Original Article

The relationship between violence and cognitive failures in nurses in Isfahan 2018

Sara Fooladvan[1], Roya Torkashvand[2], Arash Ghodousi[3]*

[1] Department of Psychiatric Nursing, Faculty of Nursing, Isfahan Branch, Islamic Azad University, Isfahan, Iran. [2] Department of nursing,Borujerd Branch,Islamic Azad University,Borujerd,Iran. [3] Associate professor, Community Health Research Center, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran.

Correspondence: Arash Ghodousi, Associate professor, Community Health Research Center, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran.

ABSTRACT

The ratio of violence and consequently the ratio of cognitive failures are the factors affecting the performance and efficiency of nurses in the workplace. This study has been conducted aiming to investigate the relationship between cognitive failures and physical violence. This descriptive - analytical and cross - sectional study was performed on 98 male and female nurses working in various wards of the Modarres hospital of Isfahan in 2018. Valid questionnaires were used to measure the violence and ratio of cognitive failures. Finally, the data was analyzed using SPSS, version 25, software and performing Spearman correlation test, the t-test, and one-way ANOVA. Using Spearman correlation coefficient, the research results showed that there was a significant relationship between violence and the memory of nurses at 5% error level ($p \leq 0.05$). Also, there was also a significant relationship between physical violence and attention and motor actions ($p \leq 0.05$). The results of this study showed that the occurrence of physical violence was high among nurses and there was an interaction between the dimensions of cognitive failures and violence; so that increasing violence had led to cognitive failures` increase in doing the duty.

Keywords: Violence, nurse, occupational cognitive failure

Introduction

Studies have shown that the ratio of violence in workplace has increased over the past decade; hence the Center for Diseases Control and Prevention in the US considers violence in the workplace an epidemic issue. Recent estimates have reported that 48% of graduated nurses fear from bullying in the workplace and more than 60% of all new graduated nurses do their first task due to the negative behavior in the workplace that in numerous studies, the nurses in the positions of managers and senior nurses have been identified as the agents of non-aggressive behavior, and at the same time, they have been accountable for managerial strategies to eliminate violence cases in the workplace. Gideen et al. (2019) have defined workplace violence as "aggressive acts toward those who are performing duty inside or outside the workplace". But Ghasemi in his article, has mentioned a comprehensive and specialized definition of workplace violence in this way that the job opportunities in which employees are abused, threatened or attacked by another person (s) in their working positions are called violence workplace.

Investigations showed that nowadays, violence is increasing in many workplaces, and of course one of these environments is the healthcare services providing environments. [1] The occurrence of violence imposes many effects and complications on the healthcare system, among which numerous financial burdens can be mentioned. Estimates of the costs resulting from violence against nurses in the UK indicated that due to the costs resulting from the absence of nurses being injured and their treatment, and the reduction of the activity and concentration of these nurses, 30 million Ponds is imposed on the UK treatment sector annually. [2] No statistics has been found regarding this issue in Iran, which should be taken into consideration. Anger can have devastating complications for the aggressive person, target

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individual or groups and the community in which they live. Violence in the workplace is often considered as a part of nurses' work and it is not even reported in most cases. [3] But this violence is one of the sources of occupational damages for the nurses. Victims of violence not only face physical violence, but consequently may suffer from emotional problems such as anger, anxiety, hopelessness, and depression. These damages can decrease concentration, limitations in motivation and activity, anger, self-confidence, financial, psychological and life injuries, resorting to sedative drugs, going to leave and absence from the work, changing job and occupational stress, anger, fear, and even revenging or suicide. [3] Also, decreasing working morale, increasing occupational stress, increasing job abandonment, decreasing trust in managers and colleagues, and creating an unfriendly working environment are the negative organizational outcomes of violence that have many impacts on the efficiency and success of the organization. [4] Najafi et al. (2017) conducted a study aiming to determine the status of workplace violence against nurses in Iran by a systematic review study method. [5] They investigated all articles published over the past decade in both Persian and English languages about workplace violence against nurses conducted inside the country. The results showed that nurses are exposed to workplace violence types, especially verbal violence. The obtained results from the extraction of the articles` findings revealed 5 main concepts including "violence characteristics", "characteristics of nurses and their reaction to violence", "predisposing factors of violence", "preventive factors of violence" and "reporting ratio and reasons for not reporting". According to the obtained results, the prevalence of workplace violence against nurses is considered as a serious problem. Performing preventive measures in order to deal with workplace violence against nurses is an urgent need. Regarding the lack of interventional studies, future researches should move from descriptive studies towards intervention studies to provide guidance for clinical use.

