Job stress and resilience in Iranian nurses during the COVID-19 pandemic: A case-control study

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Abstract.
BACKGROUND: The COVID-19 pandemic has created a wide range of sociocultural pressures on nurses. Resilience is defined as one's ability to adapt to an unpredictable situation and it can be a factor in accepting an undesirable psychosocial situation.
OBJECTIVE: The aim of the present study was to examine resilience in nurses in the face of job stress during the COVID-19 pandemic.
METHODS: The study was carried out as a case-control study with participation of 400 nurses as the target group (nurses exposed to COVID-19 patients) and the control group (nurses not exposed to COVID-19 patients). To examine resilience and job stress, Conor and Davidson's questionnaire and OSIPOW questionnaire were used respectively.
RESULTS: The mean scores of job stress and resilience were significantly different between the target and control groups ($p < 0.05$). So that resilience in the target group was less than that in the control group. In addition, job stress in the target group was higher than that of the control group ($p < 0.05$). There was a significant and negative correlation between resilience and job stress and the correlation was stronger in the target group ($p < 0.05$).
CONCLUSIONS: Given the high job stress score in the participants and its negative correlation with resilience, there is need to provide the health personnel with efficient preventive and treatment approaches, improve and educate the principles of resilience, improve mental health services system, and introduce programs to control some of demographical factors in job stress such as physical activity, and employment status of nurses.

Keywords: COVID-19, job stress, resilience, nurses, psychophysical health

1. Introduction

Today, job stress is one of the main phenomena of social life and a serious threat to individual's health in the world. According to the International Labour Organization (ILO), job stress is the main health

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threat in individuals [1]. It is estimated that 75% of medical problems are directly caused by stress; thus, stress is responsible for notably heavy costs of health care services and poor performances [2]. Based on studies conducted in the past few decades, nursing profession is one of the stressful and challenging jobs given its specialized nature, complicacy, and the need for managing emergency situations [3, 4]. Job stress in nurses is a source of concern as to mental health, mental diseases, and disorder in employees' performance. It can have negative effects on nurses' attitudes and behavior [5–7]. Among the factors that might create stress at work environment for nurses are conflicts with patients, interpersonal relationship with physicians and other colleagues, low support for nurses, high job demand, leadership and management style, lack of a rewarding system, rotating work schedule, dealing with emotional needs of patients, overtime work, facing death, and ambiguity of medication results [8, 9]. In addition, the outbreak of COVID-19 has added to psychophysical problems of medical team members and nurses in particular who are in direct contact with COVID-19 patients [10–12]. COVID-19 is a new member of Coronaviridae, which was found in 2019 in Wuhan, China [13, 14]. COVID-19 is a serious global health threat [15] and the biggest atypical pneumonia outbreak since severe acute respiratory syndrome (SARS). A few weeks after the outbreak of COVID-19, the total number of death cases had already exceeded that of SARS [16, 17].

According to the available reports, the first definite case of COVID-19 was found in Iran on 19th February 2020. Ten days after the first COVID-19 caused death, the disease spread from 19 provinces to 31 provinces [18]. This made Iran as one of the main countries afflicted by COVID-19 in the world. Since the initiation of the pandemic, new cases of COVID-19 have been found and reported on daily basis in Iran. Given the high prevalence of the disease, the health system is under extreme physical and mental pressure to provide care to COVID-19 patients [19]. Studies have shown that during epidemics like Influenza, Ebola, and SARA, individuals experienced a wide range of psychosocial effects at personal, social, and international levels. At the personal level and given the high mortality rate caused by such diseases people tend to feel high anxiety, fear, and stress. The public belief that there is no efficient way to prevent or treat COVID-19 has increased the symptoms of mental problems [10, 20, 21]. Lack of adequate facial masks and other health equipment to prevent COVID-19 intensifies the negative effects on

