



The Effect of Educational Stress Management on Job stress of Operating Room Nurses at Hospitals Affiliated to Shiraz University of Medical Sciences During Year 2016: A Randomized Controlled Clinical Trial

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Abstract

Background: Job stress is a psycho-social stress that is created as a result of harsh working conditions and effects individuals' performance and physical and mental health. In fact, many mental and psychological health problems are directly related to job stress. Stress at the workplace could even create disabilities in some cases. The nature of work at hospitals, especially operating rooms, generates a lot of stress and tension for the staff.

Objectives: This study aimed at evaluating the effect of stress management on stress of operating room personnel, working at hospitals affiliated to Shiraz University of Medical Sciences.

Methods: In this randomized controlled interventional study, 201 females were selected from 463 operating room nurses, who worked in educational hospitals affiliated to Shiraz University of Medical Sciences, using block randomization and their basic job stress scores were measured. Then, from 87 nurses with job stress mean scores of > 150, 60 were selected using the table of random numbers and were divided into 2 groups of 30, using the RA software. The intervention group participated in 5 sessions of stress management training program, while the control group did not receive any intervention. Job stress score was evaluated in the 2 groups, two months after the intervention. The data were collected using demographic information and the Osipow job stress questionnaires. The data were then entered in the SPSS statistical software, version 18 and analyzed by descriptive and inferential methods (chi-square, independent t-test, and paired t-test). P values of < 0.05 were considered statistically significant.

Results: The results showed no significant differences between the 2 groups in terms of underlying variables ($P > 0.05$). Also, no significant difference was found between the 2 groups regarding the mean score of total job stress before the intervention ($P = 0.96$). However, significant differences were observed between the 2 groups concerning the dimensions of job stress, including incompetence of the role ($0 < 0.001$), duality of the role ($0 < 0.001$), responsibility ($0 < 0.001$), and range of the role ($0 < 0.001$).

Conclusions: This study indicated that stress management training could reduce job stress among female nurses working in operating rooms. Therefore, stress management training in administrative, clinical, and educational areas seems to be necessary for operating room nurses.

Keywords: Stress Management, Education, Operating Room Nurses, Job Stress

1. Background

Stress or tension refers to a physical and psychological reaction that a person shows against external and internal stimuli, disturbing the balance and stability of physiological conditions of one's body (1). Stress is an undeniable reality with the current living conditions. However, it is not possible to remove stress entirely from life. Without stress, life will be still and stagnant and will lead to a lazy mind.

On the other hand, increased stress upsets body's balance system and disrupts its desirable efficiency. Hence, "stress management" is the only way to deal with stress (2). Generally, some degrees of stress are normal and even necessary. Nonetheless, in case stress is severe, persistent, or repetitive and individuals are not able to deal with it or have little support sources, it can be considered as a negative phenomenon that could cause physical and mental disorders (3). Severe stress could result in physical and psycholog-

ical reflections. Its psychiatric symptoms, include reluctance to socialize, anorexia, reluctance to live and communicate, and depression. Its physical symptoms include migraines, high blood pressure, cardiovascular diseases, insomnia, chronic back pain, and stomach ulcer (2).

Employment is one of the most important causes of stress in any individual's life. Nowadays, job stress has become a common and costly problem at the workplace. Job stress occurs when expectations from a person are far beyond one's authorities and abilities (4). Job stress that often occurs due to harsh working conditions in environments with tension effects individuals' daily performance as well as physical health and mental function. In fact, a lot of mental and emotional problems originate directly from job stress. Stress at the workplace could even create disabilities in some individuals (5). Overall, job stress could be considered as accumulation of stressors or job-related situations agreed by most people to cause stress. In other words, job stress refers to the stress that a certain person undergoes in a certain job (2).

Job stress is one of the main factors that reduces the efficiency of organizations and employees (6). Beehr and Newman (1978) cited 3 categories of signs that occur in job stress conditions, including psychological symptoms, physical symptoms, and behavioral symptoms (7). Psychological symptoms include emotional and cognitive problems that occur as a result of distress caused by job stress. Dissatisfaction with the job is also one of the most common consequences of job stress. A person, who is dissatisfied with one's job goes to work reluctantly and does not see good reasons to do one's job well. Other psychological symptoms include depression, anxiety, boredom, frustration, isolation, aversion, increasing number of sick leave sheets, and job burnout (2). In a meta-analysis of 67 articles focusing on the results of work-life conflict and its harmful effects on health, it was indicated that work-life conflict was directly associated with job stress (8).