Understanding occupational cognitive failure can be helpful in predicting the types of risky and probable occupational behaviors. In general, considering that for each action or duty, there are 3 cognitive stages, including planning, storing, or designing it in the memory, and execution, in each one of these stages there is the possibility of the existence of a form of occupational failure such as slip, unclear and mistakes. [6] With regard to the increasing prevalence of violence against nurses and cognitive failures in the nursing occupation, and the impact of these cognitive failures and errors on clients' therapeutic processed and its impact on nurses' mental health, and also considering the point that no study has been conducted so far about investigating the relationship of violence against nurses with the prevalence ratio of occupational cognitive failures in nurses and the point that there are no exact statistics in this area, the researcher decided to design a study to answer this question: Is there a relationship between violence against nurses and the prevalence ratio of occupational cognitive failures in nurses?

Methodology

In this study, 98 nurses working in psychiatric ward of Modarres hospital in Isfahan who had willingness to cooperate and had at least 6 months of work experience were included. At first, the questionnaire of the demographic characteristics including age, gender, work experience ratio, ward, marital status, and so on was developed by reviewing the texts. The questionnaires used in the research have been introduced below.

Workplace Violence Questionnaire in the Health (Medicine) Sector: This was prepared using the standardized questionnaire of the International Labor Office (ILO) (Kris Ng 2009), the World Health Organization (WHO), [7] the International Council of Nurses (ICN) and the Public Services International (PSI). [5] The questions included demographic information, physical, psychological, verbal violence, intimidation, bullying, individual chastity insult, racial, managerial system, and beliefs` assault about workplace violence. The questions included demographic information and physical violence in the workplace that were used qualitatively. In this questionnaire, the nurses answered questions about confirming the emergence of violence in the workplace, agents of violence, time of committing violence, and so on. The descriptive indicators of SPSS software were used for data analysis of violence questionnaire. Finally, the researcher used information of this section to describe the emergence of violence. Content validity determination method was used to determine the validity, and for this purpose, the tool was provided to 12 academic members of the University of Medical Sciences. After calculating the CVR, the CVI in each case was determined that the score of both cases was above 70%.

Reliability of the tool was tested by the retest method, in a way that the questionnaires were distributed among 10 nurses in two stages with 15 days time interval and among the obtained scores in two stages, the relationship was surveyed, the results of which have been as follows: for nurse-related factors $r = 0.97$, and for patient-related factors $r = 0.73$, and patient's companion-related factors $r = 0.94$, and for organizational factors $r = 0.98$.

Occupational Cognitive Failure Questionnaire (OCFQ): The Broadbent's Occupational Cognitive Failure Questionnaire (OCFQ) contains 30 questions in three domains of memory, attention, and motor actions failures. This questionnaire considers the various dimensions of cognition, cognitive characteristics, and various theories of occupational cognitive failures and the dimensions and layers in which occupational cognitive failures occur. [8] In this study of Alahyari et al. in order to determine the reliability of this questionnaire, the internal consistency and repeatability of this tool were tested in Iranian workplaces. The results obtained from studying Cronbach's alpha of this questionnaire were estimated 0.96, indicating high reliability of this tool. This questionnaire includes questions with answer sheet based on the 5-point Likert's scale ranging from never = 1 to very high = 5. Therefore, in case of repeated occurrence, number 5 and in case of non-occurrence, number 1 was reported. The Occupational Cognitive Failures Questionnaire scores are from 0 to 100, and the higher scores indicate higher ratio of failures. Based on the

definition of cognitive failures, which is a cognitive-based error while doing a duty that a person has usually performed successfully [9] and considering that nurses are able to perform their duties on a daily basis, and under the influence of working conditions, they commit errors in doing their duties, cognitive failures questionnaire can be used to distinguish these errors that the nurse successfully performs under normal conditions.

After explaining about the research, confidentiality of information and how to respond to the questionnaires and obtaining the nurse's consent, the questionnaires were delivered. The time of delivering the questionnaires was at the end of working shift and the nurses were asked to complete the questionnaires at the end of working shift that had the highest probability of fatigue ratio and the highest dealing with the patients and companions.