the mental health in society [20, 22, 23].The negative outcomes of job stress in nurses and other health care experts include mental disorders, poor mental health, alcohol and drugs abuse, absenteeism, delay in appearing at work, job burnout, injuries at work, skeletomuscular disorders, lower performance, concentration and memory disorder, and negative effects on the immunity system [24, 25]. Therefore, based on scientific reasons one may say that stress might lead to hard situations and accidents in nursing profession [2]. Despite all these challenges, one of the factors that enable nurses to adapt to their situation and have a healthy and stable psychological performance is resilience in the face of psychophysical risk factors. Resilient nurses learn how to overcome their problems and develop better frameworks to face the stress of being exposed to demanding work conditions and environments [23, 26, 27]. Resilience tries to find methods to improve one's capability and create processes to have the required flexibility at all levels of changes and under organizational stress [28, 29]. Wood reported that resilience is the ability of a system to carry out adaptive measures in the face of information change, changes in situations, or new forms of events or survival challenges through using previous adaptations, models, or hypotheses [30]. There has been a growing interest to uncover the way resilience affects health care personnel. Studies have shown that resilience is important in terms of health outcomes such as psychophysical health and job performance [26, 31]. There have been several recommendations to create resilience during nursing programs [32]. In addition, studies have shown that the indices of resilience can affect job stress [26, 32, 33]. Given the introduction, to help health care personnel, and to improve the quality of services to hospital care-seekers, the present study is an attempt to examine resilience in nurses in the face of job stress during COVID-19. The authors wish that the results can help developing efficient strategies to control and prevent the risks of job stress during COVID-19. The results can be also used for job stress risk management to improve health level and performance in the personnel.

2. Materials and methods

The study was carried out as a case-control study on 400 nurses working in Ahvaz-based educational hospitals. The participants were selected randomly and filled out online questionnaires. Nurses

exposed to COVID-19 patients constituted the target group ($n = 200$) and nurses not exposed to COVID-19 patients were considered as the control group ($n = 200$). The Ethics Committees of the Ahvaz Jundishapur University of Medical Sciences approved the study (no. IR.AJUMS.REC.1400.281).

2.1. Data gathering tool

Data gathering tool was an e-form that was administered using email. The participants were informed about the objectives of study and those interested, filled out the tool. The questionnaire was anonymous and consisted of three parts including demographical information (e.g. age, work experience, gender, physical activity, education level, work contract, marital status, and number of children). The inclusion criteria were good general health condition, at least one year of work experience, no history of chronic and psychological physical disease, and not using a specific drug for a long period of time [34].

2.1.1. Resilience

To examine resilience of the participants, Conner-Davidson Resilience Scale (CD-RISC) was used. The questionnaire has been used in several studies. Mohamadian and Khodabakhsh Koulaie obtained Cronbach's alpha of the tool equal to 0.89 and 0.87 respectively [35, 36]. The items of the tool are designed based on Likert's five-point scale (never = 0, rarely = 1, sometimes = 2, most of the time = 3, and always = 4) and the score range is from 0 to 100. The higher the score, the higher the resilience in individuals.

2.1.2. Job stress

To examine job stress level, Osipow Job Stress Questionnaire was used. The tool measures stressors like role workload, role incompetence, role dyad, role limitation, responsibility, and physical environment. Reliability and validity of the tool were examined by Sharifian et al. [37] and Cronbach's alpha was obtained equal to 0.83. The items of the tool are scored based on Likert's five-point scale (never = 1, sometimes = 2, mostly = 3, usually = 4, and most of the time = 5). The score range of the tool is from 60 to 300 so that the higher the score the higher the job stress. In addition, the score range 60–119 is interpreted as low stress, 120–179 as low-moderate stress, 180–239 as moderate-severe stress, and 240–300 as severe stress [38].

2.2. Statistical analysis

To examine normal distribution of the variables, Kolmogorov-Smirnov (KS) test was used. Data analysis for not-normally distributed data was done using non-parametric tests using Pearson correlation, independent samples t-test, one-way ANOVA, Welch, Kruskal-Wallis test, and Mann-Whitney U test in SPSS (v.25) ($P < 0.05$).

