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Original Article

The Nurses' Perspective on the Relationship between Job Stress and Nursing Errors in the COVID-19 Pandemic: A Case Study in Teaching Hospitals Affiliated with Shahid Sadoughi University of Medical Sciences in Yazd

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Abstract

Introduction: Job stress can lead to nursing errors. Therefore, due to the spread of the corona virus disease and excessive fatigue of the medical staff, this study was conducted to investigate the relationship between job stress and nursing errors during the Covid-19 pandemic in 2022.
Methods: This is a descriptive correlational study conducted during the covid-19 pandemic on 130 nurses of the teaching hospitals of Yazd University of Medical Sciences. The data were collected using standard questionnaires of occupational stress (HSE questionnaire) and nursing errors. Data was analyzed using descriptive and analytical statistics using SPSS version 22.
Results: The overall mean score of job stress was 119.3, which indicates a high (severe) job stress level in the studied nurses. Also, the overall mean score of nursing errors was 35.15, which indicates high levels of nursing errors. Finally, there was a statistically significant relationship between job stress and nursing errors (P=0.031). As the level of occupational stress increased, the incidence of nursing errors enhanced.
Conclusion: A wide range of factors play a role in the occurrence of nursing errors, and occupational stress is one of them. Identifying other factors and removing them from the work environment increase the quality of care and patient safety. It is necessary to identify the amount and stress factors in future and try to eliminate them by providing management solutions.
Keywords: Job stress, Nursing error, Corona pandemic, Teaching hospitals

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Introduction

Patient safety is one of the main quality factors of health services. Sometimes, healthcare receivers are harmed while receiving services (1). Meanwhile, medical errors are considered a key component of health care quality (2).

Medical errors occur when medical care providers such as nurses make a wrong decision, or use a wrong method (3). The law defines nursing error as an activity which does not comply with diagnostic, treatment, and care standards. In legal literature, error is also classified as negligence or violation of laws (4).

Zangrillo et al. consider nursing errors as actions that put the patient's life at risk or cause harm to the patient (5). According to the rules in the ethical codes, nurses play an important role in maintaining patient safety and creating, maintaining, and improving the quality of care (6). It is worth mentioning that the occurrence of human error is inevitable, and the field of health and nurses is not an exemption. Given that the error in the field of providing nursing services

is a harmful phenomenon, it is vital to identify the types of nursing errors in order to reduce them and improve the safety of patients. Identifying types of nursing errors is based on the lived experience of nurses (7).

The estimated annual average cost of medical errors, which are an integral part of health care delivery systems, is $42 billion (8). These mistakes occur in different medical professions such as doctors, nurses and pharmacists, but the occurrence of mistakes in nurses is more than other health and medical professions (9). Although errors are inevitable, more than half of the medication errors are preventable, suggesting the vital role of nurses in this regard (10).

Due to the relationship with patients, nurses are under the influence of many tensions such as unhealthy work environment, continuous work fatigue, difficult relationships in the work environment, job hazards, heavy workload, job satisfaction, and stressful working conditions, which reduce their professional performance, and factors such as burnout and absenteeism have affected their quality of life (11, 12).

Stress is an unspecified reaction of the body and a type of anxiety, mental pressure, worry and fear (13). Among different job groups, health sector employees and those working in the hospital and treatment contexts experience higher job stress (14, 15). Among this group of jobs, nursing is known as one of the jobs with high risk for fatigue and illness (16).

If stress is not properly managed, it can lead to serious problems. Being exposed to chronic stress can cause both physical diseases such as heart discomfort and mental diseases such as anxiety disorders. Low motivation and lack of job satisfaction cause delays in attending work, absenteeism, and burnout (17).

The occurrence of errors in medical environments results in side effects such as an increase in death rate among patients, increase in length of stay, increase in costs and dissatisfaction, and a decrease in trust in the system (18). On the other hand, nurses are one of the most important human resources of hospitals, who should spend long hours in the front line of providing health services, communicate with other hospital employees, and provide services to patients in long work shifts. Such a feature increases job stress for nurses, affects the quality of their services and can cause stress and moral conflicts in nurses; and cases such as severe injury to patients and even death can be irreparable results of nursing errors (19).

Among these stressful factors, we can mention the pandemic of the corona virus, which in addition to the death of hundreds of thousands of people, led to the quarantine of many cities and countries in the world. The high rate of contagion and its rampant spread in different parts of the world caused many concerns in different countries (20).

Due to the direct contact with patients infected with corona, nurses endure higher job stress compared to other jobs; therefore, the possibility of cognitive failure is higher in them, which may lead to clinical errors (21).

Unfortunately, Yazd was one of the provinces that had the highest number of people infected with Corona and the least compliance with health protocols. This has caused an increase in the number of outpatients and inpatients in the hospitals of the province, especially those located in the city of Yazd. It seems that hospital nurses are more likely to be involved in medical errors due to work pressure and stress.