Physical symptoms of job stress are more difficult to be recognized because while certain working conditions are associated with certain health problems, it is difficult to determine whether problems are merely the result of the job or other aspects of life. Nonetheless, scientific evidence has shown a relationship between job stress and physical symptoms. One of the most common physical symptoms associated with job stress is cardiovascular disease (2). Workplace tension is also very common as in environments in with a large number of mental and physical stresses, achieving career goals is difficult and the staff thus experience physical and mental problems (9).

Behavioral symptoms of job stress are categorized to 2 groups. The first category consists of signs that are directly related to the employee. This category includes be-

haviors, such as refrain from working out, increased consumption of drugs, bulimia or anorexia, aggressive behaviors towards colleagues or family members, and interpersonal problems. On the other hand, the results of the second category of behavioral symptoms return to organizations or administrations, including absenteeism from work, quitting the job, increasing work-related accidents, and lack of efficiency (2).

Nurses' working environments are among environments with high levels of tension. Since unfavorable environmental factors and conditions, hard work, small number of employees, and heavy responsibilities are effective in occurrence of stress, it could be said that nurses' work setting, especially the operating room, is such a stressful environment (1).

Light et al. (10) evaluated the impact of stress management interventions on job stress among nurses working in critical care units. The results showed that the training was effective in reducing the nurses' job stress ($P = 0.001$). Hazavehei et al. also surveyed job stress in nurses and ways they employed to deal with this problem. The results revealed nurses' moderate awareness of the dangers of stress and ways to deal with it (4). This indicated the necessity to train nurses and create awareness. In another study, Sharma et al. aimed at assessing stress and controlling its health risks among nurses. The results demonstrated a statistically significant correlation between workplace and stress levels ($P = 0.024$). In this study, nurses who were not tired of their jobs, experienced less stress ($OR = 0.043$). Accordingly, it was concluded that hospital managers had to provide strategies to reduce job stress for nurses so that they could deal with the problems caused by their job stress (11).

Coping with stress refers to how a person confronts events for successful compliance with conditions and environmental interactions (12). Different ways of coping include relaxation, communication, distraction, and exercise (13).

Because healthcare workers play an important role in the quality of provided care to patients, job stress is considered as one of the most important issues in the healthcare system (5). Findik (2015) studied the relationship between occupational stress and security of operating room nurses. The results showed that injuries with sharp instruments during surgeries, lack of health screening for the personnel, lack of vaccinations, using X-ray without protection, and perception of a lack of support were effective in increasing job stress.

Nursing, because of its nature, is a profession subjected to a high degree of stress (4). Given that most nurses are women in Iran and women are more susceptible to psychological problems due to job stress, it was decided to se-

lect only female nurses in this current study.

However, no interventions based on stress management were performed in the mentioned study (14).

According to the review of the literature available on Medline from 2010 to 2017, no interventional studies have been done on stress management in operating room nurses. In general, stressful environment and heavy workload of operating room increase stress level among operating room nurses. In other words, operating room nurses have many responsibilities in dealing with public health. Indeed, their performance affects both their own and other individuals' health.

2. Objectives

The present study aimed at determining the effect of stress management training on the level of job stress among operating room nurses.

3. Methods

In this randomized controlled interventional study, the research community included all female nurses working in operating rooms of educational hospitals affiliated to Shiraz University of Medical Sciences. The inclusion criteria of the study were having A.D., B.Sc. or M.Sc. degrees in nursing, working in an operating room, being willing to participate in the study, having at least 5 years of work experience, and lack of psychiatric disorders (based on their self-report). On the other hand, the exclusion criteria of the study were unwillingness to continue cooperation, absence of more than one session from training classes, consumption of tranquilizers, occurrence of psychiatric disorders during the study, taking part in relaxation, yoga and meditation classes, and hospitalization or any other problems that prevented individuals from continuing participation in the study.

According to the available studies (4-6, 9, 11, 12), using the sample size formula, and considering $\alpha = 0.05$ and power of 95%, a 40-subject sample size was determined for the study (20 subjects in each group). However, the number of participants was increased to 30 in each group to allow for drop outs.

