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Evaluation of Educational Intervention on Standard Precautions among Healthcare Provider Based on Health Belief Model

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Abstract

Background and objective: Occupational exposure makes healthcare provider at risk of a variety of infections such as AIDS, Hepatitis B, and Hepatitis C. This study investigated the effect of educational intervention on standardized precautionary behaviors in healthcare provider based on health belief model, in Jam city, Iran during 2016.

Methods: This experimental study was carried out on Tohid hospital staff and health care provider of Jam`s health center. Random stratified sampling based on different occupation designated into two groups, intervention (n=50) and control (n=50). After confirming the validity and reliability of the data collection tool, the educational intervention was examined before and after the intervention. Data were analyzed using descriptive statistical methods, independent t-test and one-way ANOVA (SPSS 20).

Results: The results revealed that the healthcare provider did not have any previous educational background on standardized precautionary (34.3%). Furthermore, the history of needle stick injuries (42.5%) and contact with patients' body fluids (17.5%) were reported. Educational intervention regarding to standardized precautions in the intervention group was significantly increased the mean score of knowledge constructs, perceived sensitivity, perceived severity, perceived benefits, perceived barriers and behaviors. However, no significant changes were observed in increasing the self-efficacy the score.

Conclusion: The results indicate the effectiveness of educational intervention on standard precautionsamong healthcare provider based on health belief model. Educational program based on promotion behavioral pattern in relation to standard precautionsis recommended to the healthcare provider.

Keywords: Educational intervention; Health belief model; Standardized precautionary; Health care provider

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Introduction

Health care personnel(HCP)/Provider are at high risk for contagious infections such as blood-borne infections and body fluids in the context of occupational exposure. General precautions are the basis for initial prevention and reduction of occupational exposure [1]. The term HCP/Provider refers to all people who work in a health care provider system and have the possibility of exposure to contaminated and infectious substances such as blood, human tissue, and body fluids, contaminated medical equipment.

Therefore, health care providers can include hospital personnel, dental services, laboratories and even health centers, including all doctors, health care providers and nurses, technicians, students and clinical students, health personnel, health care workers and even workers. The crew may contact the patients directly or indirectly contact the patients, such as workers who are responsible for the transfer of hospital waste [2]. Occupational hazardous exposure of health and medical personnel can put them at risk for a variety of infections such as AIDS, hepatitis B and hepatitis C. These exposures can also occur in various forms, such as skin exposure to blood and other body fluids in patients, such as needle stick injury, exposure to mucous membranes such as material splash in the eyes, mouths or nose contaminated fluids, and even exposure to unhealthy skin such as the scratched skin or cracked skin or dermatitis [3].

The risk of HBV infection depends, in principle, on the degree of exposure to the blood and the HBe Ag status of the source. Based on evidence, if both HBS Ag and HBe Ag are both positive, the risk of developing clinical hepatitis is 31%-22%, and the probability of serologic changes is 62%-37%. If HBe Ag be negative and HBS Ag is positive, the risk of developing clinical hepatitis from infected needles has been estimated to be 1 to 6% and the risk of developing serological evidence of HBV infection is 23-37%.

In addition, the risk of HCV infection is lower due to exposure to blood from hepatitis B, an average of 1.8% (range 7-1%) of serum evidence occurs after accidental cutaneous exposure to the source of HCV. The risk of HIV transmission varies according to the type and severity of exposure. Medium risk for HIV transmission for HCP after exposure of skin with HIV-infected blood is about 0.3% and after exposure to mucous membrane is estimated at 0.09% [4]. One of the most common and controllable ways of transmitting an infection in occupational exposure is the non-observance of the principles of standard precautions.

Observing safety precautions during and after exposure is especially important in areas where exposure is likely to be greater, such as an operating room, emergency room, delivery and dialysis [5]. Because caution and prevention of exposure and avoidance of high-risk items and the use of protectors during service delivery can be effective in reducing exposure [6]. A serious blood-transmitted infection could cost $1 million to carry out tests, follow-ups, disability costs, and loss of time, so that the cost of preventing suspected damage is estimated at $3,000 [6,7] But despite many emphasis on preventing injuries, these injuries can still be considered as a major threat to healthcare providers [8].

A study by Loripoor et al. [9], examined the effect of general care education on occupational exposures on Rafsanjan midwives, where the mean occupational exposure of the case and control groups before training was 10 ± 25.7 and 21.6 ±7.1 and 14.16 ± 4.6 and 20.2 ± 6.1 after training, respectively.