It is necessary for managers and policy makers to understand the necessity and importance of this issue to take necessary measures in this field. Since limited research has been done in the field of occupational stress and nursing errors during the corona pandemic, especially in Yazd city, the present study was carried out with the aim of investigating the relationship between job stress and nursing errors in the Covid-19pandemic among the nurses who worked in teaching hospitals of Yazd University of Medical Sciences in 2022.

Methods

This is a descriptive correlational study conducted during the Covid-19 pandemic among nurses working in the teaching hospitals of Yazd University of Medical Sciences (Afshar, Shahid Sadouqi, Shahid Rahnamon) in 2022.

According to the cluster sampling method, the selected number of nurses from each hospital was proportional to the volume of each hospital, in such a way that by obtaining the total number of nurses in hospitals, the ratio of nurses in each hospital to the total volume of the sample is determined. Multiplying this ratio by the selected volume of 160 samples indicates the sample amount of each hospital. (Shahid Sadouqi Hospital: 72 people, Shahid Rahnamoun Hospital: 50 people, Afshar Hospital: 38 people). It should be noted that, with the completion and return of 130 questionnaires, the total response rate of the study was estimated to be 81.2%.

The statistical population of this study was made up of nurses from the hospitals in question who had at least one year of work experience during

the Covid-19 pandemic. The data of this study was completed in the form of a questionnaire by the nurses of Yazd teaching hospitals. In this study, after conducting studies and checking the value of correlation coefficient, according to the following formula and considering α=0.05, β=0.84 and r=0.05, we estimated a sample size of 160 people. According to the cluster sampling method, the selected number of nurses from each hospital was proportional to the volume of each hospital. In such a way that by obtaining the total number of nurses in hospitals, the ratio of nurses in each hospital to the total volume of the sample was determined. Multiplying this ratio by the selected number of 160 samples indicates the number of samples for each hospital. It should be noted that, with the completion and return of 130 questionnaires, the response rate was 81.2%.

The tools used for this study included two standard questionnaires. The first questionnaire was the HSE Job Stress Questionnaire (England Health and Safety Institute Job Stress Questionnaire, 2004), which is used to determine the job stress score of nurses (22). This questionnaire has seven general dimensions (role, communication, support of officials, support of colleagues, control, demand, and changes) with 35 items. For grading, first, each answer is scored from 1 to 5 (never, rarely, sometimes, often, and always). It should be noted that in this questionnaire, questions 3, 5, 6, 9, 12, 21, 22, 34 are graded in reverse, so that the never option receives a score of 5 and always a score of 1. After obtaining the score of each answer, the subscales were obtained in the following order. A high score in this questionnaire indicates low and suitable job stress and pressure, and a low score indicates a high level of stress (36 ???). Finally, scores of 35 to 69 indicate low stress, 70 to 104 moderate stress, and 105 to 175 severe stress.

Another tool used to investigate nursing errors was the nursing error questionnaire, which is one of the clinical governance questionnaires of the Ministry of Health and was used by Baghaei, et al. in 2013. The validity of the tool has been confirmed, and its reliability has been calculated using Cronbach's alpha test (82 percent (0.82) (23). This questionnaire has five general dimensions (medication, prescription reading, care, vital signs and report writing) with 19 items. In order to obtain information from this questionnaire, we requested the nurses and supplementers to answer the questions and say whether your actions have led to category errors in the past 6 months. In the section related to nursing error questions, the questions are graded on a Likert scale (1: very high - 5: very low), where an increase in score means fewer errors. Finally, the way of scoring errors was shown as low error (scores from 103 to 150), medium error (scores from 68 to 102), and high error (scores from 20 to 67). Finally, after entering the data into the SPSS software (version 22), the data were analyzed using appropriate descriptive indicators such as mean score, standard deviation

Table 1: Frequency distribution of demographic and job variables of the studied nurses

Variable		Frequency	Percent
Age	20-29	56	43.1
	30-39	50	38.5
	40-49	20	15.4
	50 and above	4	3.1
Gender	Female	96	73.8
	Male	34	26.2
Marital Status	Single	41	31.5
	Married	89	68.5
Education	B.S. Degree	128	98.5
	M.S. Degree	2	1.5
Work Shift	Rotating shift	130	100
	Fixed shift	0	0
Work Department	Intensive Care Unit	43	33.1
	Heart Disease	21	16.2
	Surgery	20	15.4
	Internal	13	10.0
	Gynecology	17	13.1
	Orthopedics	5	3.8
	Children	11	8.5
Death of family members or relatives during covid-19 Pandemic	Yes	23	17.7
	No	107	82.3

and correlation test.

