

Effect of Implementing Self-Awareness and Empowerment Development Model in Emergency Nurses on Decreasing the Exposure to Sharp Objects and Patients' Discharge

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Abstract

Aims: The risk of exposure to blood-borne pathogens is one of the occupational hazards and serious concerns of health care workers. This study aimed to investigate the effect of the self-awareness development and empowerment model in emergency nurses on decreasing exposure to sharp objects and patients' discharges.

Instrument & Methods: This quasi-experimental study was conducted at Khoy University of Medical Sciences in 2019-2020. According to the census method, all 90 nurses who worked in the emergency ward of Imam Khomeini (42 patients as intervention group) and Qamar-e Banihashem (48 patients as the control group) hospitals participated in the study. The nurses of the intervention group underwent an educational program based on the self-awareness development model and were trained in 5 sessions. The questionnaire on exposure to sharp objects and discharges of patients was completed by nurses in both groups before and after the intervention. Data were analyzed using SPSS 19 software through non-parametric Chi-square, McNemar and Mann-Whitney, and independent T-tests.

Findings: There was no statistically significant difference between the two groups before implementing the model ($p=0.647$). Exposure history in emergency nurses was 55.6% ($n=40$). There was a statistically significant difference between the two groups after implementing training programs based on the model steps of nurses' exposure ($p=0.024$).

Conclusion: Implementation of the self-awareness and empowerment model effectively exposes sharp objects and patients' discharge in nurses working in emergency departments.

Keywords

Self-Awareness [<https://www.ncbi.nlm.nih.gov/mesh/68056348>];

Empowerment [<https://www.ncbi.nlm.nih.gov/mesh/2030829>];

Sharp Objects [Not Found];

Patients' Discharge [Not Found];

Nurses [<https://www.ncbi.nlm.nih.gov/mesh/68009726>];

Emergency [<https://www.ncbi.nlm.nih.gov/mesh/68004630>]

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Received: October 1, 2021

Accepted: December 15, 2021

ePublished: January 15, 2022

Introduction

People's health in a society reflects the well-being and comfort of society, and it is an index for measuring its development. In this regard, the health of healthcare workers, which is one of the basic pillars of community health, is very important. Every year, many health workers suffer from problems in the face of occupational injuries that endanger their health [1]. One of the occupational hazards and serious concerns among health care system employees is injuries caused by sharp objects and contact with patients' secretions [2, 3]. Exposure to sharp objects means skin penetrating damage caused by sharp medical instruments contaminated with blood or discharge of the patient and is the greatest risk factor threatening employees working in medical departments [4]. With the advancement of technology in medicine, invasive methods and injections in patients have expanded. For this reason, health care workers are at risk of occupational exposure to many blood-borne pathogens [5]. Based on the World Health Organization report, each year, 3 million people are injured by sharp objects and the discharge of patients, and 90% of these cases occur in developing countries [6].

Injuries caused by sharp objects are significant because they transmit twenty types of blood-borne pathogens associated with needle head injury and patient discharge from health care workers. Viral infections including hepatitis B, hepatitis C, and HIV are the most common and dangerous [7-10]. The chance of transmitting hepatitis B, C, and AIDS through needle injury from an active patient is about 30, 3, and 0.3%, respectively. About 37%, 3%, and 4% of hepatitis B, C, and AIDS cases in the treatment team are due to needle injury, which 90% of these cases occur in developing countries [11, 12].

The nursing staff is more at risk among the health care workers due to frequent injections, transfusions, and care of patients infected with these viruses. Heavy workload, inadequate number of nurses compared to patients, frequent shift works, and excessive fatigue increase these cases in nursing employees, especially in developing countries [13].

In assessing the frequency of injury with sharp objects and patients' discharge according to the workplace, the emergency department has been identified as a high-risk ward, due to the urgency of work and dealing with different occupational groups (nurses and students), performing procedures (injections, transfusions, sutures) which are one of the most dangerous procedures and can be considered as a reason for the risk of emergency ward [14]. According to the research of Zeighami *et al.*, nurses working in the emergency department are almost three times more at risk of needle head injury than other departments due to the high volume of work [3].

