Effect of Education on Stress of Exposure to Sharps Among Nurses in Emergency and Trauma Care Wards

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Background: Health care services can cause injuries to medical staff. One of these injuries is exposure to needle-sticks. This can result in the transmission of blood-borne diseases, such as HIV and hepatitis B; the staff undergo continuous stress. Thus, it is necessary to use some method to reduce this stress.

Objectives: The purpose of this study was to examine the effect of education based on the stabilization model on stress induced exposure to needle sticks among nurses working in emergency and trauma wards.

Patients and Methods: This Quast- Experiental Study was performed on 35 nurses working in emergency and trauma wards of our hospital in October-December 2013. Data were collected using a two-part questionnaire; Reliability and validity of the questionnaire were confirmed ($\alpha = 0.92$ and ICC = 0.94).Data were analyzed using SPSS version 20. The one-sample Kolmogorov-Smirnov test, independent t-test and paired sample t-test were also used.

Results: The mean and standard deviation of stress experienced by nurses before and after the intervention were 64.94 ± 15.67 and 43.91 ± 10.73, respectively. Findings indicated that education decrease needle stick stress in nurses significantly (P < 0.001).

Conclusions: According to the results of this study, the stress level induced due to needle-stick exposure and its complications is high and interventions for reduction are essential.

Keywords: Early Intervention (Education); Emergency Service, Hospital; Needle-stick Injuries; Stress Disorders, post Traumatic; Nurses

1. Background

Nursing is an occupation that has high levels of stress (1). Researchers have stated that stress in nurses is due to the fear of exposure to infectious diseases and needle-stick injuries (2), which has a negative impact on the individuals, their families and colleagues (3). Sharps can lead to life-threatening viral infections transmitted through blood (4). The Centers for Diseases Control (CDC) states that needle-stick injury is a major occupational health threat and nurses have the highest number of needle-stick injuries (5). In one study, stress of exposure to needle-stick was classified as a psychological trauma with intense psychological symptoms, posttraumatic stress, anxiety, and depression (6). Workers who feel anxious or distressed are often unrecognized and untreated; therefore, their needs for assistance is mostly unknown (7). The documents show that over half of injuries from sharp instruments are not reported (8). Education is one of the key elements in raising awareness and improving clinical skills of the staff. Several studies have shown that taking comprehensive precautions not only encourages staff performance during clinical practice, but also is effective for improvement of compliance with corporate policies and guidelines. A safe work environment and efficient trainings to confront the hazards of needle-stick injuries can reduce the incidence of these injuries (9).

2. Objectives

This study aimed to examine the effect of education based on the stabilization model on stress induced due to exposure to needle sticks among nurses working in emergency and trauma wards at Baqiyatallah Hospital.

3. Patients and Methods

This Quast- Experiental Study was conducted on 35 nurses in emergency and trauma departments of our hospital in 2013. Data were collected using a two-part questionnaire; part one consisted of demographic data and part two consisted of questions about stress induced due fear from needle stick exposure; 15 individuals of the target group filled out a questionnaire with two week intervals. Reliability was calculated with $\alpha = 0.92$ and ICC

= 0.94.Samples were all nurses who had at least one-year of clinical experience and they had at least an associate degree (10).

The objectives of the study were explained and stress questionnaires were distributed among them; 20 closed questions were measured using Likert scale (wherein very low gets score 1; low gets 2, mean gets 3, high gets 4, and very high gets 5). The minimum score attainable was 20 and maximum score was 100. The questionnaire had four parts including safety policy, occupational safety, and contact-care and mental-environment conditions. Safety policy contained 5 questions, occupational safety 6 questions, and contact-care 4 questions and mental-environmental conditions 5 questions. In this study, the instrument content validity was used to validate the demographic characteristics.

Intervention included education (which increased the amount of information participants had in the field of sharps injuries) and training universal precautions to prevent injury, proper use of protective coatings and use of equipments and engineering measures based on the type of care, disease transmission method, disease control protocols, laboratory tests and prophylactic actions in case of exposure. All of the above-mentioned objects were based on international standards and Center for Disease Control (CDC) (11).

3.1. Data Processing and Analysis

Data were analyzed via SPSS version 20 (Inc., Chicago, ILL, USA) using the one-sample Kolmogorov-Smirnov test, independent t-test and paired sample t-test. Descriptive statistical analyses were used to determine the relative frequency, mean stress and the Pearson correlation coefficient.

4. Results

4.1. Socio-Demographic Characteristics

From the total of 35 participants, 20 cases (57.1%) were males and 15 (42.9%) were females. the mean and median ages of the participants were 35.17 and 34 years, respectively. There was no statistically significant correlation between age and stress (P = 0.26 and r = -0.19) and there was also no correlation between education and needle-stick stress score (P = 0.34).