Comparison of the mean of occupational exposure before and after training showed that this mean in the case group was significantly decreased (P=0.001). However, there was no significant difference between the mean occupational exposure of the control group before and after training (P=0.3), [9]. Another study by Cho and colleagues [10] found that more than 40% of health workers were infected with hepatitis B and C and 2.5% were infected with HIV due to needle stick injury [10]. Laboratory experts (91.7%) had the highest occupational exposure [11]. Overall, the results of the studies often show the needle stick injury is due to lack of standard precautions, (eg. self-capping needle [9-12], IV/intravenous line [finding] and injection), [13,14], which can lead to the anxiety, fear, and stress of individuals and, on the other hand, can impose heavy costs on care and treatment systems [15]. Health education is one of the most effective interventions that could be effective in reducing exposure and improve the health of individuals, because the ultimate goal of health education is to improve the quality of life of individuals, and if it be effective, can save many people's lives, more than any other research, and provide the necessary tools for community health [6]. Educational process in health education can increase health information and improve attitudes and health behaviors [6].

Job training, with an emphasis on safety, has a very effective contribution to awareness, motivation and performance of health care staff [16]. One of the patterns used in changing behavior and preventing high-risk behaviors is the health belief model, and this pattern, with a focus on individual beliefs, can have a potential role in preventing and reducing high-risk behaviors. Educational content based on the patterns of their health beliefs increased preventive behaviors by increasing the motivation and understanding of the benefits of preventive behaviors as well as increasing self-efficacy in the creation and institutionalization of health behaviors [14].

Considering the significant frequency of occupational exposure in health care personnel and the serious effects of injuries, the attention of relevant authorities as well as vulnerable groups and the reasons for the impact of education on exposure reduction, the present study was conducted to evaluate the effectiveness of general preventive measures on occupational exposures of healthcare staff based on the health belief model.

Material and Methods

This study is a semi-experimental and interventional research. The population participating in the research includes health and medical personnel working in the health center and Tohid Hospital in Jam city, Bushehr province, southern Iran in 2017.

The number of samples needed in the study was based on the research of Loripour et al. The mean of occupational exposure in the case and control groups before the intervention (25.10 ± 7; 21.7 ± 6.1) and after training (14.4 ± 16.6; 20.6 ± 2.) were determined [9], based on the error of 5% and the test power of 90%, the minimum sample size of 45 was determined. Considering the rate of loss of people, 50 people in each group were calculated. Health care personnel were selected in two stages, in a random and quotasampling, so that at first, the total number of health care workers in the city of Jam (Tohid Hospital staff and clinics affiliated with the hospital, health centers and local health center) including: nurses and paramedic (12 subjects), social worker (18 subjects), laboratory staff (5 subjects), midwives (8 subjects), and health personnel (7 subjects). In the form of quota sampling, the number of people was determined by job title. Then, subjects were randomly divided into two intervention and control groups (each group was 50).

Inclusion criteria included at least one year of work experience, willingness to participate in the study, and exclusion criteria was: one-day absence or more in training classes.

Prior to the intervention, a briefing session was held for the participants in the study and provided information on how to do the research and the purpose, and the confidentiality of the information was explained to them. After obtaining written consent, and identifying intervention and control groups, the educational intervention was conducted for the intervention group (50 people). Educational intervention consisted of 3 sessions with 90 minutes of lectures, as well as questions and answers in a two-week period for the intervention group.

The preliminary meeting aimed at presenting the expectations and objectives of the study and completion of the questionnaire, as well as providing the schedule of participation in the training classes, the groups were made up of 10 to 15 people according to the situation. At the second meeting, information was provided on occupational exposure, threats and risks to personnel, as well as on the benefits of pre-exposure and post-exposure protection measures. In the third session, information was given to reduce barriers and increase self-efficacy and performance using PowerPoint. Then, for 2 months after the intervention, the evaluation was carried out. The data gathering tool in this research was a researcher-made questionnaire based on health belief model, by considering studies and authoritative sources.