Due to the prevalence of injuries caused by needle heads, discharges, and the resulting risks, the necessity of paying attention to its effective factors has particular importance to reduce these injuries among nursing staff. Therefore, one of the methods that play an important role in reducing injury is training and educational programs [15, 16]. Different methods with different effects have been used to reduce the exposure. Among the compelling cases, we can mention the use of training models. In the model of developing self-awareness and empowerment, a person can use her/his intelligence and intellectual and practical capacities for self-management in a desirable way. In the model of self-awareness and empowerment, it is emphasized that the revision of training programs should be done to lead to the training of specialized and experienced staff in various specialties. The Objectives of developing self-awareness and empowerment are increasing the knowledge and awareness of healthcare workers, improving the functional skills of health care workers in safe care, strengthening health and the importance of maintaining and promoting health in employees, reducing staff stress and worries, and promoting self-efficacy beliefs in health care workers [17].

In most previous studies, general suggestions for reducing contact with sharp objects have been mentioned. Investigating the research background reveals that staff exposure to needle heads and patients' discharge has been significant, and the provided suggestions and solutions could not help solve the problem. Also, medical staff can't enjoy safe medical equipment in terms of economic, cultural, and social conditions. Therefore, considering the determining role of theory-based educational interventions as well as the researcher's work experience in the emergency department, this study aimed to investigate the effect of implementing the self-awareness development and empowerment model in emergency nurses on exposure to sharp objects and patients' discharges.

Instrument and Methods

This quasi-experimental study with pre and post-study design was performed at the emergency department of Khoy University of Medical Sciences hospitals in 2019-2020. Forty-one people were allocated to each group based on the number of samples required in the study of Loripour *et al.* [18] and 5% error and 90% test power. Due to the limited statistical population, 90 nurses were included in the study how were permanently healthcare workers of the emergency department of Imam Khomeini and Qamar-e Banihashem hospitals (not temporary or alternative), with at least a bachelor's degree in nursing and at least six months of experience in the emergency department.

Due to the conditions of the intervention sessions, the

employment of the studied samples, and the impossibility of moving nurses, 42 and 48 emergency nurses of Imam Khomeini and Qamar-e Banihashem Hospitals were considered as the intervention and control groups, respectively.

Data were collected using a three-part questionnaire including demographic information (age, gender, work experience, work experience in the emergency ward, and type of work shift), the frequency of exposure to sharp objects, and patients' discharge (exposure history, number of exposure times, shift of exposure and exposure history in the three months leading up to the research time), and perceived stress of nurses. The stress section consisted of 20 questions scored using a 5-point Likert scale, including very low (1 point), low (2 points), medium (3 points), high (4 points), and very high (5 points) with a minimum score of 20 and a maximum score of 100. Five nursing faculty members confirmed the instrument's content, and its reliability in the pilot group study was calculated at 0.86 using Cronbach's alpha.

After obtaining the necessary permission from the ethics committee of Urmia University of Medical Sciences, sampling was conducted in the two studied hospitals. Due to the limited movement of employed nurses and the need to hold a one-time training course on the development of self-awareness and empowerment, the samples of Imam Khomeini Hospital were selected as the intervention group, and a training course was held in this university. The model of self-awareness and empowerment was implemented in six steps.

