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Effectiveness of Structured Teaching Programmes on Practices in Prevention of Needle Sticks Injury

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Abstract

Introduction

Every day, health care workers are exposed to dangerous and deadly blood borne pathogens through contaminated needle sticks, sharps or splash exposure. These exposures are often considered as part of the job. The pathogens that pose the most serious health risk are Hepatitis B virus, Hepatitis C virus and Human immunodeficiency virus. More than 20 other infections can be transmitted through needle stick including syphilis, malaria and herpes. Preventing needle stick injury is the best way to protect the health care workers from these infections.[1]

Objectives

The objectives of the study were to assess the existing practices in prevention of needle stick injury using objective structured practical examination (OSPE) and to assess the practices in prevention of needle stick injury after structured teaching programme using OSPE, among the nursing students of a selected educational institute. And also to evaluate the effectiveness of structured teaching programme on practices in prevention of needle stick injury among the nursing students.

Methods

The research design used in this study is quantitative research design: one group pre test - post-test design. Purposive sampling technique was used to select the sample. A total of 30 subjects were assessed and included in the study after informed consent. Null hypothesis is stated as there is no difference between the pre test and post test practice score of the students. A modified checklist was prepared based on the guidelines of American nurses association 2010 to assess the practices in prevention of needle stick injuries using objective structured practical examination. The checklist was used before and after the structured teaching programme.

Results

Majority of nursing students 93.3% were aware of practices in prevention of needle stick injury. Of all the nursing students 23.4% nursing students were exposed to needle stick injury. The paired 't' test was applied and the null hypothesis was rejected and revealed that structured teaching programme was effective on practices in prevention of needle stick injury. It can be interpreted with 95% confidence that the mean score of post-test among the nursing students of selected educational institute is significantly different from the hypothesized value.

Conclusion

The research study revealed lacunae in the practices of handling sharps such as looking for availability of needle destroyer, checking adequate lighting, placing disposable container with sodium hypochlorite solution, checking for any leftover sharps in the procedure area and holding syringe by middle of barrel. The practices can be improved with the planned and effective structured teaching programme included in the curriculum.

Keywords Needle sticks injury, Health care workers, OSPE

INTRODUCTION

Needle stick injuries are wounds caused by sharps such as hypodermic needles, blood collection needles, intra venous cannulas or needles used to connect parts of intravenous delivery system. It is one of the greatest risks faced by the frontline health care workers. Every percutaneous needle stick and sharp injury carries a risk of infection from blood borne pathogen.

A structured teaching on practices in preventing needle stick injury will improve the practices on preventing needle stick injury and thus can reduce these incidence to an extend along with other measures. Past studies have shown that needle stick injuries are often associated with such practices like recapping needles, failing disposal of used needles properly in puncture resistant sharp container and improper plan for safe handling and disposal of needles before and after the procedure.

BACKGROUND OF THE STUDY

Exposure to blood borne pathogen is one of the most deadly hazards that nurses face on a daily basis and also one of the most preventable. The probability that a single needle stick will result in disease is 3-5 chances in 1000 for HIV, 300 chances in 1000 for hepatitis B, 20-50 chances in 1000 for hepatitis C. Every year health care workers experience between 6,00,000 and 8,00,000 exposure to blood as per united states department of Labour-occupational safety and Health administration, 2001. The exposure carry the risk of infection with hepatitis B, hepatitis C and human immunodeficiency virus. The risk of infection from a needle stick injury depends on pathogen involved, the immune status of the worker and severity of the needle stick injury.

At least1000 health care workers estimated to contact serious infections annually from needle stick and sharp injuries. The highest risk of injury is from blood filled hollow needles. They account for 63% of needle stick injuries from June 1995-July 1999 in CDC surveillance hospitals. The Centres for Disease Control and Prevention documented 90% cases of health care workers who contacted HIV from needle stick injuries involved injuries with hollow bore, blood filled needles.[2,3]

METHODS

The research design used in this study is quantitative research design: one group pre test - post-test design. Null hypothesis is stated as there is no difference between the pre test and post test practice score of the students before and after the structured

teaching programme. H_0:µd =0 where µd is the mean deviation of score and H_0 the null hypothesis.

A modified checklist was prepared based on the guidelines of American nurses association 2010 to assess the practices in prevention of needle stick injuries using objective structured practical examination. The checklist was used before and after the structured teaching programme.

Purposive sampling technique was used to select the sample for easy accessibility and feasibility. A total of 30 subjects were assessed and included in the study after informed consent. Pre-test was conducted on 13 January 2016 to assess the existing practices in the prevention of needle stick injury.

A structured teaching programme was made based on the pre-requisites of safe handling of sharps for the prevention of needle stick injuries. Based on which demonstration and power point presentation were done during the structured teaching programme. The post test was conducted on 20 January 2016 with the same group of students and same researchers.

RESULTS

Analysis of data shows that majority of 93.3% (28) nursing students were aware of practices in prevention of needle stick injury and 6.7% (02) nursing students were unaware of the practices in prevention of needle stick injury. Further 23.4% (07) nursing students were exposed to needle stick injury. Out of which 28% nursing students were exposed to needle stick injury before the procedure, 28% (02) nursing students were exposed during the procedure and 42% (03) nursing students were exposed after the procedure. 20% (06) nursing students faced problems in safe handling and disposal of needles and 80% (24) nursing students did not face any problem in safe handling and disposal of needles.

