress has received less attention [5]. Health professionals work in different clinical units under intense pressure and it seems that working on the front line is a significant risk factor for psychological problems and reduced quality of life [6-8].

During the COVID-19 epidemic, nurses play a key role in combating the epidemic that can in turn pose a serious threat to their mental health. In these stressful situations, high levels of anxiety and work pressure may lead to psychological problems [9]. Uncertain status of the disease and uncertainty about treatment policies also cause high levels of anxiety in nurses and affect their quality of life [10]. All these factors can cause occupational fatigue in nurses [11]; To the extent that some nurses are forced to resign from their jobs [12, 13]. Occupational fatigue reduces people's desire and ability and reduces efficiency [14].

During the COVID-19 epidemic, nurses face a high workload and too much anxiety, which leads to a lot of occupational fatigue [11]. However, some studies have shown that resilience is a protective factor and can help nurses' well-being [15]. Resilience as an effective coping strategy changes people's reaction in stressful situations [16] and is an effective factor in promoting quality of life in nurses [17]; A study in ICU nurses showed that low resilience is a factor in their depression [18]. One of the most important steps in preventing occupational fatigue is to identify stressful sources early and improve your personality. Resilience is one of these capabilities that has protective effects against occupational fatigue [19]. Resilience is the adaptation of an individual to important stressors such as threat, trauma, tragedy, family and relationship problems, workplace, and financial issues [20]. Resilience is very important for nurses because they face many risk factors in their daily work and live with them and must provide standard care to patients in addition to all problems [21].

As resilience increases, nurses can cope with difficult situations. Adaptation and improvement increase so that they can do the job better and ultimately occupational fatigue is minimized. In the fight against coronavirus epidemic, it is necessary to assess the psychological status of healthcare professionals and monitor the long-term effects of this epidemic on their occupational fatigue [22]. Moderating anxiety levels and supporting nurses' resilience is thought to be important in achieving success in combating the epidemic. Therefore, the purpose of this study was to investigate the role of anxiety and resilience in predicting occupational fatigue in nurses during the COVID - 19 virus epidemic in Iran. Doing this research can help us understand the role of Covid-19 anxiety and resilience in predicting occupational fatigue in nurses. Assessing the role of anxiety, resilience and socio-demographic and occupational factors in nurses' occupational fatigue can be useful for designing intervention programs to empower nurses in the future.

2. Materials and Methods

Participants

The present study was a cross-sectional online survey on nurses of selected hospitals in Rasht. Two public hospitals, Razi and Poursina, which were the main hospitalization centers for patients with COVID-19, were selected as the sampling units. The required sample size was calculated based on the formula proposed by Chow et al. [23]. A total of 160 sample was calculated based on the research by Aziziaran and Basharpour [24] considering margin of error as 1.5, the significance level of 0.05 and 20% non-response rate. Eighty nurses from each hospital were selected using simple random sampling method. The selection of individuals was based on the list of active hospital nurses. Satisfaction to participate in the study, at least one year of activity in the nursing profession and receiving COVID-19 vaccine were considered as inclusion criteria. Failure to complete at least 10% of the questionnaire questions was considered as an exclusion criterion. Data collection started on April 25, 2021, at the height of the fourth wave epidemic in Razi and Poursina hospitals in Rasht and continued until May 5, 2021. Due to the need to observe social distance and prevent unimportant traffic to the hospital, the questionnaires described above were administered online. The link to the web page of the informed consent form and questionnaires were sent to the nurses via SMS and they were asked to answer the questions within 15 minutes if they had informed consent.

Measures

Swedish Occupational Fatigue Inventory (SOFI)

SOFI was designed by Åhsberg et al. and has 20 items that measures five components of occupational fatigue (e.g. lack of energy, physical exertion, physical discomfort, lack of motivation and sleepiness). The scale score based on seven-point Likert type scale from never=0 to very high=6. The range of scores in this questionnaire is between 0-120 and the high score indicates occupational fatigue [25]. In the Iranian sample, the validity of this questionnaire was confirmed by confirmatory factor analysis and internal consistency ($\alpha=0.80$) [26]. The internal consistency of this instrument was calculated as ($\alpha=0.96$) in the present study.