- The first step was to receive support, for which a meeting was held with the participation of the hospital's managers, nursing services manager, and infection control expert and some explanations about the model, importance of the research topic in the organizational chart, and the use of the authority of senior managers was provided to them for accessing appropriate equipment to avoid exposure. The justification and responsibility of the infection control expert in updating the health records of the employees were also requested.
- The second step was culture building, which was carried out through the help of a management team using posters, making personal protective equipment available to nurses, and introducing colleagues who were successive work samples.
- The third step was to try to empower and develop nurses' awareness. For this purpose, after preparing training tools, appropriate training objectives were provided to the intervention group for three 60-minute training sessions. The nurses of the intervention group were divided into four groups based on shift and working time and were trained at the theater of

Imam Khomeini Hospital. Training sessions were held on Sundays (understanding the phenomenon of exposure and its nature, recognizing actual and potential problems related to the disease, and increasing people's awareness), Mondays (discussion on prevention of exposure to sharp objects and patients' discharge), and Tuesdays (training of exposure protocols based on the latest instructions) weekly. The methods used for teaching included lectures, questions and answers, and group discussions. To properly understand the content, prevent misunderstanding of the content, and involve the nurses' sense of sight in learning, due to the great importance of this sense in learning, other teaching tools such as posters, pamphlets, and whiteboards were used along with the lecture.

- The fourth step was to use defense mechanisms to reduce stress and anxiety. At this stage, a counseling psychologist explained the mechanism for the nurses in a 60-minute session.
- The fifth step was to use the appeal to spirituality. A religious and spiritual affairs expert asked to give a 60-minute speech to the nurses of the intervention group regarding the importance of paying attention to health from the perspective of Islam.
- Step 6 was performed three months after the educational intervention, and the extent of perceived stress exposure was assessed in both groups.

Exclusion criteria were lack of full participation in classes and moving to other departments. The researcher also explained the confidentiality of the subjects, and research units were asked to provide all information accurately and honestly. Data were analyzed using SPSS 19 software through Chi-square (to compare demographic characteristics between the two groups), Mann-Whitney (to compare the level of exposure before and after training), and independent T-tests (to assess the level of perceived stress before and after training).

Findings

There was no significant difference between the intervention and control groups regarding demographic characteristics. Most participants (53.3%) were female and in the range of 25-30 years (31.1%). 30% of the subjects had more than five years of work experience in the emergency department. The majority of participants (90%) worked in rotation shifts. 55.6% of nurses had a history of exposure, and 72.4% reported exposure to an infection control expert.

There was a significant difference in the mean of occupational exposure to sharp objects and patients' discharge, perceived stress of nurses, and the number

of exposed people in the intervention group after the intervention (Table 1).

Table 1) Comparison of the studied indicators in the two groups of intervention and control before and after the intervention

Parameter	Before intervention	After intervention	Significance level
Average occupational exposure to sharp objects and patients' discharge			
Control	21.7±6.1	22.1±5.4	p<0.001
Intervention	7±25.10	13.0±6.2	
Perceived stress			
Control	66.6±19.3	65.9±17.6	p<0.001
Intervention	64.9±15.6	43.9±10.7	
Number of exposed people			
Control	8	7	p=0.024
Intervention	7	1	

Discussion

Findings showed no significant difference between the intervention and control groups regarding quantitative demographic intervening variables, including work experience, emergency work experience, and the number of exposure and qualitative demographic intervening variables including age, gender, type of work shift, and the two groups were homogeneous. According to the results of the present study, most of the participants were in the age range of 25-30 years (31.1%), which was consistent with the study of Singh *et al.* (31%) [19]. Also, most of the participants were female (53.3%), and the findings were by the results of Salmanzadeh *et al.* (53%) [20]. According to various studies, needle stick injury in healthcare providers, especially nurses, has been significant. Given that nurses are the majority of the hospital workforce, the rate of needle stick injury in nurses is more than other health care providers. According to the results, 55.6% of nurses had a previous history of exposure, which was consistent with the study of Nejadghaderi *et al.* (55%) [21], Legesse *et al.* (55.1%) [22], and Mahmoudi *et al.* (50%) [23].

