

Occupational Stressors in Nurses and Nursing Adverse Events

Abstract

Background: Nursing adverse events (AEs) are well-defined problems in the healthcare system and may have irreparable consequences. Due to the complexity of care, many factors contribute to AEs and affect patient safety, one of which is occupational stress. The present study aimed to determine the relationship between nursing AEs and occupational stress in nurses in centers affiliated to Isfahan University of Medical Sciences, Isfahan, Iran, in 2015. **Materials and Methods:** In this descriptive correlational study, the participants were selected through random and quota sampling methods. The data collection tool was a three-part questionnaires consisting of a demographic characteristics form, the Nurses' Job Stress Questionnaire, and Nursing Adverse Events Questionnaire. Descriptive and analytical statistics were used to analyze the data in Statistical Package for the Social Sciences software. **Results:** Among the four factors affecting occupational stress in nurses, administrative factors had the highest impact; subsequently followed, by environmental factors and interpersonal factors. The mean score of AEs was reported as 30 cases per year. There was a significant correlation between the overall mean score of occupational stress and AEs ($r = 0.12$, $p = 0.04$). **Conclusions:** According to the results of this study, moderate to high levels of job stress were observed among nurses. The results also showed that occupational stress can lead to nursing AEs. Given that nurses believe the highest mean of occupational stressors is related to administrative factors, an appropriate and comprehensive leadership is necessary to improve the current conditions.

Keywords: Iran, nurses, nursing adverse events, occupational stress, occupational stressors

Introduction

An important issue in the field of health is the quality of services and care provided for patients. Patients are the main axis in hospitals, and hospital services are undertaken because of their presence. Quality comprises elements of which the patient's safety is the most important. Although the provided healthcare services are usually safe and effective, healthcare professionals, including nurses, can harm patients, endanger patients' safety, and reduce the quality of healthcare.^[1] A common issue in health systems in this regard is the occurrence of adverse events (AEs) due to medical error, which result in annual mortality rates and physical complications for the patients and their families and even society. Numerous studies conducted in the USA and other countries have suggested that medical errors and AEs are the greatest problems of the healthcare system and are of global health concern.^[2] The results of studies in this regard in Iran indicate the occurrence of this issue in the Iranian healthcare

system. A previous study has reported a 16.7% incidence of medication error in the educational hospital in Sanandaj, Iran.^[3] Other studies have reported the incidence of 19.5 cases of medication error for each nurse during a 3-month period^[4] and 31.6 cases of medication error during 1 month in internal-surgical wards^[5] in hospitals in Tehran, Iran.

Provision of services without harming patients is the main concern of healthcare providers. Healthcare providers are inherently motivated to improve patient safety due to professional ethics, occupational norms, and their expectations of their own performance. However, due to the complexity of care services, many factors result in medical errors and impact patient safety.^[6] On the contrary, occupational stress has presently become a common and costly issue to the extent that it has been labeled as the disease of the century by the United Nations and as an epidemic by the World Health Organization (WHO). The nursing profession, due to its nature, has been recognized as a stressful

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occupation.^[7] Many studies have been conducted on stressors in nurses. Elen and Theodor conducted a review study on the sources of occupational stress and its outcome on nurses' efficiency and quality of work.^[8] They reported that the stressful nature of the nursing profession is due to its heavy workload, long working hours, night shifts, risk of exposure to infectious diseases, risk of needlestick injury, patients' pain and suffering, and patient deaths. They also noted the impact of factors such as working conditions (physical conditions), interpersonal interaction (communication with colleagues, lack of support from superiors and colleagues, and lack of satisfaction with the head nurse), and organizational factors (novel technology, manpower shortage, high workload, and unclear responsibilities).^[8]

Occupational stress affects individuals in terms of different aspects including psychological, physiological, and behavioral aspects. Under stressful conditions, the brain is occupied by stress, and thus, attention and concentration are reduced in the performance of tasks. Chronic stress damages the brain structure, such as the hypothalamus, which causes issues in cognitive functions.^[9] These cases may increase the repetition of errors in tasks and result in an AE. In literature review, no studies were found on the relationship between occupational stressors and AE in the nursing profession. Thus, the determination of factors which cause stress in each area and the relationship of each of the four dimensions of occupational stress (environmental, interpersonal, and administrative factors, and factors related to patient care) with AE in the nursing profession can be an important step toward creating a systemic approach to the evaluation of the underlying factors and their eliminations and the reduction of errors to the extent possible.