Corona Disease Anxiety Scale (CDAS)

CDAS was designed by Alipour et al. [27] in Iran. The scale has 18 questions and measures two components of coronary anxiety (e.g. psychological and physical symptoms) based on the Likert scale of four factors (never = 0 to always = 3). The range of scores in this questionnaire is between 0-54 and the high score indicates more anxiety [27]. Cut-off scores for different levels of anxiety (Low <16, Medium 17-29, and High >30) are reported [27]. The validity of this questionnaire was confirmed by exploratory factor analysis and internal consistency ($\alpha=0.91$) [27]. The internal consistency of this instrument was calculated to be $\alpha=0.91$ in the present study.

Connor-Davidson Resilience Scale (CD-RISC)

The 25-item of the CD-RISC was used to assess resilience. The scale consisted of five components of resilience as personal competence, tolerance of negative effect and strengthening effects to stress, positive acceptance of change, self-control and spiritual influences. The items are scored based on 5-point Likert type scale from completely incorrect = 0 to completely correct = 4. The range of scores in this questionnaire is between 0-100 and the high score indicates more resilience [28]. The validity of this questionnaire was confirmed by confirmatory Factor Analysis and internal consistency ($\alpha=0.94$) in the Iranian sample [29]. The internal consistency of this instrument was calculated as ($\alpha=0.92$) in the present study.

Socio-demographic and occupational data including age; Gender; Marital status (single, married); Status of employment (permanent / contract and temporary) working unit (COVID, COVID and non-COVID, ICU,

non-COVID); employment history and workplace hospital (Razi and Poursina) were collected using a research-made data collection form.

Statistics analysis

Descriptive indices of mean, standard deviation (SD), range and median were calculated for quantitative variables. Qualitative variables were reported based on frequency and percentage. Kolmogorov-Smirnov test was performed to evaluate the normal distribution of the main variables SOFI, CDAS and CD-RISC. Due to the normal distribution of these variables, parametric tests (independent t-test and variance analysis) were used to compare the mean scores with socio-demographic and occupational characteristics of nurses. The relationships between the main variables were investigated using Pearson correlation coefficient. Stepwise linear regression model was used in order to predict SOFI in nurses based on CDAS and CD-RISC. All data analyses was performed in data analysis, SPSS Statistics v.19 (IBM).

3. Results

A total of 140 nurses (participation rate = 87.5%) with mean age of 32.13 (SD = 7.50) years were participated in this study. 90.7% of participants were female. The majority were female (90.7%), married (59.3%), and in contract or temporary position in the work (65%). About half of them (48.6%) were working in COVID and non-COVID units simultaneously. Most of nurses (42.1%) had medium level of anxiety. Also, 41.4% had low anxiety and 16.4% had high anxiety. Descriptive information of study participants is shown in Table 1.

Table 2 shows the comparison of the mean scores of occupational fatigue, anxiety and resilience based on socio-demographic and occupational variables. The anxiety score based on CDAS score was higher in women than men. The resilience score was higher in married people than in singles. Also, the resilience score in permanent individuals was higher than contract and temporary individuals. The results of the post hoc test showed that the anxiety score was lower in those engaged in COVID wards than in those who were active in both COVID and non-COVID; But there was no significant difference between nurses working in other units.

Occupational fatigue has a moderate positive correlation with anxiety ($r=0.401$, $P=0.001$) and a weak negative relationship with resilience ($r=-0.173$, $P=0.41$); indicating that a higher occupational fatigue level indicates a higher anxiety level and a lower resilience level. While,

Table 1. Descriptive statistics of study participants (n=140)