Mean (SD) before = 194.6 ± 12.5

Mean (SD) after = 181.8 ± 10.2

$$n_1 = n_2 \frac{\left(z_{1-\frac{\alpha}{2}} + z_{1-\beta}\right)^2 (s_d^2)}{(\mu_1 - \mu_2)^2} \quad (1)$$

$$sd = \sqrt{\frac{s_1^2 + s_2^2}{2}} \quad (2)$$

$$\begin{aligned} \text{Effect size} &= \frac{\mu_2 - \mu_1}{s_d} \\ &= \frac{13/26}{8/65} \\ &= 1/35 \end{aligned} \quad (3)$$

The study data were collected using demographic characteristics questionnaire and the Osipow Job Stress questionnaire. Demographic characteristics questionnaire included the participants' age, gender, work experience, marital status, number of children, education level, work shift, number of working hours, presence or absence of underlying diseases, job satisfaction, and amount of income per month. The Osipow Job Stress questionnaire consisted of 60 questions categorized in 6 dimensions, namely workload, incompetence of the role, duality of the role, range of the role, responsibility, and physical environment. Additionally, each dimension included 10 questions.

First dimension: Workload is related to how an individual responds to workplace demands.

Second dimension: Incompetence of the role is related to appropriateness of individuals' skills, education, training, and experimental features with workplace requirements.

Third dimension: Duality of the role is related to individuals' awareness of workplace priorities, expectations, and evaluation of criteria.

Fourth dimension: Range of the role is related to individuals' differences in terms of work ethics and the expected roles.

Fifth dimension: Responsibility is related to individuals' sense of responsibility in terms of performance and well-being of others at the workplace.

Sixth dimension: Physical environment is related to inappropriate environmental conditions that an individual is exposed to.

The items of the Osipow Job Stress questionnaire are scored based on a 5-point Likert scale with the following options: never (1), sometimes (2), often (3), usually (4), and most of the time (5). Accordingly, job stress is divided to 4 levels; i.e., low (from 60 to 99), low to medium (from 100 to 149), medium to severe (from 150 to 199), and severe (from 200 to 300). The Osipow Job Stress questionnaire was used by Osipow et al. in 1987 for the first time. It was also used repeatedly by various researchers within the country and its validity and reliability were confirmed. Sharifian et al. (2006) reported the favorable content validity of the questionnaire. They also assessed its reliability by the test-retest method and reported Cronbach's alpha coefficient of 89% (15).

In this study, from the 463 operating room nurses working in educational hospitals of Shiraz University of

Medical Sciences, 201 were selected through simple randomization and their basic job stress scores were measured using the Osipow Job Stress questionnaire. Then, 87 nurses with job stress mean scores of > 150 were diagnosed with moderate and severe stress. At this stage, each nurse received a specific number. Afterwards, 60 nurses were randomly chosen using the table of random numbers and were assigned to either the intervention or the control group using the RA software.

The intervention group participated in five 45-minute training sessions held weekly during 35 days. Training interventions took place in relation to a variety of stress management techniques, such as muscle relaxation, guided imagine, abdominal breathing techniques, positive thoughts, and meditation. The first 25 minutes in each session were dedicated to teaching one way to deal with stress and the last 20 minutes were devoted to practicing the technique. At the end of each session, the participants were encouraged to repeat the exercises at home. Educational interventions were performed by an experienced psychiatric nurse. However, no interventions were done for the control group. This group's information was only investigated for the sake of comparison with the intervention group. Participants and outcome rater, but not the interventionist, were blind to intervention conditions. Two months after the end of the intervention, job stress scores were examined again for both groups.

Ethical considerations in this study included obtaining written informed consents, observing the confidentiality of the participants' information, and the freedom to discontinue participation at any stage of the research.

After collecting the data, they were entered in the SPSS statistical software, version 18 and were presented through descriptive statistical methods, including relative and absolute frequency, mean, and standard deviation. Inferential statistical methods, such as paired and independent t-test and chi-square test were also used to compare the levels of job stress before and after the intervention.

4. Results

The two groups' mean age, work experience, working hours per week, and amount of income per month have been presented in Table 1. Chi-square test was used to assess the homogeneity of the study groups in terms of qualitative demographic variables. In this regard, no significant differences were observed between the intervention and control groups (Table 1). The majority of the participants were married ($n=17$, 56.7% in the intervention group and $n=18$, 60% in the control group). In terms of work shift, most of the participants in both groups had rotational shifts ($n = 27$, 93.1% in the intervention group and

$n = 29$, 96.4% in the control group). Moreover, 16 subjects (53.3%) in the intervention group and 17 (56.7%) in the control group were satisfied with their jobs.