Materials and Methods

The present descriptive correlational study was conducted to determine the relationship between AE in the nursing profession and occupational stressors among nurses in selected centers affiliated with Isfahan University of Medical Sciences, Iran, in 2015. Sampling was performed through quota and random sampling methods in two stages. The study population consisted of nurses who worked in the selected educational hospitals and had the inclusion criteria. The inclusion criteria consisted of an informed consent to participate in the study, an associate degree in nursing or higher degrees, and lack of use of psychiatric medication in the previous year. The exclusion criterion was lack of completion of the questionnaire. Based on statistical calculations, the sample volume was considered as 209 individuals with the consideration of 1.96 confidence interval (CI), 80% power factor (0.84), minimum r of 0.2, and possibility of sample loss. The study environment was educational hospitals affiliated with Isfahan University of Medical Sciences (Al-Zahra, Amin, Noor, Ali Asghar, Ayatollah Kashani, Feiz, Seyed-al-Shohada, and Shahid

Beheshti Hospital). The data collection tool was a three-part questionnaire consisting of a demographic characteristics form, the Occupational Stressors Questionnaire, and the Nursing Adverse Events Scale. The Occupational Stressors Questionnaire was developed using the questionnaire, which was designed by Torshizi and Ahmadi, and the validity and reliability of which were approved in the study of "Job stress from clinical nurses' perspective."^[10] The validity of the questionnaire was again approved by a group of professors and nurses. The reliability of the questionnaire was approved using split-half method; the questionnaire was completed by 20 individuals who had the inclusion criteria and the Pearson correlation coefficient showed a favorable correlation between odd and even questions ($r = 0.98$). This questionnaire consists of the four subscales of physical environment with 12 items (such as excessive noise), administrative factors with 21 items (such as manpower shortage, and low salary), interpersonal interaction with 7 items (lack of support by supervisors, and issues in communication with authorities of the ward), and patient care with 29 items (such as observing patients' pain and suffering, and providing end-of-life care). The questions are scored based on a five-point Likert scale ranging from 0 to 4 (none = 0, low = 1, moderate = 2, high = 3, and very high = 4). The total mean score of each subscale was calculated and presented as percentage, and was considered as the occupational stress score of the subjects. A score of 0–25, 25–50, 50–75, and 75–100 was considered as representing low, moderate, moderate to high, and high stress level, respectively. In order to determine the AE score, the AE format, which was the result of the study by the clinical governance committee of Mashhad University and Medical Sciences, Mashhad, Iran, was used.^[11] The section related to the nursing personnel was selected and converted into a questionnaire. The validity of this questionnaire was evaluated by a group of professors and experienced nurses, and the necessary changes were implemented. Cronbach's alpha was used to determine the reliability of this questionnaire. This tool was used for 30 subjects who had the inclusion criteria; they were later excluded from the study. A Cronbach's alpha of 85% was obtained and approved. The questionnaire is scored based on a three-point Likert scale ranging from 0 to 2 (never = 0, once = 1, and more than once = 2). The total mean score was considered as the mean error score of each individual during 1 year. The Nursing Adverse Events Scale consists of the subscales of standard procedures (such as failure to perform medical procedures based on standards, monitor patients based on their status, and implement cardiopulmonary resuscitation according to protocol), adverse drug event (such as error in administration of drugs to patients, preparation and storage of drugs, drug dosage, and frequency of drug use), AE related to hemovigilance (such as AE in blood sampling, blood banking, and blood transfusion), AE related to infection control principles (such as lack of separation of