Findings

The Occupational Cognitive Failure and Violence Questionnaire was distributed for all nurses of the psychiatric ward of Modarres Hospital (98 Nurses), which is a public subspecialty hospital. All nurses participated in this study. Initial investigations were performed to confirm the nurses' questionnaires for analysis. This investigation resulted in the removal of one case from 98 questionnaires due to a defect in completing the questionnaire. Finally, 97 questionnaires were used. Thus, the effective response ratio was 98.9% (97 people). The completed questionnaires were transferred to a blinded statistician for data collection and registration in the SPSS software. The response rate for this hospital was very high. This research was confirmed by the ethics` committee of the hospital.

According to Table 1 the age groups observed in this study were: 20-29 (20 people, 21%), 30-39 (56 people, 57.7%), 40-49 (14 people, 14.4%), 50-59 (7 people, 7.2%). More than three-quarter (76 people and 78.3%) of the total sample had lower than 40 years old. Twenty people (21%) of the respondents were single, and 69 people (71.1%) were married and 8 people (8.2%) were divorced. All respondents were nursing staff (97 people, 100%). One person (1%) had less than 1 year, 32 people (33%) had 1-5 years, 32 people (33%) had 6-10 years, 23 people (23.7%) had 11-15 years, 8 people (8.2%) had 16-20 years and one person had more than 20 years work experience (Table 1).

Table 1: Demographic Information of Participants

Variable		Number
Age	20-29	20
	30-39	56
	40-49	14
	50-59	7
	Over 60	0
Gender	Male	57
	Female	40
Marital Status	Single	20
	Married	69
	Divorced	8
	Widow	0
Occupation	Physician	0
	Nurse	97
	Midwife	0
Ward	Neurology	34
	Psychiatric	63
Work Experience	Less than One Year	1
	1-5	33
	6-10	32
	11-15	23
	16-20	8
	Over 20 Years	1

Demographic Information of Participants Related to Violence

As it has been reported in Table 2, the demographic results of the respondents obtained through this survey were: age, gender, marital status, occupation, workplace ward, work experience and history (in terms of year). More than half of the respondents were female (57 people, 58.7%) and the rest were male (40 people, 41.2%). Although the number of women in this study was high, only 8.8% of them had been subjected to physical violence, while 72% of men have reported violence. This difference was statistically significant ($p \leq 0.05$). The observed age groups in this study were 20-29 (20 people, 21%), 30-39 (56 people, 57.7%), 40-49 (14 people, 14.4%), 50-59 (7 people, 7.2%). More than three-quarter (76 people, 78.3%) of the total population had less than 40 years old. These differences were not statistically significant ($p \geq 0.05$). Twenty people (21%) of the respondents were single, 69 people (71.1%) were married and 8 people (8.2%) were divorced, which was not statistically significant ($p \geq 0.05$). Among the samples, one person (1%) had less than 1 year, 32 people (33%) 1-5 years, 32 people (33%) 6-10 years, 23 people (23.7%) 11-15 years, 8 people (8.2%) 16-20 years and one person had over 20 years working experience. These differences were not statistically significant, either ($p \geq 0.05$) (Table 2).

Table 2: Demographic Information of Nurses

	Variable	Physical Violence	Nonviolence	P-Value
Age	20-29	7 (35%)	13 (65%)	0.62
	30-39	19 (34%)	37 (66%)	
	40-49	4 (28.6%)	10 (71.4%)	
	50-59	4 (57%)	3 (43%)	
	Over 60	0	0	
Gender	Male	29 (72.5%)	11 (27.5%)	≤ 0.001
	Female	5 (8.8%)	52 (91.2%)	
Marital Status	Single	6 (30%) 6	14 (70%)	0.06
	Married	28 (40.6%)	41 (59.4%)	
	Divorced	0	8 (100%)	
	Widow	0	0	
Occupation	Physician	0	1 (100%)	0.57

	Nurse	34 (35.8%)	61 (64.2%)	
	Midwife	0	1 (100%)	
Ward	Surgery	0	0	-
	Internal	0	0	
	Pediatric Ward	0	0	
	Obstetrics and Gynecology	0	0	
	ICU	0	0	
	Orthopedic Ward	0	0	
	CCU	0	0	
	The Infectious Ward	0	0	
	Neurology	34 (35%)	0	
	Psychiatric	0	63 (65%)	
Experience	Less than One Year	1 (100%)	0	0.16
	1-5	11 (34.4%)	21 (65.6%)	
	6-10	14 (43.8%)	18 (56.2%)	
	11-15	4 (17.4%)	19 (82.6%)	
	16-20	3 (37.5%)	5 (62.5%)	
	Over 20 Years	1 (100%)	0	