This questionnaire consists of two parts: demographic questions and health belief model structures based on the self-report. The first part includes demographic questions (17 questions), the second part of the questions based on health belief model constructs including awareness questions (20 questions), perceived sensitivity (6 questions), perceived severity (6 questions), perceived benefits (6 questions), perceived barriers (8 questions), self-efficacy (8 questions), practice guide (5 questions) and performance (13 questions). The score for 5-point Likert scale (from totally agree to completely disagree) was scored with a score of one to five. The questions about the job exposure section were multiple choices with a score of zero to three, where a higher score indicates a better performance. The validity of the researcher-made questionnaire was obtained using 9 experts panel, which determined content validity index and content validity ratio of 0.89 and 0.78 respectively. The reliability of the tool was that the awareness and behavioral questions were calculated using the retest method as 0.81 and 0.90 with a two-week interval. The questions of health belief model were 0.76 using Cronbach's alpha coefficient, which were all acceptable. Data were then analyzed using SPSS version 20 software. In addition to descriptive statistical methods, chi-square test was used to analyze the homogeneity of the intervention and control groups. Independent t-test was used to compare the mean differences of structures in two groups and paired t-test for comparing changes in structural scores over time. Furthermore, a significant level of 5% was considered. It should be noted that this research was approved by the ethics committee of Bushehr University of Medical Sciences with an ethic code (BPUMS.RE.1394.56).

Results

The aim of this study was to evaluate educational intervention based on health belief model in terms of behaviors regarding standard precautions in health care staff.

In this research, 100 people participated in the study from the health system staff of Jam city including 50 in the intervention group and 50 in the control group. The mean age of the participants in the study was 34.43 ± 8.25, and the average work experience of the personnel was 10.64 ± 27.1 (Table 1).

In the survey, it was found that 34.3% of the health system staff had no previous history of standard precautions and 42.5% had needle stick injuries and 17.5% had contact with secretions of patients.

The intervention and control group is based on the demographic and basic factors including gender, occupation, education, employment status, history of participation in educational curriculum regarding standard precautions, having the necessary information on exposure to sharp objects, the use of two gloves at the time of service delivery and vaccination against hepatitis B disease, were not found to be significantly different (Table 1).

In addition, before the education of the two groups, the mean scores of knowledge, health belief model and behaviors related to standard precautions were the same and did not differ significantly ($P<0.05$). The results of the study showed that changes in knowledge, perceived sensitivity, perceived severity, perceived benefits, perceived barriers and behavior associated with standard precautions were found in the intervention group and showed significant changes ($P<0.05$) (Table 2). After intervention, comparison of changes in the mean scores of the two groups showed significant changes in mean scores of awareness, perceived sensitivity, perceived severity, perceived benefits, and behavior regarding standard precautions ($P<0.05$).

Discussion

Adherence to the principles of standard precautions reduces the transmission of infection and the psychological burden of occupational exposure. Therefore, in order to address these principles in the headline of health and medical personnel, a targeted educational program appropriate to behavioral models is needed to promote their health. Therefore, in this study, the Health Belief Model was used to improve the effectiveness of public health precautions on the occupational

Table 1. Demographic information and base of research participants.

Variable	Variable levels	Intervention group		Control group		P-value
		Frequency	Percent	Frequency	Percent	
SeX	Male	16	32	15	30	975/0
	Female	34	68	35	70	
Occupation	Nurse	11	22	12	24	141/0
	Midwife	7	14	8	16	
	lab	7	14	5	10	
	health	6	18	7	14	
	Healthcare Hospital	19	38	18	36	
Education level	Under the diploma	2	4	2	4	795/0
	Diploma	7	14	6	12	
	Associate Degree	15	30	14	28	
	Bachelor's degree and higher	26	52	28	56	
Employment Status	A plan	6	12	8	16	678/0
	Contractual	9	18	9	18	
	A pledge	15	30	15	30	
	Official	20	40	18	36	
Standard Precaution Training History	yes	27	54	26	52	951/0
	No	23	46	24	48	
Information on post-exposure action	yes	22	44	23	46	769/0
	No	28	56	27	54	
Vaccination for hepatitis B vaccine	yes	44	88	43	86	974/0
	No	6	12	7	14	
History of Needle Steak	yes	24	48	21	42	137/0
	No	26	25	29	58	

Table 2. Comparison of mean scores of knowledge, health beliefs model and behavioral patterns with standard precautions in both groups before and 2 months after intervention.