3. Results

Table 1 lists the demographics of the control and target groups. The mean scores of job stress and resilience were 190.59 ± 22.56 and $61.13.13$ respectively. Table 2 lists the mean score of these two scores and the subscales for the two groups. As shown by the results, the mean scores of resilience and job stress are significantly different between the two groups ($p < 0.05$). The elements of resilience are significantly different between the two groups except for Spiritual influences ($P = 0.806$)). In addition, the mean scores of all elements of job stress are significantly different between the two groups ($p < 0.05$) (Table 2). Table 3 lists the mean scores of job stress and resilience based on demographical variables. The mean score of job stress in target group is significantly different in terms of gender and employment contract ($p < 0.05$) so that job stress is higher in women than men (195.14 ± 23.82 and 189.95 ± 12.69). In addition, the mean score of job stress in the individual not in contact with COVID-19 patients is significantly different only based on physical activity level ($p = 0.001$) (Table 3). The mean score of job stress is generally higher in individuals without physical activity compared to those who had physical activities (62.14 ± 13.99 and 58 ± 12.81 respectively). Physical activity affected the mean score of resilience ($p < 0.05$). In addition, there is a significant different between individual with different education levels in terms of resilience ($p < 0.05$) (Table 3).

The correlation between resilience and job stress and the elements of these two indices was examined. Table 4 lists the results for the groups in this study. As listed, there is a significant, strong, and inverse correlation between resilience and job stress in the target (–0.888) and control (–0.910) groups and the correlation is stronger in the control group. Resilience also has a significant and inverse relationship with all the elements of job stress ($p < 0.05$). In addition, job stress is significantly and inversely correlated with all the elements of resilience ($P < 0.05$).

Table 1
Frequency and percentage of the demographical variables of the participants

Variables		Frequency (percent)		
		Total	No exposure to COVID-19	Exposure to COVID-19
		400(100%)	200(50%)	200(50%)
Age	25>	26(6.5)	10(5)	10(10)
	25–30	129(32.25)	61(30.5)	72(36)
	30–35	141(35.25)	79(39.5)	52(26)
	>35	104(26)	50(25)	56(28)
Sex	Male	71(17.75)	38(19)	31(15.5)
	Female	329(82.25)	162(81)	169(84.5)
Marital status	Unmarried	174(43.5)	87(43.5)	87(43.5)
	Married	226(56.5)	133(56.5)	113(56.5)
Education	High school diploma	30(7.5)	15(7.5)	15(7.4)
	Bachelors' degree	264(66)	121(60.5)	155(77.5)
	Masters' degree	106(26.5)	64(32)	35(15.1)
Has children	Yes	137(34.25)	61(30.5)	85(42.5)
	No	263(65.75)	139(69.5)	115(57.5)
Employment status	Temporary	107(26.75)	36(18)	91(45.5)
	Contractual	186(46.5)	100(50)	78(39)
	Life time	107(26.75)	64(32)	31(15.5)
Work experience	<5	164(41)	164(41)	98(49)
	5–10	136(34)	136(34)	56(28)
	>10	100(25)	100(25)	46(23)
Physical activity	Yes	70(17.5)	70(17.5)	65(32.5)
	Not now*	131(32.75)	131(32.75)	72(36)
	No	199(49.75)	199(49.75)	63(31.5)

*I used to exercise, but not anymore.

Table 2
The mean scores of resilience, job stress, and the elements in the two groups

Variables	Mean ± SD	Exposure to COVID-19	No exposure to COVID-19	p-value*
Competence[1]	19.56 ± 5.13	18.97 ± 5.42	20.78 ± 4.23	0.001
Negative effect[2]	15.35 ± 4.17	14.94 ± 4.4	16.23 ± 3.48	0.004
Secure relationships[3]	13.29 ± 2.81	12.96 ± 2.79	13.99 ± 2.73	0.002
Control	7.17 ± 2.46	6.97 ± 2.58	7.59 ± 2.15	0.021
Spiritual influences	5.65 ± 1.61	5.64 ± 1.52	5.69 ± 1.81	0.806
Resilience scale	61 ± 13.13	59.62 ± 14.02	63.93 ± 10.48	0.002
Role workload	32.26 ± 5.39	32.89 ± 5.51	30.95 ± 4.88	0.001
Role incompetence	31.76 ± 5.48	32.5 ± 5.06	30.19 ± 6	<0.001
Role dyad	34.03 ± 4.65	34.44 ± 4.49	33.16 ± 4.86	0.017
Role limitation	30.8 ± 5.31	31.24 ± 5.4	29.89 ± 5	0.029
Responsibility	31.58 ± 5.89	32.26 ± 5.63	30.15 ± 6.19	0.002
Physical environment	30.16 ± 8.53	30.83 ± 8.29	28.73 ± 8.88	0.035
Occupational stress scale	190.59 ± 22.56	194.16 ± 22.21	183.07 ± 21.52	<0.001

*P value for Independent sample T test, 1-personal competence, high standards, and tenacity; 2- trust in one's instincts, tolerating negative effects and strengthening effects of stress; 3- positive acceptance of change, and secure relationship.