Investigating the Relationship between Agents of Violence, the Time of it and the Type of Weapon

In the past 12 months, 35 percent (34 people) of the respondents have reported physical violence. Of these, only 5.8% (2 people) of the attacks were with cold weapon and the rest (32 people) were without weapon (Table 3). During the same period, 65 percent of the respondents reported that they have not been exposed to physical violence at workplace. In cases of physical violence, the attacker was often the patient him/herself (32 people, 94%), but in 2 cases, the patient's visitors and relatives (6%) were reported as violence agents (p≥0.05). According to the results of this study, most physical violence attacks occurred during the evening shifts (13 cases, 38.2%) have been the violence without weapon. These results were not statistically significant (p≥0.05).

Table 3: Investigating the Relationship between the Agents and the Time of Violence

Variable		Cold Weapon	Without Weapon	P-Value
Violent Agents	Patient	2 (6.3%)	30 (93.7%)	0.72
	Patient's Relatives	0	2 (100%)	
	Hospital Staff	0	0	
	Manager / Supervisor	0	0	
	Other People	0	0	
Shift of Committing	Morning	1 (9%) 1	10 (91%)	0.63
	Evening	1 (7.7%)	12 (92.3%)	
	The Night	0	10 (100%)	

Distribution of Cognitive Failures Based on Nurses' Demographic Information

As it can be observed in Table 4, the demographic results of the respondents in relation to the occupational cognitive failure have been reported. According to these results, there was only a significant relationship between marital status and all dimensions of occupational cognitive failure (p≤0.05). In all dimensions, the singles influenced by violence have made more mistakes in doing personal duties. As it can also be observed in the table, investigating the relationship between age groups and the total score obtained in the dimensions of cognitive failure did not show a statistically significant difference (p≥0.05), while in a more accurate investigation about the dimensions of cognitive failure separately it was shown that motor actions were highly affected by age (p≤0.05) and by increasing the age of motor actions against violence, it may face with more errors. In young nurses this issue was controllable and did not have that much effect. Investigating the relationship between gender and total score obtained in the cognitive failure dimensions did not show significant statistical difference (p≥0.05), while a more accurate investigation about the dimensions of cognitive failure separately indicated that the memory was strongly affected by gender (p≤0.05), so that men under the influence of violence suffered more from forgetfulness. Investigating the relationship between gender and the total score obtained in cognitive failure dimensions did not show significant statistical difference (p≥0.05) while a more accurate investigation about the dimensions of cognitive failure separately indicated that memory was strongly affected by gender (p≤0.05), so that men under the influence of violence suffered more from forgetfulness. Investigating the relationship between work experience and total score obtained did not show significant statistical difference in any of the dimensions of cognitive failure (p≥0.05).

Table 4: Demographic Information of Nurses Regarding Occupational Cognitive Failure

Variable		Memory	Attention	Motor Actions	Total
Age	20-29	30.45 ± 8.20	29.9 ± 8.73	29.1± 7.93	89.45± 24.17
	30-39	29.77± 9.35	29.73± 8.87	29.96± 8.96	89.46± 26.37
	40-49	34± 10.83	34.93± 9.73	34.64± 10.27	103.57± 30.06
	50-59	37.57± 8.77	37.43± 7.99	37.71± 25.5	112.71± 21.43
	Over 60	-			-
	P-Value	0.12	0.10	0.05	0.09
Gender	Male	34.67± 10.27	34.32± 9.3	34.62± 9.06	103.62± 27.88
	Female	28.56± 8.03	28.79± 8.37	28.5± 8.13	85.84± 23.66
	P-Value	0.02	0.29	0.48	0.14