Table 1. Demographic Characteristics of the Intervention and Control Groups^a

Variables	Groups		P Value
	Intervention	Control	
Age	33.66 ± 6.81	34.23 ± 8.46	0.776
Marital status			0.79
Single	13 (43.3)	12 (40)	
Married	17 (56.7)	18 (60)	
Job status			0.57
Without rotation	2 (6.9)	1 (3.6)	
With rotation	27 (93.1)	27 (96.4)	
Work experience, y	11.033 ± 6.55	10.76 ± 6.95	0.879
Working hours per week	48.66 ± 11.99	50.93 ± 12.70	0.48
Income per month, \$	478.016 ± 129.827	486.328 ± 149.965	0.82
Job satisfaction			0.79
Satisfied	16 (53.3)	17 (56.7)	
Not satisfied	14 (46.7)	13 (43.3)	

^aValues are expressed as No. (%) or mean ± SD.

The results of independent t-test and chi-square test showed that the two groups were similar regarding these variables.

The results of independent t-test showed no significant differences between the 2 groups regarding the total mean score of stress before the intervention ($P = 0.96$). Also, no significant difference was found between the 2 groups regarding the mean scores of different dimensions of job stress before the intervention. The stress score dimensions included workload ($P = 0.39$), incompetence of the role ($P = 0.06$), duality of the role ($P = 0.11$), range of the role ($P = 0.9$), responsibility ($P = 0.56$), physical environment ($P = 0.09$), and total stress score before the intervention ($P = 0.96$).

Paired t-test was used to compare the mean scores of job stress between the intervention and control groups before and after the intervention (Table 2). According to the results, the intervention group's mean scores of job stress reduced in all dimensions, except for workload ($P = 0.46$) and physical environment ($P = 0.096$). However, a significant increase was detected in the mean scores of incompetence of the role, range of the role, and responsibility dimensions.

Independent t-test was employed to compare the 2 groups regarding the mean scores of different dimensions