4. Discussion

The COVID-19 pandemic poses a serious threat to global health and has created a wide range of psychosocial effects at personal, regional, and international levels. At the personal level, given the high mortality rate of the disease, the virus has caused anxiety, panic, and stress in individuals [10, 20]. Like other countries, Iran has witnessed stress and several psychological outcomes in different social groups following the pandemic [39]. Taking into account the importance of resilience in psychosocial coping, resilience level in nurses in the face of job stress during the COVID-19 pandemic was examined. The results indicated that job stress in the study groups was not at a desirable level, which is consistent with

Table 3
The mean score of job stress and resilience based on demographical variables in the two groups

Variables		Exposure to COVID-19				No exposure to COVID-19				Total			
		Occupational stress		Resilience		Occupational stress		Resilience		Occupational stress		Resilience	
		Mean ± SD	p-Value	Mean ± SD	p-Value	Mean ± SD	p-Value	Mean ± SD	p-Value	Mean ± SD	p-Value	Mean ± SD	p-Value
Age	25 >	198.91 ± 28.84	0.530*	59.73 ± 10.89	0.223*	188 ± 18.27	0.620*	62.64 ± 9.1	0.586*	193.45 ± 24.21	0.828*	61.18 ± 9.91	0.270*
	25–30	193.54 ± 24.92		60.88 ± 16.09		186.28 ± 26.15		63.54 ± 13.21		190.92 ± 25.49		61.86 ± 15.08	
	30–35	195.96 ± 21.54		57.07 ± 12.28		176.36 ± 22.85		65.46 ± 9.45		191.31 ± 23.31		58.95 ± 12.19	
	> 35	191.16 ± 18.23		62.16 ± 14.19		183.37 ± 12.04		63.6 ± 7.75		188.47 ± 16.71		62.66 ± 12.32	
Sex	Male	189.95 ± 12.69	0.049**	59.49 ± 8.31	0.922**	178.88 ± 22.93	0.068‡	68.6 ± 8.59	0.062**	186.82 ± 16.81	0.079**	61.84 ± 9.23	0.490**
	Female	195.14 ± 23.82		59.65 ± 15.08		183.86 ± 21.29		63.16 ± 10.6		191.41 ± 23.58		60.82 ± 13.83	
Marital status	Unmarried	196.07 ± 24.71	0.269**	60.37 ± 14.76	0.516**	181.26 ± 22.69	0.443**	63.66 ± 11.47	0.811**	191.3 ± 24.99	0.607**	61.44 ± 13.82	0.634**
	Married	192.73 ± 20.36		59.12 ± 13.68		184.48 ± 20.66		64.15 ± 9.71		190.01 ± 20.77		60.74 ± 12.73	
Education	High school diploma	194.12 ± 19.31	0.077*	59.35 ± 16.23	0.034*	187.75 ± 24.86	0.313*	58.13 ± 12.55	0.179*	192.08 ± 20.93	0.809*	58.96 ± 14.9	0.555*
	Bachelors' degree	196.09 ± 21.39		58.22 ± 14.67		180.05 ± 15.76		65.83 ± 7.68		190 ± 20.91		61.07 ± 13.03	
	Masters' degree	190.53 ± 24.11		62.39 ± 11.79		196.63 ± 37.19		57.13 ± 16.99		191.63 ± 26.78		61.43 ± 12.95	
Has children	Yes	194.03 ± 19.46	0.954**	58.7 ± 13.57	0.511**	181.54 ± 17.62	0.527**	65.82 ± 8.79	0.104**	189.03 ± 19.65	0.335**	61.47 ± 12.8	0.643**
	No	194.22 ± 23.37		60.03 ± 14.24		184.21 ± 24.09		62.6 ± 11.41		191.4 ± 23.95		60.76 ± 13.52	
Employment status	Temporary	204.29 ± 27.55	0.027†	55.67 ± 15.14	0.157†	182.67 ± 23.92	0.541*	65.21 ± 10.13	0.472†	192.52 ± 27.69	0.626†	60.88 ± 13.45	0.990†
	Contractual	192.74 ± 18.19		59.92 ± 13.86		181.36 ± 15.34		63.86 ± 8.63		189.67 ± 18.14		60.98 ± 12.76	
	Life-time	190.64 ± 23.26		61.29 ± 13.42		188.47 ± 27.18		60.59 ± 14.76		190.22 ± 23.91		61.16 ± 13.6	
Work experience	1–5	195.27 ± 24.69	0.087†	59.83 ± 15.5	0.592†	185.3 ± 25.07	0.615*	64.59 ± 11.78	0.641*	191.42 ± 25.22	0.061†	61.65 ± 14.33	0.467†
	5–10	190.4 ± 19.97		60.5 ± 11.86		177.97 ± 20.28		63.77 ± 10.07		187.13 ± 20.7		61.36 ± 11.46	
	> 10	197.92 ± 21.04		58.08 ± 14.79		184.48 ± 12.68		62.8 ± 8.13		193.92 ± 19.85		59.49 ± 13.29	
Physical activity	Yes	184.25 ± 9.47	0.142*	64.46 ± 9.81	0.035*	173.09 ± 15.34	0.001†	69.2 ± 5.89	<0.001†	177.63 ± 14.28	<0.001†	67.27 ± 8	<0.001†
	Now not[a]	193.08 ± 19.14		61.52 ± 16.03		184.85 ± 18.47		63.32 ± 8.93		190.16 ± 19.23		62.14 ± 13.99	
	No	196.39 ± 24.64		57.67 ± 12.74		191.32 ± 26.21		59.18 ± 13.17		195.3 ± 24.99		58 ± 12.81	