infectious waste, and failure to observed aseptic technique), AE in transferring samples to the laboratory (such as collection of samples from the wrong location and the wrong individual, and lack of name label), AE in documentation (such as loss of patient's health records, and lack of attention to the physician's instructions), AE in admission and discharge (such as delay in admission, lack of admission of patients, prolonged admission process, undue discharge, delay in or failure to discharge, discharge against medical advice, transference of the wrong patient, and transference of patient to the wrong location). Considering the sample volume and the number of nurses in each center, the number of subjects required from each center was determined using quota sampling. After obtaining the permission of and coordinating with hospital authorities, the list of personnel was obtained from human resources. Because the number of nurses in each hospital was higher than the sample volume, subjects who had the inclusion criteria were selected through random sampling. The collected data were analyzed using descriptive statistical tests (frequency distribution, mean, and standard deviation) and analytical statistics (Pearson correlation coefficient) in Statistical Package for the Social Sciences software (version 16, SPSS Inc., Chicago, IL, USA).

Ethical considerations

After obtaining a written permission letter from the School of Nursing and Midwifery of Isfahan University of Medical Sciences, the researchers referred to the study environments in order to collect the required data. The study objectives were explained to hospital authorities, the researchers referred to the wards, and after coordination with the manager of each ward and the selected subjects, they visited the wards on the determined date and time to complete the questionnaires. The questionnaires were placed in a thick envelop and distributed among the participants. They were assured of the confidentiality of their information.

Results

In terms of demographic characteristics, the nurses' age ranged between 25 and 52 years with a mean age of 31.8 years. Their work experience ranged between 2 and 30 years with a mean work experience of 8.05 years [Table 1]. The data collected using the Occupational Stressors Questionnaire were analyzed using descriptive statistical tests (frequency distribution, mean, and standard deviation). The results showed that the total mean score of occupational stressors was 57.7% (moderate to high). Mean occupational stressors scores were, respectively, 62.4, 59.0, 54.3, and 56.1% in the dimensions of occupational stress associated with administrative factors, environmental factors, factors related to the patient, and interpersonal factors [Table 2]. The results of the Nursing Adverse Events Scale showed that the minimum and maximum AE scores were 0 and 150 cases, respectively, with a mean of 30 cases per year. The Pearson correlation coefficient

Table 1: Demographic characteristics

	Category	Mean (SD) or percentage
Gender	Women	173 (82.80)
	Men	36 (17.20)
Marital status	Married	148 (70.80)
	Single	61 (29.20)
Educational status	LPN	6 (2.90)
	BSc	195 (93.30)
	MSc	8 (3.80)
Working shift	Fixed	35 (16.80)
	Rotation	174 (83.20)
Age	-	31.8 (60)
Clinical experience (year)	-	8.5 (6.40)

LPN: Licensed practical nurse

Table 2: Nurses' occupational stress scores and its dimensions and nursing errors

Statistical indices	Mean (SD)	Minimum	Maximum
The score of adverse events	30 (26.37)	0	150
Stress related to environmental factors	59 (15.80)	13	100
Stress related to interpersonal interaction factors	56.1 (21)	10	100
Stress related to patient care factors	54.3 (14.80)	11	96
Stress related to administrative factors	62.4 (15)	27	100
Mean total occupational stress in nurses	57.7 (13.30)	20	89
Total occupational stress score		100	

showed that the AE score had a significant relationship with total occupation stressors score ($r = 0.04$) ($p < 0.05$), and the score of occupational stress in the areas related to environmental factors ($r = 0.13$) ($p < 0.05$), patient care ($r = 0.14$) ($p < 0.05$). However, the AE score did not have a significant relationship with the score of occupational stress in the areas of interpersonal factors ($r = 0.09$) ($p > 0.05$) and administrative factors ($r = 0.04$) ($p > 0.05$) [Table 2].

Discussion

In the present study, the score of occupational stress in the four dimensions of stressors related to administrative factors, physical environment, interpersonal interaction, and patient care and the total mean score of occupational stress among nurses were determined and their relationship with AE in the nursing profession was studied. Total mean score of occupational stress showed that the subjects of the present study had moderate to high occupational stress. The results of the study by Mortaghy Ghasemy *et al.* in Zanjan, Iran, on occupational stress among nurses in educational hospitals of Zanjan showed moderate to high occupational stress among nurses, which is in agreement with the results of the present study.^[12] Mean occupational stress scores in the four dimensions of stressors related to administrative,

interpersonal, and environmental factors, and factors related to patients were suggestive of moderate to high stress level.

