Effect of education on the incidence rate of occupational exposure resulting from sharp bodies and mucocutaneous contamination with blood and body fluids of patients among nursing personnel of Valiasr Hospital- Fassa, 2008

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Abstract

Objective. To determine the effect of education on the incidence rate of occupational exposure resulted from sharp bodies and mucocutaneous contamination with blood and body fluids of patients among nursing personnel of Valiasr Hospital- Fassa, 2008. **Methodology.** Interventional study. Samples consisted of 120 nurses (60 as study group and 60 as control group) selected by systemic randomized allocation. The study group was trained in occupational exposure for a period of ten hours. The data collecting tool was an occupational exposure questionnaire that was completed for both groups, before and two months after education. A knowledge test was also applied to both groups before and after education. Data analysis was done by descriptive statistics, frequency, mean and standard deviation, inferential statistics, x^2, T-test and paired t, and a level of significance $p<0.05$ was statistically accepted. **Results.** Results of the research, indicated an increase of the knowledge level and a reduction of the incidence rate of occupational exposure among the study group in such a way that, the knowledge mean score of this group went from 8.1 before education to 14.1 after education ($p<0.05$). The incidence rate of occupational exposure resulting from sharp bodies and mucocutaneous contamination with blood and body fluids of patients was also reduced after education in the case group ($p<0.05$). **Conclusion.** The results of the study indicated improvement of knowledge and practice level in the the case group, concerning occupational exposure due to sharp bodies and mucocutaneous contamination with blood and body fluids of patients after the training intervention. In addition, continuous education in this respect is necessary because its effect lowers with time-lapse.

Key words: education, nursing; occupational exposure; intervention studies; control groups.

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Efecto de la educación en la tasa de incidencia de exposición ocupacional por objetos cortopunzantes y por contaminación mucocutánea con sangre y fluidos corporales en enfermeros del hospital de Valiasr-Fassa

Objetivo. Determinar el efecto de la educación en la tasa de incidencia de exposición ocupacional por objetos cortopunzantes y por contaminación mucocutánea con sangre y fluidos corporales en enfermeros del Hospital de Valiasr en Fassa (Irán) en 2008. **Metodología.** Estudio de intervención. Se tomó una muestra de 120 enfermeros (60 en el grupo de estudio y 60 en el grupo control) asignados por aleatoriazación sistemática. El grupo de estudio recibió 10 horas de capacitación en prevención de exposición ocupacional. Para la recolección de datos se utilizó un cuestionario, el cual fue completado por ambos grupos antes y dos meses después de la capacitación, igualmente se aplicó un examen de conocimientos a ambos grupos antes y después de la capacitación. **Resultados.** Los resultados del estudio indicaron aumento del nivel de conocimiento y disminución de la tasa de incidencia de exposición ocupacional en el grupo de estudio de tal manera que el puntaje de la media del nivel de conocimiento de este grupo alcanzó un puntaje de 8.1 antes de la capacitación a 14.1 después de la capacitación, ($p<0.05$). **Conclusión.** El programa educativo se asoció a mejores prácticas preventivas del riesgo de exposición a objetos cortopunzantes y contaminación mucocutánea con sangre y fluidos corporales de pacientes.

Palabras clave: educación en enfermería; exposición profesional; estudios de intervención; grupos control.

Efeito da educação na taxa de incidência de exposição ocupacional por objetos perfurantes e por contaminação mucocutânea com sangue e fluidos corporais em enfermeiros do hospital de Valiasr-Fassa