a. I used to exercise, but not anymore; p-value for *Kruskal-Wallis test; ** Independent Samples Test; †One-way ANOVA; ‡Mann-Whitney U test.

Table 4
Correlation between the indices of job stress and resilience and the elements

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Competence[1]	1	0.611**	0.478**	0.722**	0.316**	0.901**	−0.315**	−0.284**	−0.213*	−0.393**	−0.516**	−0.454**	−0.626**
2 Negative effect[2]	0.813**	1	0.176	0.521**	0.184	0.751**	−0.290**	−0.293**	−0.293**	−0.444**	−0.475**	−0.500**	−0.672**
3 Secure relationships[3]	0.604**	0.617**	1	0.422**	0.293**	0.618**	−0.401**	−0.159	−0.287**	−0.313**	−0.363**	−0.307**	−0.504**
4 Control	0.700**	0.695**	0.672**	1	0.253**	0.787**	−0.297**	−0.136	−0.150	−0.346**	−0.524**	−0.399**	−0.535**
5 Spiritual influences	0.415**	0.260**	0.363**	0.339**	1	0.488**	−0.444**	−0.222*	−0.125	−0.424**	−0.188	−0.345**	−0.485**
6 Resilience scale	0.929**	0.903**	0.781**	0.836**	0.482**	1	−0.525**	−0.315**	−0.333**	−0.657**	−0.647**	−0.663**	−0.910**
7 Role workload	−0.593**	−0.582**	−0.580**	−0.597**	−0.329**	−0.662**	1	−0.043	0.209*	0.541**	0.247**	0.368**	0.610**
8 Role incompetence	−0.132*	−0.131*	−0.193**	−0.111	−0.077	−0.154*	−0.015	1	0.403**	0.055	0.030	−0.179	0.308**
9 Role dyad	−0.401**	−0.374**	−0.357**	−0.383**	−0.174**	−0.421**	0.258**	0.438**	1	0.129	0.120	−0.012	0.445**
10 Role limitation	−0.657**	−0.605**	−0.635**	−0.660**	−0.352**	−0.720**	0.627**	0.010	0.260**	1	0.374**	0.542**	0.730**
11 Responsibility	−0.641**	−0.564**	−0.508**	−0.592**	−0.308**	−0.657**	0.455**	0.081	0.153*	0.529**	1	0.579**	0.705**
12 Physical environment	−0.627**	−0.575**	−0.500**	−0.598**	−0.368**	−0.662**	0.450**	−0.214*	0.044	0.605**	0.552**	1	0.735**
13 Occupational stress scale	−0.814**	−0.768**	−0.730**	−0.784**	−0.435**	−0.888**	0.733**	0.256**	0.485**	0.814**	0.751**	0.732**	1