In the present study, among the four dimensions of occupational stressors, the score of administrative factors was the highest. In the studies by Torshizi and Ahmadi^[10] and Habrani *et al.* in Mashhad, the most common causes of stress were administrative factors.^[13] Environmental, interpersonal, and patient care factors were, respectively, the most common causes of occupational stress.

In the present study, the minimum AE score was 0 cases and the maximum was 150 cases with a mean of 30 cases per year. Presently, there is no scale for the quality and type of error, and for the provided care to be recognized as safe, the rate of error should ideally be 0. Thus, only the prevalence of error can be compared. As previously noted, different rates of error have been reported in different studies.

In the present study, the mean AE score in the nursing profession had a significant relationship with total mean score of occupational stress. In the study by Park and Kim on the effect of occupational stress and cognitive disorders on AE among nurses, a significant relationship was observed among different dimensions of occupational stress and AE.^[14] This was in accordance with the results of the present study. Of the four dimensions of occupational stress, the score of occupational stress related to environmental factors had a significant relationship with mean AE score. The study by Mahmood *et al.* on nurses' perception of the effect of the physical environment on medication error noted the small size of the medication room, unsuitable design of the nursing station, lack of sufficient space for documentation, the long distance between rooms (results in increased walking in the ward), lack of visibility of and control over the nursing environment, excessive noise, poor lighting, and lack of safety in the nursing station as environmental factors which caused medication error, documentation errors, and other nursing errors.^[15] Among these factors, the long distance between rooms and excessive noise were noted as the most important factors. Moreover, a significant relationship was observed between the score of occupational stress in the dimension related to patient care and AE score. Paddock *et al.* classified data on errors obtained from medical records into four groups of factors related to patients, and systemic, personal, and team factors. They reported factors related to patients as the most effective on these errors, and disease conditions as the most effective among these factors.^[16]

No significant relationship was observed between AE score and mean score of occupational stress related to administrative factors. Bijani *et al.*, in a descriptive analytical study, evaluated factors effective on medication errors in the three dimensions of factors related to the nurse, ward, and administration.^[17] The highest mean score was related to the dimension of

nursing administration (64.44%). The relationship of administrative factors with incidence of errors and their greater effectiveness in this study was not in agreement with the findings of the present study. This difference may be because, among the dimensions evaluated in the two studies, of the only common factor was the administrative factors. Furthermore, the difference between the study results may be due to the greater extent of the present study and diversity of its subjects.

There was no significant relationship between mean AE score and score of occupational stress in the area of interpersonal interaction. In a study conducted in Canada in 2009, researchers found that 36.9% of AE were preventable and lack of supportive resources and measures was an effective factor in this regard.^[18] They also found that if nurses are supported and encouraged in teamwork, they work harder to provide patients with safe care.^[18] This factor has been recognized as an effective factor in AE in the nursing profession; this may be due to differences in sociocultural factors and thus concluded based on the results of several studies in Canada. A limitation of this study was that despite the use of the Occupational Stressors Questionnaire, the effect of nonoccupational factors in the completion of the questionnaire and in the calculation of stress cannot be overlooked. Another limitation of the study was study population to nurses in educational hospitals. To overcome this limitation, it is recommended that future studies be conducted in governmental hospitals and private centers with a greater sample volume.

Conclusion

Based on the results of the present study, nursing managers must pay more attention to occupational stress among nurses. They must pay greater attention to administrative factors, because these factors have a more significant relationship with occupational stress level among nurses. Thus, it can be stated that factors related to the environment and patient care, which are greatly related to the administrative system, have a closer relationship with the incidence of AE. Therefore, nursing managers must take measures to modify the administration system of the organization.

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Conflicts of interest

Nothing to declare.

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