Variable		No. (%)	Mean±SD	Range	Median	Z (P)
Age	Years	-	32.13±7.50	20-51	29	
Work experience	Years	-	8.44±6.63	1-28	6	
Sex	Female	127(90.7)				
	Male	13(9.3)				
Marital status	Married	83(59.3)				
	Single	57(40.7)				
Employment type	Permanent	49(35)				
	Contract and temporary	91(65)				
Working unit	COVID	30(21.4)				
	COVID and non- COVID	68(48.6)				
	ICU	15(10.7)				
	non- COVID	27(19.3)				
Hospital	Poursina	70(50)				
	Razi	70(50)				
Corona Disease Anxiety Scale (CDAS)	Low < 16	58(41.4)				
	Medium 17< 29	59(42.1)	19.43±9.26	3-48	18	1.151 (0.141)
	High > 30	23(16.4)				
Connor-Davidson Resilience Scale (CD-RISC)		-	61.41±13.98	20-99	63	1.133 (0.153)
Swedish Occupational Fatigue Inventory (SOFI)		-	53.72±26.94	0-113	55	0.740 (0.644)

Note: No.= frequency; SD= standard deviation; Z= Kolmogorov–Smirnov test; P= significance level



there was no significant correlation between anxiety and resilience ($r=-0.099$, $P=0.243$).

The result of stepwise multivariate linear regression exploring the predictors of occupational fatigue showed that anxiety was an independent significant predictor of occupational fatigue ($B=1.16$, $P<0.001$).

4. Discussion

The aim of this study was to evaluate anxiety, resilience and occupational fatigue in nurses during the COVID-19 epidemic in Iran. The results showed that the score level of anxiety in most nurses was low to moderate. The mean score of CDAS in our study is lower than the studies of Aziziaran and Basharpour [24] and Asadi et al. [39]. Abadi et al. [40] reported moderate anxiety in nurses

during the COVID-19 epidemic based on the Depression Anxiety and Stress Scale. In explaining the low level of nurses' anxiety in this study compared to previous studies based on CDAS, it can be attributed to the increase in nurses' knowledge and understanding of the disease; at the beginning of the epidemic, the disease was interpreted as mysterious and unknown to nurses [41], but now it is better known to the world. Also, considering that the vaccination process of health workers has started in this period (date that this manuscript is being compiled) and the participants in this study have been vaccinated, their hope for improvement has increased. As a result, their anxiety level has decreased.

Table 2. Mean differences in SOFI, CDAS and CD-RISC scores by socio-demographic and occupational variables

Item	SOFI		CDAS		CD-RISC		
	Mean±SD	t*/F** (P)	Mean±SD	t*/F** (P)	Mean±SD	t*/F** (P)	
Sex	Female	54.14±26.94	19.94±9.25	61.10±13.69	0.586* (0.55)	2.05* (0.04)	0.82* (0.41)
	Male	49.53±27.56	14.46±8.01	64.46±16.94			
Marital status	Married	53.74±27.83	19.72±9.94	63.75±13.47	0.013* (0.98)	0.44* (0.66)	2.43* (0.01)
	Single	53.68±25.83	19.01±8.22	58.00±14.13			
Employment type	Permanent	49.42±27.41	18.93±8.94	64.95±11.83	-1.38* (0.167)	-0.46* (0.64)	2.23* (0.027)
	Contract and temporary	56.03±26.54	19.70±9.46	59.50±14.72			
Working Unit	COVID	57.80±25.62	22.50±9.90	63.03±12.41	0.465** (0.70)	3.06** (0.03)	1.60** (0.19)
	COVID and non- COVID	51.57±27.12	17.11±7.38	61.50±15.02			
	ICU	57.20±21.24	21.46±8.09	54.33±12.69			
	non- COVID	52.66±31.14	20.74±12.01	63.33±13.03			
Hospital	Poursina	53.31±25.73	19.60±8.65	61.45±12.76	-0.17* (0.89)	0.20* (0.83)	0.03* (0.97)
	Razi	54.12±28.27	19.27±9.89	61.37±15.20			

Note: SD=standard deviation; Y=years; *t= Independent Samples Test; **F=ANOVA; P= significance level



In this study, it was shown that the CDAS score in female nurses was higher than men, which is consistent with the studies of Savitsky et al. [30] and Simonetti et al. [31]. But in contrast to Labrague et al. [9] and Mo et al. [32] that observed no significant difference between men and women. The reason behind the difference between men and women nurses in anxiety level need to be explored in further studies.