Variable		Before intervention (Standard deviation) average	2 months after the intervention (Standard deviation) average	P-value
Awareness	Intervention group	03/4±41/35	04/3±28/40	000/0
	Control group	67/5±81/34	51/6±18/35	425/0
P-value 521/0 000/0				
Perceived sensitivity	Intervention group	73/5±80/27	24/6±25/29	020/0
	Control group	54/6±64/26	42/3±04/27	731/0
P-value 63/0 001/0				
Perceived severity	Intervention group	81/9±21/45	91/4±32/48	004/0
	Control group	91/11±98/46	01/12±17/45	127/0
P-value 39/0 002/0				
Perceived benefits	Intervention group	23/4±25/27	56/8±21/29	002/0
	Control group	15/4±56/26	21/5±15/27	231/0
P-value 34/0 006/0				
Perceived barriers	Intervention group	70/8±64/24	40/5±02/22	143/0
	Control group	84/5±56/23	35/6±34/23	651/0
P-value 18/0 23/0				
Efficacy	Intervention group	02/6±57/21	23/6±15/22	178/0
	Control group	15/7±98/20	24/5±92/19	319/0
P-value 38/0 32/0				
Behavior	Intervention group	25/6±71/29	81/6±25/32	001/0
	Control group	07/5±25/28	41/5±11/28	721/0
P-value 32/0 02/0				

exposure of HCP in Jam, Iran. The findings of this study demonstrated that 34.3% of the health system staff had no previous history of standard precautions and 42.5% had needle stick injuries and 17.5% had history of contact with secretion of patients, which suggests the need for more and effective training courses in this field.

Lack of knowledge and low sensitivity to hazards can increase risk behaviors among employees. The study of Jeong et al. in Korean hospitals also indicated that nurses were not following standard precautions. The study emphasized that the lack of continuing education in hospitals led to a reduction in precautions [17]. In a study by Ehsani et al. [18], the status of needle stick injury among nurses in Tehran hospitals was similar to that of recent study. Other studies in Iran also reported different data [19]. But in all studies, emphasis has been placed on giving more attention to hospital management. Studies in other countries also noted that needle stick injury was one of the most common injuries among the health team. The prevalence of needle stick injury is different in hospitals. This difference depends on the standard precautions, policies, and infection control management [20-22]. In addition, the lack of sensitization of the hospital management team to employees can be effective in this regard. Increased sensitivity and risk perception can be increased by instructive training [13]. The results of current study revealed a significant increase in knowledge and constructs of health belief model (sensitivity, intensity, perceived benefits) and behavior, but there were no significant changes in the increase of self-efficacy scores and the reduction of perceived barriers score. Another study by koohsari et al. [23] indicated that educational intervention in relation to standard precautions was significantly capable of increasing the mean score of knowledge constructs, perceived sensitivity, perceived severity, perceived benefits, and self-efficacy in behavior.

In a study by Khodaveisi et al. [24], perceived barriers were not significantly associated with behavior. Therefore, the absence of increased perceived barriers can mean that barriers are less important for employees than the perceived benefits. Khodaveisi et al. also showed that the perceived benefits had a direct and meaningful relationship with behavior. Masoudi et al. conducted a study to predict the standard precautions in nurses of educational hospitals in Zahedan based on health belief model, in which there was a direct and significant relationship between perceived severity and perceived sensitivity with preventive behaviors. Also, self-efficacy showed a significant relationship and perceived barriers had a negative and inverse relationship in the formulation of preventive behaviors. Self-efficacy played a stronger role in perceived barriers and nurses had poor knowledge and performance that were found to be different from the present result. Moreover, self-efficacy of direct and significant relationship and perceived barriers had a negative and inverse relationship in the formulation of preventive behaviors. Self-efficacy played a stronger role in perceived barriers and nurses had poor knowledge and performance that were different from the present result. These findings can be explained by the different research environment, information resources, the teaching method, the interest and motivation of the staff for learning [25]. Khodaveisi et al. [24] have investigated the factors influencing the observance of infection control standards in emergency staff using the Health belief model. The mean score of knowledge was found to be poor and performance was moderate and also a significant relationship was found between perceived benefits, guides for action, perceived sensitivity, perceived self-efficacy and performance.

Although studies have reported contradictory results about the level of awareness and standard precautions [26], in most studies, increased awareness has been found to be associated with increased precautions [3,27-29]. The CDC Guideline training has increased the level of standard precautions in HCP [30]. Regarding the findings, it can be concluded that education based on health belief model has been able to increase the awareness of people's perceptions, where the creation of a sense of danger (perceived sensitivity), the severity of this risk (perceived severity), change in behavior was led to an understanding of the many benefits of standard precautions (perceived benefits). Therefore, they have tried to remove barriers by (perceived obstacles) promoting their behavior. But it seems that people's judgments about their abilities during work (self-efficacy) have not been effective in improving their performance due to lack of basic knowledge (lack of prior education).

Conclusion

According to the results of the study, efforts are needed to reduce the risks among health workers, such as holding public education classes in accordance with valid texts, attempting to change attitudes and promoting the health behavior HCP.

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