Marital Status	Single	35.95± 8.06	35.3± 8.14	34.8± 6.88	106.05± 22.03
	Married	30.24± 9.41	30.58± 8.96	30.43± 9.17	91.26± 26.78
	Divorced	26.12± 9.43	24.75± 9.22	26.62± 10.05	77.5± 28.24
	Widow				
	P-Value	0.02	0.01	0.05	0.02
Occupation	Physician	34	35	34	103
	Nurse	31.04± 9.56	31.03± 9.22	30.98± 9.09	93.05± 27.09
	Midwife	32	31	32	95
	P-Value				
Ward	Surgery				
	Internal				
	Pediatric Ward				
	Obstetrics and Gynecology				
	ICU				
	Orthopedic Ward				
	CCU				
	The Infectious Ward				
	Neurology	31.08± 9.46	31.07± 14.9		93.17± 26.83
	Psychiatric			0.02±9	
	P-Value				
Experience	Less than One Year	42	43	39	124
	1-5	34.28± 7.37	33.43± 7.98	33.9± 7.6	100.8± 22.06
	6-10	29.22± 9.53	29.43± 9.09	29.84± 9.52	88.5± 27.17
	11-15	29.43± 10.16	29.78± 9.71	29.43± 9.83	88.65± 29.46
	16-20	29.25± 12.99	30± 11.6	30.87± 10.4	90.12± 33.76
	Over 20 Years	30	34	32	96
	P-Value	0.20	0.35	0.59	0.34

Investigating the Relationship between Violence against Nurses and the Dimensions of Cognitive Failures

The changes of the scores obtained from the Cognitive Failure Questionnaire regarding the distribution of violence against nurses can be observed in Table 5. Accordingly, all cognitive failure dimensions were affected by violence ($p \leq 0.05$). As it can be observed in the table, there was a significant difference between the memory score (36.17 ± 8.32) in nurses who had been violated and the memory score of nurses who had not experienced violent actions (28.33± 8.94) ($P \leq 0.05$). The same state was true about the score obtained in attention, motor actions, and the total score of nurses. Spearman's correlation coefficient between violence and memory dimension of the occupational cognitive failure questionnaire was also 0.39, although this correlation was not that much strong, it showed that by increasing violence, the memory score ratio increased ($p \leq 0.05$). Spearman's correlation coefficient between violence and attention, motor actions and the total score of cognitive failure was 0.31, 0.33 and 0.35, although these correlations were not that much strong. But by increasing violence, the score ratio of attention, motor performance, and the total score increased ($p \leq 0.05$). This means that by increasing violence, the obtained scores in each one of the dimensions of memory, attention and motor performance also increased.

Table 5: Relationship between Violence against Nurses and the Dimensions of Cognitive Failures

Variable	Physical Violence	Nonviolence	P-Value
Memory	36.17±8.33	28.33±8.94	≤0.001
Attention	35.03±8.4	28.93±8.86	0.001
Motor Actions	35±8.55	28.87±8.56	0.001
Total Score	106.20±24.55	86.14±25.5	≤0.001

Discussion and Conclusion

In this study, physical violence with cold weapon or without weapon has been reported by 34 out of 97 nurses (35%). These nurses have experienced at least one violence period during the last 12 months. The results obtained from conducted studies in other countries indicated that workplace violence is very high and is not comparable to the results of this study. Comparison of the findings of this study with other studies showed a sharp difference in the ratio of reported cases of violence against nurses in various centers. In a way that in 2002, 54.3% of nurses of a health center in Saudi Arabia reported that they are exposed to workplace violence, [10] also in 2011, 67.4% of health care workers reported that they have been exposed to violence. In a study, Chapman et al. (2010) investigated the causes of creating violence against nurses at a hospital in Western Australia. In this research, all 332 nurses with at least one year of work experience were investigated. Of the 113 nurses who had conditions to participate in the study, 75 percent had the workplace violence experience during the recent year; 50% of them reported verbal violence to their senior staff, only 16% of nurses have formally reported violence. The reason for not reporting the violence was that according to them, the violence is a part of their job environment and the authorities do not want to be responsive.

Regarding these results, it seems that the prevalence of violence in our study was very low. There was also a significant correlation between gender and physical violence. Among the possible reasons for the low prevalence ratio, the high number of female nurses as participants in this study can be mentioned. Because of cultural and social conditions, women are often embarrassed to tell about adverse events. The results of this study showed that except for gender, no significant relationship was observed between demographic characteristics of hospital nurses and physical violence. These results were consistent with the results of the study of Rahimzadeh et al. (2011). [11] According to