Results

In this research, as to the personal and job characteristics of the studied nurses, the results (Table 1) showed that:

- The age range of the studied nurses was between 23 and 60 years (with a mean age of 32.7 years) with a mean work experience of 8 years.

- 96 out of the total number of nurses studied (equivalent to 73.8 percent) were women and the rest (34 people equivalent to 26.2 percent) were male.

- 89 (equivalent to 68.5%) nurses were married and most of them (98.5%) had a bachelor's degree.

- Almost all nurses had too many work shifts. 23 nurses (equivalent to 17/7) had lost one of their relatives due to Corona.

- The highest and lowest number of nurses studied were from in the special care departments (43 equal to 33.1%) and orthopedics (5 equal to 3.8%), respectively.

The results of Table 2 show that among the dimensions of job stress, the highest mean score belonged to the demand dimension (with the mean score of 22/20) and the lowest to the dimension of changes (with the mean score of 10/26). The overall mean score of work stress was reported 119/3, indicating a high (severe) job stress level in the studied nurses.

The results of Table 3 show that there was a statistically significant relationship between work and job stress. Also, in a two-by-two comparison using the Benferoni method, it has been determined that there is a significant difference between the gynecology department with surgery and Intensive Care Unit, so that the mean score of stress in the gynecology department was significantly higher than those of the surgery and intensive care unit.

The results of Table 4 show that among the dimensions of nursing errors, the highest mean score belonged to the dimension of care (with a mean of 11.96) and the lowest was related to prescription reading dimension (with a mean of 4.54). Average overall score of nursing errors was also reported as 35.15, which indicates a high level of nursing errors.

The results of Table 5 show that there was a statistically significant relationship between gender and nursing errors, so that the average nursing errors were more common among male nurses than female ones.

The results of Table 6 show that there was a

Table 2: Distribution of the mean job stress score by each dimension in the studied nurses

	Variable	Mean	Standard deviation
1	Role	98.19	3.65
2	Relationship	13.50	2.86
3	Official Support	17.35	3.26
4	Colleague Support	15.31	2.59
5	Control	20.51	5.48
6	Demand	22.20	4.24
7	Changes	10.26	2.58
8	Total Score	119.13	14.54

Table 3: The relationship between the mean job stress score and demographic and job variables in the studied nurses

Variable		Mean	Standard deviation	Test statistics	Significant values
Age	20-29	119.39	13.94	0.466	0.706
	30-39	118.28	14.52		
	40-49	121.78	16.85		
	50 and above	113.50	15.84		
Gender	Female	120.10	14.52	1.27	0.206
	Male	116.41	14.60		
Education	B.S. Degree	119.38	14.55	1.58	0.115
	M.S. Degree	103.00	00.00		
Work Department	Intensive Care Unit	114.34	11.37	3.68	0.002
	Heart Disease	122.95	16.33		
	Surgery	113.10	12.18		
	Internal	127.07	20.15		
	Gynecology	128.05	15.63		
	Orthopedics	119.00	11.89		
	Children	117.81	4.89		

Table 4: Average distribution of nursing errors according to each dimension in the studied nurses

	Variable	Mean	Standard deviation
1	Drug therapy	7.55	5.51
2	Prescription reading	4.54	1.98
3	Cares	11.96	4.60
4	Vital Signs	7.50	3.42
5	Reporting	3.58	1.52
6	Total Score	35.15	11.36

Table 5: The relationship between the mean score of nursing errors with demographic and job variables in the studied nurses

Variable		Mean	Standard deviation	Test statistics	Significant values
Age	20 - 29	34.42	9.65	1.15	0.332
	30 -39	34.78	99.12		
	40 -49	36.15	12.99		
	50 and above	45.00	16.24		
Gender	Female	33.76	10.22	2.39	0.018
	Male	39.08	13.50		
Education	B.S. Degree	35.21	11.42	0.520	0.604
	M.S. Degree	31.00	7.70		
Work Department	Intensive Care Unit	32.58	9.03	3.68	0.002
	Heart Disease	37.66	9.21		
	Surgery	36.30	16.08		
	Internal	34.61	12.51		
	Gynecology	39.17	13.32		
	Orthopedics	26.40	3.91		
	Children	36.72	8.34		

Table 6: The correlation coefficient between the mean job stress score and nursing errors in the studied nurses

Nursing errors		Variable
Significant values	Correlation coefficient	
0.031	0.79	Job stress

statistically significant relationship between job stress and nursing errors. As the level of job stress increased, the incidence of nursing errors enhanced.

Discussion

The general results of the study showed that there was a statistically significant relationship between job stress and nursing errors. As the level of job stress increases, the incidence of nursing errors rises. The results of similar studies also indicate the existence of a significant relationship between job stress and nursing errors among employees; however, most of these studies were reported based on medication errors (24-28).