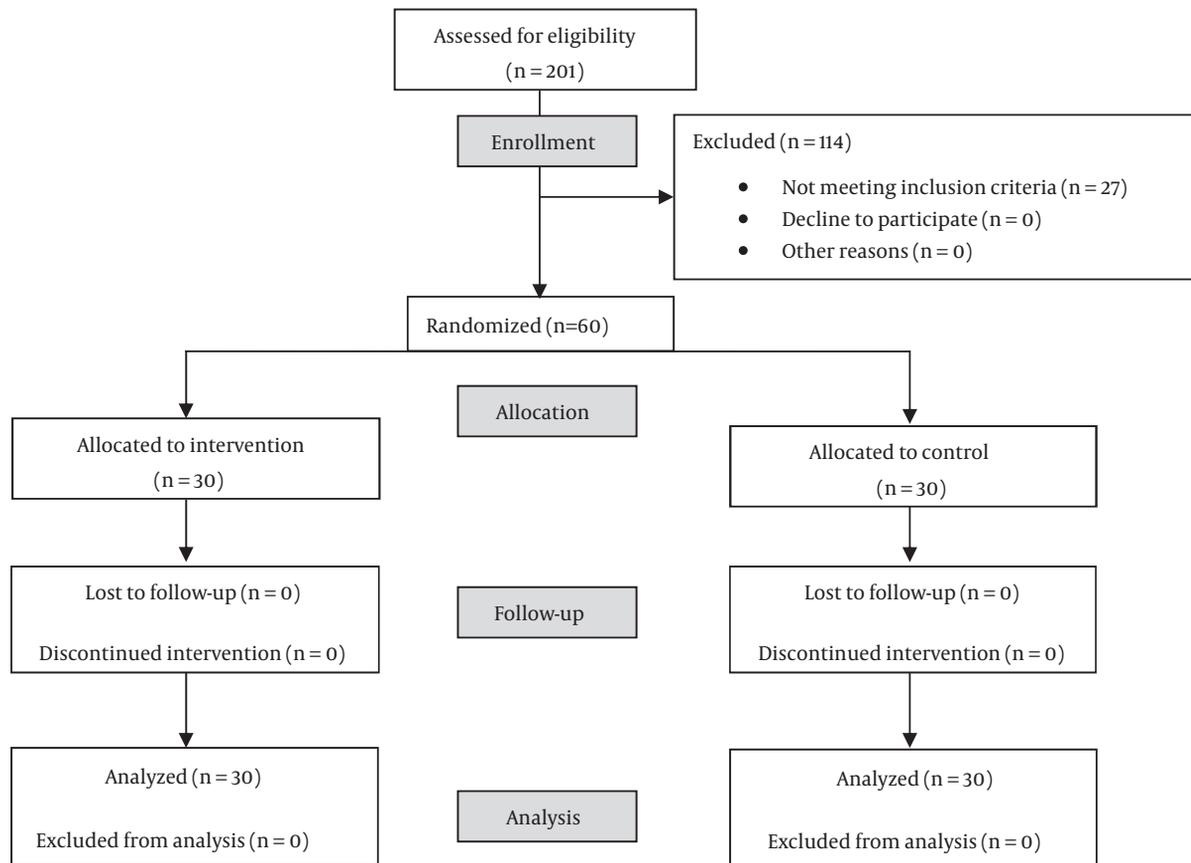


Figure 1. The Participant's CONSORT Flow Diagram

Table 2. Comparison of Pre and Post of Two Groups Regarding the Mean Score of Job Stress Before and Two Months After the Intervention in Each Group Using Paired Sample T-Test^a

Job Stress Dimensions	Case Group		Paired Sample T-Test (P Value) ^b	Control Group		Paired Sample T-Test (P Value) ^b
	Pre Intervention	2 month After Intervention		First Visit	2 Months Later	
Work load	35.50 ± 4.71	35.53 ± 4.69	0.328 (0.745)	34.23 ± 6.50	34.43 ± 6.58	1.00 (0.326)
Incompetence of the role	28.53 ± 6.33	26.53 ± 5.46	6.3 (< 0.001)	31.70 ± 6.66	32.33 ± 6.88	2.433 (0.021)
Duality of the role	34.36 ± 4.72	29.86 ± 4.66	8.5 (< 0.001)	36.33 ± 4.82	36.76 ± 4.53	1.819 (0.079)
Range of the role	33.03 ± 4.53	30.10 ± 5.14	8.15 (< 0.001)	33.20 ± 5.89	33.70 ± 5.77	2.096 (0.045)
Responsibility	32.86 ± 6.53	28.90 ± 5.50	5.7 (< 0.001)	31.90 ± 6.53	32.30 ± 6.85	2.183 (0.037)
Physical Environment	32.80 ± 7.22	32.900 ± 7.41	0.9 (0.378)	29.60 ± 7.00	29.70 ± 7.02	1.361 (0.184)
Total	197.1 ± 11.1	183.83 ± 10.5	8.4 (< 0.001)	196.96 ± 11.67	199.23 ± 11.51	3.982 (< 0.001)

^aValues are expressed as No. (%) or mean ± SD.

^bP value < 0.05.

of job stress after the intervention (Table 3). The results revealed a significant difference between the 2 groups re-

garding the mean scores of incompetence of the role, duality of the role, range of the role, and responsibility. However, no significant difference was found between the 2 groups concerning the mean scores of workload and physical environment ($P = 0.091$ and $P = 0.46$, respectively). Total job stress score decreased in the intervention group after the intervention ($P = 0.001$) yet in the control group, total job stress score increased in reverse ($P = 0.001$) (Table 3).

Table 3. Comparison of the Mean Difference Between Pre and Post Intervention in the Case and Control Groups (Independent T-Test)

Job Stress Dimensions	Case	Control	P Value
Workload	+0.03 ± 0.55	+0.2 ± 1.09	0 < 0.46
Incompetence of the role	-2 ± 1.74	+0.63 ± 1.42	0 < 0.001
Duality of the role	-4.5 ± 2.89	+0.43 ± 1.3	0 < 0.001
Responsibility	-3.96 ± 3.81	+0.4 ± 1	0 < 0.001
Physical environment	+0.1 ± 0.6	+0.1 ± 0.4	1
Range of the role	-2.93 ± 2.61	+0.5 ± 1.3	0 < 0.001
Total	-13.26 ± 8.65	+2.26 ± 3.11	0 < 0.001