Top diameter: not exposed to COVID-19, bottom diameter: exposed to COVID-19; ** . Correlation is significant at 0.01 level (2-tailed); * . Correlation is significant at 0.05 level (2-tailed). 1-personal competence, high standards, and tenacity;2- trust in one's instincts, tolerance of negative affect and strengthening effects of stress;3- positive acceptance of change, and secure relationships.

similar studies [40, 41]. Several studies have reported that nursing profession is featured with several challenges such as conflict with patients, interpersonal relationships with physicians and colleagues, poor support for nurses at work, highly demanding job, increase in complicacy of services, decrease in control, ambiguity of the role, understaffed work place, advanced technology, and competition at work. All these add to job stress in nurses [8, 9, 25].

To examine the effects of COVID-19 on job stress, the mean score of job stress in the target and control groups was examined. The results showed that in addition to poor situation in terms of job stress in the both groups, the mean score of job stress was significantly different between the two groups; so that it was higher in the target group compared to the control group. Therefore, exposure to COVID-19 risk can increase job stress level and create a poor mental-spiritual condition in nurses. This finding is consistent with Husky et al. and Yuanyuan et al. as they showed that job stress in the health team during COVID-19 pandemic was at an undesirable level [42, 43]. Consistently, Danesh et al. argued that by providing care to COVID-19 patients, nurses experience a frustrating situation that causes notable mental and physical distresses [7].

In addition, the results of studies on contagious diseases epidemics are consistent with the present work. Koh et al. and Wu et al. studied SARS epidemic in nurses and showed that job stress in nurses was not at an acceptable level because of working with SARS patients [44, 45]. One of the reasons for the high job stress level in the target group was failure to employ efficient prevention methods for COVID-19, lack of facial masks and medical equipment, lack of personal protection equipment, lack of N-95 facial masks, and the risk of infection [10, 20, 46]. In addition, the quarantine time period, fear of infection, hopelessness, lack of energy, lack of resources, financial loses, and mortality were other factors in the stress experienced by individuals exposed to COVID-19 risk [47–49]. As the results showed, other factors in job stress during the COVID-19 pandemic were staying at home, separation from family, using personal protection equipment for long hours, hearing about others' death due to COVID-19, and posttraumatic stress [50]. Studies have shown that 10 – 33% of nurses demonstrated posttraumatic stress symptoms [51, 52]. These symptoms appear after abnormal events in life such as experiencing a severe physical attack, torture, accident, and natural disasters [52].

Data analysis indicated an increase in job stress due to the risk of COVID-19 in the control and target groups. The results showed that the mean scores of all elements of job stress were significantly different between the target and control groups ($p < 0.05$) so that the mean score of these elements was higher in the target group. In addition, the maximum and minimum mean scores were obtained by duality of role and physical environment respectively in the both groups. One reason for the higher mean score of role duality can be the lack of clear procedures to fight COVID-19 and ambiguities in nurses' role.

The workload caused by the Covid-19 epidemic can be one of the reasons for the sensible changes in the mean job stress scores between target and control groups.Also, the results of a study conducted by Sawatzky et al. show that high workload is one of the most important sources of stress among nurses [53].

A survey of the results of job stress and demographical information showed that there was a significant relationship in the target group with gender and employment status; so that job stress was higher in women and individuals with temporary work contract. This finding is consistent with Dai et al.'s results about the relationship between job stress and gender during the COVID-19 pandemic in China [54]. Moreover, a study on physicians and nurses of a hospital in Wuhan-China during COVID-19 showed that women in direct contact with COVID-19 patients had a stronger symptoms of stress [55]. This findings can be explained based on vulnerability as it implies that women lack the adaptive resources and approaches to control stressors in their lives [56]. The results about employment status are consistent with Ebadi et al.'s results about depression, stress, and anxiety during the COVID-19 pandemic [57]. The reason for this can be the issue of job security as lack of it is a stressor for nurses [58]. Therefore, it is essential to support nursing community as to job security during the stressful time of COVID-19 pandemic.