4.2. Job Characteristics

31 (8.6%) were bachelor's degree nurses, 17 (48.6%) were contract and 18 (51.4%) official employees. Mean of work experience was 10.02 ± 7.8 years and (minimum 1 year and maximum 33 years). No significant relation was found between work experience and needle-stick' stress (P = 0.67, r = -0.75). Also, the overtime had no effect on stress score (P = 0.39).

Stress from sharp instruments exposure before the intervention was 64.96 ± 15.6 and mean stress after training was 43.91 ± 10.7 and paired t-test (P < 0.001) indicated that the stress was significantly reduced. In each of the areas, stress was assessed before and after trainings. In the first part which included Safety Policy, the nurses' pre-education stress was 60.00 ± 17.4 and after training was 38.84 ± 12.2 (P > 0.001), which shows a significant decrease. The second part was Occupational Safety which was 72.34 ± 23.2 before intervention and 45.94 ± 14.9 after training (P < 0.001). In the third part, the level of stress among the nurses was assessed. Results showed a mean 60.80 ± 14.0 before the intervention and 40.91 ± 12.8 after the intervention (Table 1).

5. Discussion

The present study aimed to measure stress levels in nurses in the emergency and trauma departments of Baqiyatallah Hospital. This study merely measured stress in nurses who were exposed to sharp instruments using a specific valid and reliable measuring tool. Then, nurses' awareness and knowledge in this field were increased by an educational intervention. After intervention, stress level was measured again by confronting sharp instruments. Amount of stress in nurses was 64.96 before performing the intervention that represents nurses' high stress to the exposure. Other studies have confirmed these results. The study of Gelsema showed a significant relationship between job stress and the nature of nursing (12). Studies that have been conducted on the impact of education on occupational stress reveal positive effects of education in reducing stress. In a study that included 105 hours psychological training attitude and communication skills caused a reduction of stress in oncology nurses (13). Moeini et al. conducted a study based on PRECEDE Model, which was effective on decreasing job

Table 1. Mean Stress in a Four-Area Questionnaire Before and After Training

Area	Mean Stress Before	Mean Stress After	Paired t Test
Safety policy	60.00 ± 17.4	38.83 ± 12.2	P < 0.001
Occupational safety	72.34 ± 23.2	45.94 ± 14.9	P < 0.001
Contact-care	60.80 ± 14.0	40.91 ± 12.8	P < 0.001
Mental-environment condition	66.62 ± 19.3	49.94 ± 14.8	P < 0.001
General stress	64.94 ± 15.6	43.91 ± 10.7	P < 0.001

stress in nurses (14). In another study, progressive muscle relaxation trainings reduce stress and anxiety in nursing (15, 16). Stress among nurses in our study was 64.96, consistent with the results of Hebrani (17).

Another study also showed no significant difference in stress of nurses who had been injured by sharp objects last month with the nurses who had no history of injury. However, despite higher stress, no significant difference was observed. In this study, samples were not homogeneous due to the differences in work experience. This means that nursing groups had a significantly higher experience (18). In another study, occupational safety awareness and safety behavior significantly decreased the rate of injuries with sharp objects (19). Results of many studies imply that the improvement of performance, attitudes, awareness and educations is essential to control and reduce injuries (20, 21).

In this study, there were no significant differences between demographic characteristics and stress, caused by exposure to sharp objects and no difference in the stress levels between men and women as well. However, a showed that aging increases the rate of needle-stick injury (22). In our study, despite the fact that more than 68% of the participants worked over time, there was no significant difference in participants' stress levels. Studies confirmed that fatigue and sleepiness can increase an occupational exposure to blood and secretions (23).

Injury prevention trainings provided specific instructions related to safety and occupational accidents and were effective to communicate for reporting. Also, mental-environment conditions and contact-care education were effective and decreased stress score. The results of a survey in Germany showed a reduced incidence of needle-stick injury using safety box (24). In mental-environment condition area, O'Connor showed that injury by sharp objects caused leave or absence and is prolonged due to anxiety or stress disorder (25). Work-related interventions are important to improve occupational health in emergency room nurses, nursing managers should be aware of the causes and consequences of occupational stress in emergency room nurses, in order to activate preventive interventions (26).

Nurses were reluctant to participate in the study due to lack of time. Statistical results derived from this study suggest that the level of stress among nurses was one of the major obstacles that should be considered in the process of Position stabilizing in the emergency and trauma departments.

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Authors' Contributions

Malihe Sadat Moayed: study conception and design, data collection and analysis, drafting of the manuscript. Hosein Mahmoudi: study conception and design, critical revisions for important intellectual content, drafting of the manuscript and supervision. Abbas Ebadi: substantial contributions to analysis and interpretation of data, critical revisions for important intellectual content, and final approval of the version to be published. Mohammad Mehdi Salary and Zahra Danial: scientific advisers, critical revisions for important intellectual content, and final approval of the version to be published.

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