5. Discussion

This study aimed at investigating the effect of stress management on the level of job stress among female nurses working at operating rooms. The results showed that stress management training during 5 sessions was effective in decreasing total job stress among operating room nurses and reduced the mean scores of incompetence of the role, duality of the role, range of the role, and responsibility. However, the mean scores of incompetence of the role, range of the role, and responsibility increased in the control group. This might be due to the operating room nurses' high workload and their small number compared to the number of patients. Hazavehei et al. reported medium and severe job stress in more than half of the nurses. He also observed a reverse relationship between job stress and job satisfaction (4). However, Bakhtiari et al. (16) demonstrated that operating room nurses often experienced mild job stress. In the present study, on the other hand, nearly half of the cases had medium to severe stress. This could be probably due to the fact that most patients prefer to have surgeries in educational hospitals. Educational hospitals are becoming more popular among middle- to low-class patients because they often cover all types of insurance and reduce the costs of hospitalization and surgery, especially after the implementation of Health Reform Plan. Presence of specialists and subspecialists in educational hospitals could also be another possible reason for this popularity.

Mimura and Griffiths suggested that stress management strategies could be divided to 2 categories. One category of stress management strategies is used with the goal of empowering nurses and providing them with the necessary support so that they can efficiently face stressful situations and be consistent with them (17). The present study was performed using the same strategy. In this context, Hosseini et al. (13) conducted a study on nursing personnel to assess the impact of stress management program on their job stress. The results showed no significant difference between the intervention and control groups regarding the mean score of occupational stress before the intervention. After the intervention, however, the mean score of job stress decreased in the intervention group while it increased in the control group ($P < 0.001$). The number of predisposing factors for reduction of stress and enabling factors for coping with stress and stress coping behaviors also increased significantly in the intervention group compared to the control group (8). In the present study, no significant difference was found between the 2 groups regarding the mean score of job stress before the intervention. After the intervention, however, the mean score of job stress decreased in the intervention group and increased in the control group.

In another study, Alavi Arjmand et al. (18) assessed the impact of stress management on job stress and work-life conflict among 64 nurses. The results showed a significant difference between the intervention and control groups in terms of work-life conflict and job stress a month after the intervention (9). In the current study, the impact of stress management intervention lasted for up to 2 months after the intervention, which indicates the desirability and effectiveness of stress management training along with technical exercises.

Karimyar Jahromi et al. (19) evaluated the impact of stress management program on occupational stress in 35 midwives. The results showed that short-term training workshop of stress management caused a significant reduction in the mean score of occupational stress in the intervention group compared to the control group, which is consistent with the present study findings.

Mimura and Griffiths mentioned the second strategy of stress management in relation to management of workplace stressors. In this strategy, stress management aims to decrease physical stress resources in the workplace (17). Laal et al. (20) reported that stress management methods had a positive effect on job stress in 67.9% of nurses. Thus, the researchers concluded that job stress-relieving methods were not only related to individuals but also to the job environment. Therefore, efforts should be made to reduce workplace stressors. The findings of the present study revealed no changes in the mean score of physical envi-

ronment dimension in the 2 groups after the intervention. Hence, further studies are recommended to assess the impact of physical environment on the level of stress.

5.1. Conclusion

The results of this study showed that stress management could reduce the level of job stress among female nurses working in operating rooms. Generally, operation room environment is very stressful due to the stressful nature of surgery, tough physical conditions in the operating room, and health risk factors, such as radiation, chemicals, and contagious diseases. Due to the negative effects of high stress on various aspects of individuals' jobs and lives, society, patients, and the healthcare system, stress management should be implemented to reduce the negative effects of job stress and improve the health personnel's quality of life. Stress reduction methods are also suggested to be used for operating room nurses. Since nursing is among stressful jobs around the world, high and uncontrolled stress could create a serious risk for nurses' physical and mental health. Therefore, finding the right solution to prevent and deal with this phenomenon will help individuals, families, and organizations.

5.2. Study Limitations

The samples in the present study were collected only from educational hospitals affiliated to Shiraz University of Medical Sciences. Thus, the results might not be generalized to other kinds of hospitals.

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Footnotes

Authors' Contribution: Azadeh Amiri, Giti Setoodeh and Seyyede Fatemeh Sajjadi contributed in the conception, literature search, data collection, and drafting of the manuscript. Azadeh Amiri contributed in design and statistical analysis. All authors read and approved the final version of the manuscript. Giti Setoodeh is the correspondent of this work.

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