According to the present study results, most of the participants worked in rotational shifts, which was consistent with the findings of Smith *et al.* [24]. The level of exposure in people who work in rotation work shifts is more than regular constant work shifts. Also, there was no significant difference between work shift time and exposure in the present study. This finding is not consistent with the results of Pirsheb *et al.* [25], Zeighami *et al.* [4], Cho *et al.* [9], Verma *et al.* [26], and Belachew *et al.* [27], and in these studies, the rate of exposure in the morning work shift has been reported more than evening and night work shifts.

In the study of the level of perceived stress by nurses concerning exposure to sharp objects and patients' discharge, Mehrdad *et al.* [28] studied the prevalence of exposure to sharp objects and patients' discharge and related psychosocial factors among nurses in

Iran. They found that 58.1% of the injured people had moderate to high-stress levels. Moayed *et al.* [29] showed that training for preventing injury with sharp objects and providing special instructions related to safety and occupational accidents reduce nurses' stress scores, following the findings of this study.

The findings of the present study showed the effectiveness of the self-awareness and empowerment model in the face of sharp objects and patients' discharge in nurses working in emergency departments. To justify this, we can say that the implementation of the model with six steps, and providing training sessions as well as the formation of training classes in line with one of the model steps, which were performed in the form of three face-to-face sessions for nurses using the distribution of booklets, pamphlets, and educational CDs, reduced the rate of exposure to sharp objects and patients' discharge in emergency nurses and indicates the effect of the intervention based on the model of self-awareness and empowerment. Although no research was found in this regard, following this finding, studies based on other health models and prevention education programs have mentioned the exposure reduction among health care workers, especially nurses.

Among the related studies is the study of Bijani *et al.* [30] entitled "evaluating the effectiveness of a continuing education program to prevent needle injury and exposure to sharp objects in nursing staff based on the Kirk Patrick model." The results of Bijani *et al.* [30] showed no significant difference in the rate of exposure to sharp objects and patients' discharge between the two groups before implementing the model. However, after implementing the model, the level of exposure in the intervention group has significantly decreased, which is consistent with the results of this study.

In 2017, Juni *et al.* [31] conducted a study to investigate the effect of health education on reducing needlestick injuries among nurses. They used three strategies (education through social networks, audio-visual speech, and a combination of social network and audio-visual speech) for education.

The results show that in all three methods, the exposure between the two groups was significant six months after training, and in the combined method, the difference between the two groups was significant, three months after training which was consistent with the results of the present study; there was a statistically significant difference between the two groups three months after the intervention in this study.

Sedigh *et al.* [32] studied the effect of the health belief model in the injuries caused by needle sticks and blood-borne pathogens among nurses. The results show that education based on the health belief model, increasing knowledge, and promoting nurses' preventive behaviors, decreased exposure to sharp objects, and patients' discharge, according to the

findings of this study. The method used in this study, like the present study, was the use of educational models with multiple dimensions, which has been effective in reducing exposure.

Conclusion

The model of developing self-awareness and empowerment reduces exposure to sharp objects and patient discharge in nurses working in emergency departments. Therefore, nurses and management of health systems can be encouraged to use the model of self-awareness and empowerment as a comprehensive prevention program to reduce side effects and complication management to improve the quality of nursing care.

Acknowledgments: We thank the officials of the Faculty of Nursing and Midwifery of Urmia University of Medical Sciences, the officials and staff of Qamar-e Banihashem and Imam Khomeini Khoy hospitals, and all the colleagues and participants who helped us in conducting this research.

Ethical Permissions: This research has been approved by the ethics committee of Urmia University of Medical Sciences with the ethical code of 328/1398REC.UMSU.IR.

Conflicts of Interests: No cases have been reported by the authors.

Authors' Contribution: Motaarefi H. (First Author), Methodologist/Assistant Researcher/Statistical Analyst (50%); Gholizadgougjehyaran H. (Second Author), Introduction Writer/Main Researcher/Discussion Writer (50%)

Funding/Support: This article was retrieved from the master's thesis in internal medicine surgery (No. 9561), which was conducted with the financial support of the Vice Chancellor for Research of Urmia University of Medical Sciences.

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