Our study showed that resilience is higher in married people than in single people; This is consistent with the research of Ang et al. [33], but Afshari et al. [34] reported no difference. It is possible that being married because it is an emotional bond can pave the way for more social support in stressful situations [33]. In our study, it was found that employment type is related with resilience and it is higher in nurses with permanent job; This result is consistent with the research of Afshari et al. [34]. In a possible explanation, it can be said that resilience can be affected by job insecurity [35]; People who work perma-

nently feel less at risk about their future careers and, as a result, are more resilient in stressful situations. In the importance of being married and increasing resilience, it can be argued that being married can help a person increase resilience in the face of stressful events by creating a supportive and emotional network.

Our study showed that CDAS was higher in nurses who were simultaneously working in COVID and non-COVID units than in nurses who were only working in COVID units. One possible reason is that more than 48% of participants in the QOVID and non-QOVID sections were working at the same time, which can increase anxiety scores. But in a possible explanation, we can point to the increase in the workload of nurses who work simultaneously in the COVID unit and non-COVID units.

We also found in this study that there is a direct relationship between CDAS and SOFI; Zhan et al. [13] and Kamali et al. [36] also achieved similar results in

their research. In a possible explanation, it can be said that nurses are under severe physical and psychological stress during the COVID-19 epidemic, which can lead to fatigue and burnout [37]. In our study it was shown that there is a negative relationship between nurses' SOFI and CD-RISC; This is consistent with previous studies by Labrague et al. [9] and Roberts et al. [38]. In explanation, it can be said that resilience is a protective factor that can help nurses cope with stressful situations and moderate the effect of unpleasant factors. In explanation, it can be said that resilience is a coping strategy with stressful situations and helps nurses to deal effectively with stressful conditions during the Covid-19 epidemic, resulting in less exposure to fatigue and burnout.

The noteworthy point in our findings is that the effect of CD-RISC was not effective in predicting SOFI, and CDAS alone predicted 16% of the SOFI variance. In a possible explanation, we can mention the time of the research; Due to the fact that nurses were vaccinated with COVID-19 during this period, the effect of anxiety was low; In fact, nurses' anxiety about Covid 19 has decreased and as a result has had little effect on their SOFI. One of the possible reasons for the ineffectiveness of resilience is the prolongation of the epidemic. As more than a year has passed since the epidemic, protective factors such as resilience in nurses have declined; As Hart et al. [42] Showed that increased conflict, imbalance and difficult work environments can reduce the level of resilience in nurses.

Overall, the results of our study showed that some demographic variables such as marital status, employment type and working area can affect nurses' resilience, anxiety and occupational fatigue. Our results also showed that anxiety has an effective role on nurses' occupational fatigue and its weight is higher than resilience.

Due to the cross-sectional nature of this study, causality cannot be obtained from the results of this study. Consequently, the results should be interpreted as correlational in screening and treatment assays. Also in this study, the samples were not homogeneous in demographic variables such as gender, this inequality should be considered in generalizing the results. Also, this study was conducted in public hospitals in Rasht, the generalization of the results for nurses in private hospitals is limited.

Nurses' anxiety in this study is lower than previous studies, which may be affected by the implementation of COVID-19 vaccination, but anxiety is still one of the factors associated with occupational fatigue in them. The protective role of resilience in preventing occupational

fatigue was not significant in our study, which could be due to the prolongation of the COVID-19 epidemic that adversely affected nurses' personal abilities. Regardless of the COVID-19 epidemic, continuous interventions are needed for nurses to improve resilience and other coping skills. Due to the increase in workload and job stress caused by the Covid-19 epidemic in nurses and the reduction of occupational fatigue in nurses, it is recommended to implement training programs with the topics of improving coping skills and increasing psychological resilience.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of [Guilan University of Medical Sciences](#), Iran (ref. no. IR.GUMS.REC.1400.031). Participants in this study were aware of our goals and answered the questionnaire questions after confirming the informed consent form. All the ethical principles of the Declaration of Helsinki were respected by researchers at all the research stages. Participation in this study was voluntary and anonymous.

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Authors' contributions

Conceptualization: AS and SS; Methodology and formal analysis SS; Data collection: AB; Writing: AS, SS, AA; Manuscript review and editing: RS.

Conflict of interest

The authors declared no conflict of interest.

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