The results as to job stress and demographical variables in the control group in general showed that the mean score of job stress in nurses who did not do physical activity was higher than those who had physical activity. This finding is consistent with Mattioli et al. [59], who reported that health improvement behaviors such as physical activity decrease stress and anxiety in individuals.

The results showed that only education level and physical activity, among demographical information were significantly related to the mean score of resilience so that physical activity was significantly related to the mean score of resilience in the both groups. That is, resilience was higher in the participants who had regular physical activity. In addition, the mean score of resilience was significantly different in the participants in terms of education level as those with an M.Sc. degree had a higher resilience than others. These findings are consistent with Afshari et al. Our findings indicated a significant relationship between resilience in the nurses at the risk of COVID-19 infection and education level [23].

This finding is not consistent with Gillespie et al.'s results about the relationship between resilience and education level [60]. One of the explanations for the inconsistent results can be cultural and political differences between the two studies. As shown by the results, resilience in women of the target group was notably less than that of men. This can be due to the less coping capability of women during disasters compared to men. In addition, this finding is explainable given that the mean age of women was higher than men in this study. Studies during the COVID-19 pandemic have shown that psychosocial factors like anxiety, depression, and job stress degrade resilience in individuals [61]. Researchers have maintained that resilience can be an efficient strategy to adapt and create a healthy and stable psychological performance [26]. The findings also showed a strong, significant, and inverse correlation between resilience and job stress. This correlation was stronger in the control group compared to the target group, which can be due to the fact that the factors in job stress can also attenuate resilience in individuals. Therefore, through increasing resilience in nurses at work place, it is possible to lower job stress in them. So that Majumdar et al. recommended proper flexibility policies such as solutions to decrease the risk of COVID-19 infection, which would lead to a higher wellbeing in nurses [62]. In addition, studies have shown that the prevalence of COVID-19 has negatively affected resilience in individuals. Because of this, the mean score of resilience has been declining during the COVID-19 pandemic [23].

Yilmaz et al. studied the effects of resilience as a strategy to face work environment challenges in nurses and showed that by resilience, nurses can adapt better to their work environment and enjoy a healthy and stable psychological performance [26]. Our findings are consistent with Fourur et al. and Lim et al., who showed that an increase in resilience is related to a decrease in job stress [63, 64]. In addition, other studies have shown that to decrease the stress

caused by COVID-19, useful psychological variable like resilience can improve adaptability in individuals [65]. Resilience is one of the effective variable in lowering the stress and anxiety of COVID-19 [66]. In fact, resilience includes elements like hope and desire to fight and overcome problems; therefore, it can act as an immunity system in the face of crisis like COVID-19 that create considerable stress in the majority of individuals [67]. Based on resilience approach, not all individuals demonstrate negative responses in the face of severe and bitter events and chronic stress [67, 68]. Resilient individuals perceive negative events in a more flexible and realistic way and see them as temporary and limited events [68].

5. Limitations

One of the disrupting factors in the study was the effect of stressful conditions outside the work environment, which could have affected job stress level in the participants. Still, this condition was the same for the both study groups, which convinced the authors to omit it. In addition, given the effect of work condition and atmosphere on job stress and resilience, there is a need for further studies in this field before making decisions based on the findings of the present study.

6. Conclusion

There was an increase in job stress score and also its elements following the expansion of COVID-19. In addition, there was a significant, strong, and negative correlation between job stress and resilience. The relationship between job stress and resilience and some of demographical variables was also significant. In light of these, the followings are recommended. Providing efficient prevention and treatment methods, improving mental services system, and planning to control demographical factors in job stress like gender, employment status, and physical activity by modifying work schedule, promoting physical activity, and introducing better employment contracts.

Acknowledgments

Conflict of interest

None of the authors have any conflicts of interest to declare.

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