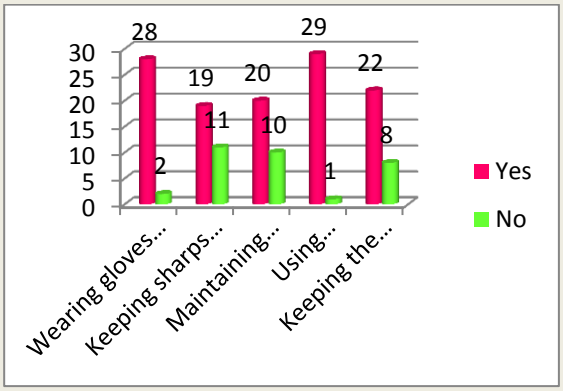

Figure 1: Bar diagram showing distribution of marks in post-test score for each step during the procedure among the nursing students of selected educational institute

93.3% (28) nursing students performed the step of wearing gloves before handling sharps in post-test, 63% (16) nursing students kept sharps pointed away from

user in post-test, 66.6% (20) nursing students performed the step maintaining visual contact with sharps in post-test, 96.6% nursing students used tourniquet for procedure in post-test, 73.3% (22) nursing students kept the sharps back to the tray after use in post-test. 80% (24) nursing students did not do the recapping of sharps in post-test. 66.6% (20) nursing students immediately disposed the sharps to container in post-test. No nursing students checked for any left out sharps to container in post-test, 76.6 % (23) nursing students disposed the sharps to needle destroyer in post-test. 13.3% (4) nursing students hold the syringe by middle of the barrel while disposing in needle destroyer in pre-test whereas 30% (9) nursing students hold the syringe by middle of the barrel while disposing in needle destroyer in post-test.

The mean practice score pre-test = 5.3 and post-test = 8.3. The mean score in pre-test was less before conducting structured teaching programme. After conducting structured teaching programme score of practices in prevention of needle stick injury in post-test increased significantly. The 't' value 4.3 was greater than the table value 2.045 at $p<0.001$ level of significance. This indicates that the structured teaching programme was effective in improving the practices in prevention of needle stick among the nursing students of selected educational institute.

Table 1 Mean, standard deviation and standard error for pre-test and post-test of practices in prevention of needle stick injury among the nursing students of a selected educational Institute

	Mean	**n**	**SD**	**SE**
Pre-test score	5.3	30	2.24	0.40
Post-test score	8.3	30	2.76	0.50

Table 2 Mean difference, standard deviation and paired't' test values of pre-test and post-test score among the nursing students of selected educational institute

Paired 't' test							
	Mean difference	Standard deviation	Degree of freedom (df)	S.E	t- value	Table value	p-value
Pre-test Post-test	2.8	1.4	30-1= 29	0.64	4.3	2.045	<0.001

Hypothesis testing

The paired 't' test when applied on pre-test and post-test score, the statistical test result

shows that t-test score is 4.3 which is greater than the table value 2.045 at p< 0.001 level of significance and rejects the null hypothesis and reveals that structured teaching programme was effective on practices in prevention of needle stick injury. It can be interpreted with 95% confidence that the mean score of post-test among the nursing students of selected educational institute is significantly different from the hypothesized value.

DISCUSSION

A study carried out by Vardhmanmahavir medical college and Safdarjang hospital, a tertiary care teaching hospital in New Delhi, India gives the result that 85.3% of nursing student participated in the study were exposed to needle stick injury.[4]

Among HCWs with NSIs, nurses had the highest percentage 49(100%), followed by junior resident 21(87.5%). Nursing student 64(85.3%), laboratory technicians 59(84.3%), interns 62(82.7%), senior resident 48(80%), and under graduate student 40(53.3%). About 13% of HCWs received the NSI due to patient aggressiveness. Recapping needle was a common cause of needle stick injury (39%). Several other studies has also shown higher occurrence of NSI among nurses. Apart from nurses the NSI were more among nursing students, interns and resident doctors.[6]

In a cross sectional study conducted by Kye Mon Imin Swe on the prevalence of needle stick injuries among undergraduate medical students in Malaysia in 2012 showed that the prevalence of needle stick injury was 63(19.9%) and majority of it occurred at medical ward 51(81%). The cause of injury was mainly due to lack of experience and it occurred during recapping and during blood withdrawal. 54 (85.7%) of them were wearing gloves when the injuries occurred. Most of the injuries were caused by hollow bore needle.[5]

In the present study, in post-test 37% (11) nursing student scored good score level, 57% (17) nursing students scored average score level whereas 2% (6) nursing students scored score poor level in post-test.

A study conducted by Gundap D G et al to Assess effectiveness of video assisted teaching on needle stick injury regarding knowledge and attitude among staff nurses in 2015 using quasi- experimental - pre and post test design regarding NSI which showed the pre-test mean knowledge and attitude score was 9.5 and 33.66 respectively which was increased in post-test to 15.16 and 34.64 respectively, where

"t"- test value knowledge (t=2.235, p < 0.0001 considered to be extremely significant which indicates significant improvement in knowledge regarding needle stick injury.[6]

CONCLUSION

In health care system health care workers are exposed to dangerous deadly blood borne pathogens through contaminated needles, sharps or splash exposure. Needle injuries carry risk of infections from blood borne pathogens.

Preventing needle stick injuries is the best way to protect the health care workers from these infections. The research study revealed lacunae in the practices of handling sharps such as looking for availability of needle destroyer, checking adequate lighting, placing disposable container with sodium hypochlorite solution, checking for any leftover sharps in the procedure area and holding syringe by middle of barrel. The practices can be improved with the planned and effective structured teaching programme included in the curriculum.

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