Resumo

Objetivo. Determinar o efeito da educação na taxa de incidência de exposição ocupacional por objetos perfurantes e por contaminação mucocutânea com sangue e fluidos corporais em enfermeiros do Hospital de Valiasr em Fassa (Irã) em 2008. **Metodologia.** Estudo de intervenção. Tomou-se uma mostra de 120 enfermeiros (60 no grupo de estudo e 60 no grupo controle) atribuídos por escolha aleatória sistemática. O grupo de estudo recebeu 10 horas de capacitação em prevenção de exposição ocupacional. Para a recolha de dados se utilizou um questionário, o qual foi completado por ambos os grupos antes e dois meses depois da capacitação igualmente se aplicou um exame de conhecimentos a ambos os grupos antes e depois da capacitação. **Resultados.** Os resultados do estudo indicaram aumento do nível de conhecimento e diminuição da taxa incidência de exposição ocupacional no grupo de estudo de tal maneira que a pontuação da média do nível de conhecimento deste grupo atingiu uma pontuação de 8.1 antes da capacitação a 14.1 depois da capacitação, ($p<0.05$). **Conclusão.** O programa educativo se associou a melhores práticas preventivas do risco de exposição a objetos perfurantes e contaminação mucocutânea com sangue e fluidos corporais de pacientes.

Palabras chave: educação em enfermagem; exposição ocupacional; estudos de intervenção; grupos controle.

Introduction

Although treating is holy and valuable, it is also followed by dangers to the clinician treating.[1] Health personnel are always exposed to occupational risks like chemical, psychological, physical and biological risks. Hepatitis B, Hepatitis C and Acquired Immune Deficiency Syndrome (AIDS) are among the biological risks that threat the safety of thousands of people belonging to the health personnel yearly. Dennis and et al.[2] said that, the most prevalent way of transmission of viral infec-

tions among health personnel are injuries resulting from sharp bodies and mucocutaneous contamination with blood and body fluids of the patients.[2] Even though, important developments have been accomplished in the field of medical knowledge, sharp bodies resultant injuries as dangerous factors are still exposing the health and treatment personnel to deadly viruses and other blood damaging factors.[3] Injuries resulting from sharp bodies have been considered as one of the basic problems of health and treating personnel for the last 50 years, and have caused, large life threating and economical losses, due to witch medical associations of several countries, have been persuaded to plan large programs in order to provide education, health insurance and safety to their treating personnel.[4] Sharp bodies resultant injuries and mucocutaneous contamination from blood and body fluids of the patients, are capable of transmitting at least 20 deadly pathogen factors to the medical personnel via blood, from which three viral diseases resulting from Hepatitis B, Hepatitis C and AIDS are gaining more importance.[5] According to the studies performed, 80-90% of the cases of transmission of infectious diseases among health-treating personnel result from contact with sharp bodies.[6] Every year, about one million injuries due to sharp bodies affect the treating personnel, from which 16000 lead to contaminate the person with contaminated blood with HIV, and 12000 cases with Hepatitis B and C.[7] Health personnel around the world are about 3.0 million times yearly exposed to sharp bodies and mucocutaneous contamination with blood and body fluids of patients. These injuries affect 16000, 66000, and 200-600 people with Hepatitis C, Hepatitis B and HIV respectively.[8] In U.S.A., 100 to 800 thousand of sharp bodies resultant injuries happen to the staff of health centers yearly (one injury every 10 seconds), but half of these injuries are not reported.[9] Nesh and Goon (2000), said that only 5.0% of sharp bodies resultant injuries are reported, because making the decision to report such injuries is affected by the nurse's judgment regarding the injury source, therefore nurses should be taught not to judge this matter, report them honestly and do not think that they.

According to the reports of the Occupational Safety and Health Administration (OSHA) and the Exposure Prevention Information Network (EPINet), the risk of infection development in the health personnel because of sharp bodies caused injuries due to HIV, Hepatitis B and Hepatitis C is 0.3%, 30.0% and 5-10% respectively.[11] According to the OSHA, since the possibility of all the personnel from treating centers of enjoying from a completely new and safe medical equipment is not available, due to economical, cultural and social problems, the best method to prevent transmitted infections through occupational contacts is to educate staff and apply prevention measures from such injuries. Other measures are: observing standard cautions, vaccination against Hepatitis B and using safe equipments and techniques.[12] This study has determined the effect of education on the rate of occupational exposure incidence resulted from sharp bodies and mucocutaneous contamination with blood and body fluids of patients among nursing personnel of Valiasr Hospital –Fassa-2008.