the results of these researchers, violence against male nurses has been more than female nurses. The patient's companions have also been the highest cause of violence against nurses. The findings of this study also showed that more severe incidents of physical violence against nurses that usually were done using cold weapon composed 5.8% of physical violence cases. According to the results obtained from a study in Saudi Arabia, nurses reported 14 violent incidents by the use of gun during one year. [12] These results were in line with the results of studies of Iraqi researchers. [13] In contrast, studies conducted in other countries showed that no weapon has been used against nurses and other healthcare employees. [14, 15] According to the results of this study, most of the violent incidents occurred in the afternoon. Similar findings in numerous studies in developed and developing countries also confirmed the point that violent incidents often occur in the afternoon or at night. [14-16] The cause of these events may be due to the lack of nursing staff, the decrease of the probability of hospital staff's presence, and the lack of security personnel. This fact should also be regarded that most patients and their relatives enter to the hospital in the afternoon to meet patients. [17] It is difficult to compare the results of this study with other studies because of difference in the definitions of violence, difference in questionnaire, studied populations, study duration and used methods. In addition, the findings may vary from sector to sector or country to country regarding the differences existing in the work system. Nurses are subjected to physical and psychological violence, so nursing is considered among the most stressful jobs of the community. In addition to many other stressors in this profession, violence has had many effects on the staff, which in turn has increased nursing errors and irreparable damages for the patient and the hospital. Therefore, in the present study, it was tried to investigate the ratio of nurses' cognitive failure under the influence of workplace violence. The results of this study indicated that the total mean score of occupational cognitive failure was obtained 93.05 ±27.09 for 95 nurses under study, indicating high ratio of cognitive failure among nurses. This value corresponded to the occupational cognitive failure ratio of the Wallace et al. study, but was very high compared with the mean score of cognitive failures in the Yousefzadeh et al. study (37.77 ±13.43). But considering its high standard deviation ratio, this value can also be worrying.

Lavie (2010) by conducting a research on 350 drivers about attention, distraction, and cognitive control in the work, concluded that the ratio of drivers' attention and preventing their distraction depends largely on how much they have information and awareness of their current task and surrounding environment. [18] This information and awareness affects their attention, distraction and involvement in their work.

Wadsworth et al. (2003) investigated the relationship between cognitive impairments with minor damages and non-damaging occupational accidents. [19] The results of the investigation of these researchers showed that occupational accidents and damages had correlation with cognitive impairments. Workers who reported more occupational accidents and damages were more likely to report cognitive failures, too. Cognitive failures had also stronger relationship with occupational damages than non-damaging accidents.

Abbaszadeh et al. (2014) in their research entitled "Investigating the relationship between cognitive abilities with situational awareness and performance of bus drivers in a sample of 30 professional bus drivers with diploma and higher degree" concluded that the driver's situational awareness increases after dangerous conditions. [20] These researchers concluded that cognitive abilities including active memory capacity, distributed attention, selective attention, and embedded forms affect only the level one of the situational awareness. The results of their path analysis also showed that perception is a key factor in driving performance after hazardous conditions. Bashlideh (2007) in his research entitled "The role of cognitive variables as the predictors of occupational accidents with 400 employees of an industrial unit in Ahvaz" concluded that there was a significant difference between the cognitive characteristics of the employees who had accident and those who did not have accident. [21] The employees who had accident in respect of cognitive variables such as selective attention, memory capacity, and so on were weaker than the employees who did not have accident. More accurate investigations showed that the dimension of performance with the mean of 30.98 ±9.09 for all nurses under study was the lowest value, while memory and attention dimensions were respectively obtained 31.04 ± 9.56 and 31.03 ±9.22. Accordingly, it can be stated that in spite of report of high physical violence, individuals have a desirable working performance in doing assigned duties, because of numerous reasons, including high working experience and skill. In other words, high working experience and skill prevent the harmful effects of violence on the nurses' performance. Unfortunately, no study has been found investigating the impact of violence on the dimensions of occupational cognitive failure.

The purpose of this study was to investigate the prevalence of physical violence in Modarres hospital in 2018 and its effect on the mean score of occupational cognitive failure. The results of this study showed that except for gender, no significant relationship was observed between the demographic characteristics of hospital nurses and physical violence. There was a significant correlation between gender and physical violence in this research. In addition, according to the results of the present study, it can be concluded that cognitive failure in nursing job was high. Therefore, this job requires taking appropriate engineering and managerial solutions to reduce the feeling of cognitive failure. Although the shortage of researches on violence in nurses is still felt, more researches are needed to develop strategies for the prevention of violence against emergency nurses that should be considered.

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