This issue was more apparent in the pandemic of infectious diseases before Covid-19 in the Middle East among nurses in the sense that nurses who were in contact with patients were more worried about family members getting infected. Now, the Covid-19 pandemic has also brought these trends and it has been discussed in many studies; in Iran, like other countries, the spread of this virus has had many psychological consequences on different sectors of the society, including nurses. According to the analysis of the results of job stress dimensions in the studied nurses, the "demand" dimension had the highest average score (22.20) and the "changes" dimension had the lowest average score (10.26).

In the study of Koshki Abedi et al., which investigated the job stress of nurses in 2021 using a similar instrument (HSE), the highest score among the dimensions was assigned to the scale of "demand or need" and the lowest to "changes", which is in the same line with the findings of the present study (29). The "demand" dimension included issues such as workload, work patterns and environment change, and the "changes" dimension showed how to manage organizational changes and the relationship of these changes with working conditions. In the present study, the overall mean score of job stress was reported as 119.13, which indicates a high (severe) job stress level in the studied nurses.

In the study conducted by Negahdari A et al., which was conducted in 2016 and with the same instrument, the job stress of nurses was mentioned at a high level with a mean score of 105.93(30), which is consistent with the result of the present study. However, in the study of Aghili Nejaad et al. (31), the job stress level of the studied nurses was reported as average with a mean score of 75.30, which is contrary to the results of the present study.

In the study of Aghili Nejaad et al., who compared the level of job stress of female nurses in different departments of one of the universities in Tehran, the results showed that the nurses who participated in the study had a moderate level of stress; of course, a significant difference was observed in the comparison of the stress level of the nurses of different departments, and this stress was significantly higher in the nurses of the emergency department than the rest of the departments (31). In the present study, this result was confirmed to some extent, and there was a relationship between stress and different departments.

According to the analysis of the results of the dimensions of nursing errors in the studied nurses, the "care" dimension had the highest mean score (11.96), and the "report writing" dimension had the lowest mean score (3.58). Of course, there are different divisions for the dimensions of nursing jobs. Ansari et al., in a qualitative study conducted in 2019, extracted the types of nursing errors in 5 main clusters: operational errors, precautionary errors, diagnostic errors, communication errors, and recording and reporting errors (32).

In the present study, the overall mean score of nursing errors was reported as 35.15, which indicates a high level of nursing errors. In the study of Dastiyar et al. (25), nursing errors were reported at a high level (55/70). Also, in Raisi et al.'s study, which investigated the job stress and cognitive impairment of nurses in the occurrence of clinical errors, according to the results of this study, stressful factors related to interpersonal relationships were identified as the factors related to the occurrence of clinical errors, and the results showed that the occurrence of clinical errors was affected by clinical work history, cognitive impairment, and job stress (24).

In the present study, there was a statistically significant relationship between gender and nursing errors. Therefore, the average number of nursing errors in male nurses was higher than that of female nurses. In Dastiyar et al.'s study, the results showed that nurses in the Covid-19 ward with low general health had higher medication errors (25).

In the current study, the relationship between anxiety caused by Covid-19 and only medication error of nurses was investigated. The results related to the investigation of variables affecting the score of medication errors of nurses showed that only work variables in the Covid-19 department and the reduction of public health level were associated with medication errors. Nurses who were in contact with patients with Covid-19 had a higher medication error score. Also, those who had less general health reported higher medication errors.

Conclusion

As the results of the present study on the relationship between job stress and nursing errors (dimensions and influencing variables) showed, and since similar cases have been proven in many studies, it should be important to pay attention to these variables from a managerial point of view. Long working hours, lack of support, heavy workload, violence from patients, insufficient staff, insufficient resources, lack of respect, lack of involvement in decisions and lack of sufficient equipment, and high expectations from nurses cause psychological diseases such as stress and anxiety.

Many factors play a role in the occurrence of nursing errors, and job stress is one of them. Identifying other factors and removing them from the work environment increase the quality of care and patient safety. In this study, the relationship between some demographic and job variables with job stress and nursing errors was not significant, and this does not mean that these variables should be disregarded. It is necessary to identify the amount and stress factors in future and try to eliminate them by providing management solutions.

Authors' Contribution

RA and MP participated in the design of the study and data collection, and ZA and ZA participated in compiling the final report.

Ethics Approval and Consent to Participate

In this research, we obtained the necessary permits and code of ethics (IR.SSU.REC.1401.044) from the

Ethics Committee of Shahid Sadougi University of Medical Sciences, Yazd, and considered the principles of confidentiality and mentioned this issue to the participants in the study, has been collected. Also, the information obtained from the current study is reported as completely real and without any interference.

Conflict of Interest: None declared.

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