Methodology

Interventional study, the sample consisted of 120 nurses (60 people in the control group and 60 in the case groups) selected by systemic randomized allocation. The study group was trained in occupational exposure for a period of 10 hours. The data collecting tool was an occupational exposure questionnaire. It had 6 main parts, containing 25 questions regarding demographic information (5 questions), exposure to sharp bodies (8 questions), mucocutaneous contamination with blood and fluids (7 questions), vaccination status (3 questions), reporting method and performed measures after exposure (one question each). A knowledge questionnaire was also applied. It had 15 questions (4 elective), each question was scored from zero to one, and the maximum score of knowledge level was 15. On this basis, the knowledge level was placed in three levels: *Low=0-7, medium=8-11 and high=12-15*. The occupational exposure questionnaire was applied

to both groups, before and two months after training. The knowledge test was also applied to both groups before and after education. It is necessary to mention that content validity and reliability of the occupational exposure, and knowledge questionnaire, was confirmed in previous studies. After collecting and coding data, they were analyzed using the SPSS software. In order to determine the variables relationship, x^2 (chi square), T and Wilconxon tests were used and a level of significance $p<0.05$ was statistically accepted.

Results

A total of 120 nurses from Valiasr hospital of Fassa participated in this research, they were placed in two groups: control and study groups. Samples from each group consisted of 60 people. The mean age of control and study group was 31.2±8.2 and 32.3±9.3 respectively. Concerning years of service, in control group the mean was 7.7±8.7 years and 8.6±9.6 years for the study group. Regarding the educational background, 80.0% of the sample had a Bachelor in Science (BSc) and 20.0% of them had diploma. Also 80.0% of the samples were nurses and the remaining 20.0% were nurse assistant. In the control group before training, the knowledge score of 25.0% of the participants was low and 75.0% of them were medium but, none of them were got a high score. In the study group, the knowledge score of 40.0% of the participants was low, 60.0% medium but no one got a high score.

In the control group after training, 15.0% got a low score, 80.0% a medium score and 5.0% a high score. Regarding the study group after training, their knowledge score in the 100.0% was high. In the control group, the mean knowledge mark before training was 8.3± 2.3 and it was 9.0 ± 2.2 after training, this difference was statistically significant ($p=0.003$). In the study group, the mean knowledge mark before training was 8.1±2.2 and it was 14.1±1.0 after training, the difference was statistically significant ($p<0.001$). It is necessary to mention that, mean knowledge mark increment in the control group was 0.68 marks and for the case group was 6.1 marks.

Regarding exposure to sharp bodies, blood and corporal fluids a decrease in the incidence rate before and after training was appreciated, being statistically significant in the study group. (Table 1)

Table 1. Incidence rate of occupational exposure to sharp bodies, blood and body fluids before and after education

Exposure	Group	Educational intervention		p-value*
		Before	After	
Sharp bodies	Study	36.7%	16.7%	0.01
	Control	30.0%	25.0%	0.54
Blood and body fluids	Study	30.0%	13.3%	<0.01
	Control	23.3%	20.0%	0.65

* Probability value of X^2 test

Discussion

Concerning the knowledge score of the case group before training, 40.0% had a low score and 60.0% had a medium score, none of them had a good score. After training, all the samples from this group got a good score. In the study of Pasyar,[14] the knowledge score of 69.0% of the samples were in

a good level and immediately after education this score for all the samples was better.

The knowledge score of the control group before training was: 25.0% had a low score and 75.0% had a medium score. After training, 15.0% had a low score, 80.0% had a medium score and 5.0% had a good score. The latter results show that the knowledge score of the case group improved after education. The score in the control group also showed an increase to some extent but, it was not as much as in the case group. The score increase in this group could have been the result from the effect of extraneous variables of training during the studying period. Dey *et al*.[15] stated that informing people about being study subjects, can effect on their performance. In the present study it is also possible that the awareness of the control group about being education subjects and the interaction of the control group with the case group resulted in their level of knowledge promotion.

The mean knowledge score of the control group went from 8.3±2.3 before training to 9.0± 2.2 after training, and there is significant statistical difference (p=0.003) between knowledge before and after training. In the control group, the mean knowledge score went from 8.1 ± 2.2 before training to 14.1±1.0 after training and there is a significant statistical difference (p<0.05) between knowledge before and after education.

A study performed by Rozitalab[16] in Shiraz, in order to survey the effect of education on the knowledge rate and participation of people exposed to a moderate risk of developing colorectal cancer, indicated that in addition to the case group, who were educated, the knowledge level of the control group who were not educated also increased. In that study, they concluded that the increase of knowledge in the control group may be the result of the interaction of people, and a series of unrecognized factors as alternative ways of education like radio, television and public broadcastings. In the carrying out study, in addition to the effect of education in the increase of the knowledge level of the case group, the rate of exposure resulting from sharp bodies and mucocutaneous contamination with blood and fluids also decreased among this group in such a way that, the incidence rate of sharp bodies exposure reached from a previous 37.0% to 17.0% after training (p=0.013). Also, the rate of exposure resulting from mucocutaneous contamination with blood and fluids went from 30.0% before education to 13.3% after education (p=0.002). The results of this study correlates with the results of Wang and et al.[17] in China which was performed to study the effect of educational programs in preventing occupational exposure resulting from sharp bodies and mucocutaneous contamination with blood and fluids. In that study the knowledge level of the case group also increased after educational interventions.

The rate of exposure incidence to sharp bodies and mucocutaneous contamination with blood and fluids in case group decreased after educational intervention (p<0.05). Based on the results of this study, needle capping was the most prevalent process why exposure to sharp bodies happened. And the most occupational exposure resulting from sharp bodies and mucocutaneous contamination with blood and fluids was in the emergency ward. These results correlate with the results of similar studies performed in other regions in Iran. For example, Nazimeh and *et al*.[18] in Yazd, Aghadost *et al*.[19] in Kashan, Salehvahedi *et al*.[20] and Hatcher,[21] assume that, needle capping is the factor responsible for 60.0% of sharp bodies resultant exposures, and stated that using safety boxes is the most effective method to prevent them.

Also, based on the results of the present study, the most exposures resulting from sharp bodies and mucocutaneous contamination with blood and fluids have happened in the morning shift. It correlates with the results of similar studies from other countries like Singapore[22], China[23] and Saudi Arabia.[24]

Joneston and Coner[25] say that, the excess amount of exposure resulting from sharp bodies, blood and fluids in the morning shift among personnel is due to work overload, performing most of the treatments in the morning shift, and also the presence of more personnel, physicians and students in this shift as compared to other shifts. Also, based on the results of the present study, putting or removing an angiocath was the most prevalent action that caused exposure to mucocutaneous

contamination with blood and body fluids. Blood was the most prevalent fluid that caused contamination. This result correlates with the results of the study performed by Lee et al.[26]

Considering the results of the research, in order to reduce the occurrence of occupational exposure resulting from sharp bodies, blood and fluids among nursing personnel, the following instances are suggested:

- Train regularly regarding occupational exposure resulting from sharp bodies, blood and fluids. Emphasizing on strict cautions to the nursing personnel, and also educating about standard cautions during BSc. as a separate subject.
- Not to cap the needle again after using it, use safety boxes instead.
- Start a prevention committee of occupational exposure resulting from sharp bodies, blood and fluids, under the supervision of the hospital´s infection control committee.
- Consider the known centers as occupational injuries clinics that treat and follow up on patients after exposure.
- Supervising the work environment safety, and record reporting occupational injuries, should be appointed as responsibilities of the nursing managers.

Our results indicate knowledge and practice levels increase in the case group, concerning occupational exposure due to sharp bodies and mucocutaneous contamination with blood and body fluids of patients after training. In addition, continuous education in this respect is necessary because, its effect lowers with time-lapse.

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