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Research Article

A quasi experimental study to assess the effectiveness of standard operating procedures on prevention and management of needle stick injury in a teaching hospital of Haryana, India

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ABSTRACT

Background: Nurses spend most of the time with patients and provide the most direct patient care; nurses are also the healthcare workers that are most susceptible to worksite-related medical problems the most common one being needle stick injuries. Adequate training will empower the nurses to protect themselves and effectively manage needle stick injuries. The aim of the study was to assess the effectiveness of standard operating procedures (SOP) in prevention and management of needle stick injuries.
Methods: A quasi experimental study was conducted among nurses working in two teaching hospitals in Haryana A total of 150 nurses were included in the study. The tools included a knowledge questionnaire and a SOP on prevention and management of needle stick injuries.
Results: There was a significant increase in the post test knowledge score of the experimental group -27.74 (day 9) and 24.13 (day 40) as compared to the pre-test knowledge score (21.00). However, there was no significant increase in the post test score on day 70 (22.26).
Conclusions: Training of nurses is vital in prevention of needle stick injuries however continuous reinforcement is required for the sustainability of knowledge.

Keywords: Needle stick injury, Health care worker, Occupational exposure, Standard operating procedures

INTRODUCTION

Healthcare workers operate in an environment that is considered to be one of the most hazardous occupational settings. In addition to the usual workplace related exposures, healthcare workers encounter diverse hazards due to their work related activities.[1]

A significant portion of a health care worker's day is spent on activities related to the direct provision of patient care. As a result, even the smallest mistake can result in serious and irreversible outcomes. The level of risk with health care worker varies according to profession, occupation and division. In comparison to all health care workers, nurses, physicians, dentists, orderlies and housekeeping staff carry the highest risk of being exposed to blood-borne agents.[2]

As nurses spend most of the time with patients and provide the most direct patient care, they are also the healthcare workers that are most susceptible to worksite-related medical problems.[3]

It is not uncommon for health care workers to become infected by a patient while providing health care. Health care workers do not give enough importance to preventive measures when coming in contact with

potentially infectious materials or to procedures in place regarding post-contact monitoring. There is also insufficient awareness of risk, benefits of adhering to standard measures, importance of notification and serologic observation after sustaining a sharp injury.[3]

Needle stick injuries (NSI) are wounds caused by sharps such as hypodermic needles, blood collection needles, IV cannulas or needles used to connect parts of IV delivery systems. These injuries can occur because of variety of causes which includes factors like type and design of needle, recapping activity, handling/transferring specimens, collision between HCWs or sharps, during clean-up, manipulating needles in patient line related work, handling devices or failure to dispose of the needle in puncture proof containers.[4]

OSHA estimates each year 385,000 needle stick injuries and other sharps-related injuries are sustained by hospital-based healthcare personnel. This equates to an average of around 1,000 sharps injuries occur per day in U.S. hospitals.[5] The incidence of NSI is considerably higher than current estimates, due to gross under-reporting (often less than 50%).[2,3] In USA 6,00,000 to 10,00,000 receive NSI from conventional needles and sharps every year, while in UK it is 1,00,000 HCWs/year4. In India, authentic data on NSI are scarce. It is known that around 3-6 billion injections are given per year, of which 2/3rd injections are unsafe (62.9%) and the use of glass syringe is constantly associated with higher degree of unsafety.[6]

The findings of different studies show the prevalence of needle stick injury presents a serious challenge among health personnel around the world including India. There is a paucity of data regarding the incidence, prevalence and sero-conversion rates amongst healthcare workers because of gross under reporting. Unfortunately the barriers for effective preventions of needle stick injury are multiple including work load in the hospital, lack of equipment's, lack of awareness and inadequate education and training of health personnel regarding prevention of needle stick injury that leads to the serious health hazards in health personnel.[4] The focus thus needs be on providing the healthcare workers the education to empower them to protect themselves from needle stick injuries.

Through the review of various related studies it was found that there is an immense need for implementation of strategies in prevention of needle stick injury and adequate training of health personnel to cope up with the increasing vulnerability of health personnel towards prevention of needle stick injury. Development of standard Operating Procedures will provide clear cut guidelines to healthcare workers to address critical issues to prevention and management of needle stick injuries. Therefore the present study was conducted with an aim to assess the effectiveness of standard operating procedures (SOP) on prevention and management of needle stick injury.

METHODS

A quasi experimental one group pre-test post-test design was adopted for the study. The hypothesis formulated was that there will be no significant difference between the mean post-test (day 9, day 40 and day 70) knowledge scores of nurses exposed to SOP on prevention and management of needle stick injuries as compared to nurses who were not exposed to SOP as measured by structured knowledge questionnaire

The independent variable was the SOP and the dependent variable was the knowledge assessed through knowledge questionnaire. The setting for the study was two hospitals in Haryana. The population comprised of nurses working in the selected hospitals. The sample size was 150 that comprised of 75 nurses in the experimental group and 75 nurses in the comparison group.

The data was collected using a knowledge questionnaire that was prepared through extensive review of literature, seeking opinion from experts and by reviewing published and unpublished literature.

The SOP on prevention and management of needle stick injuries was prepared for nurses working in hospitals by the researcher. The objective of the SOP was to sensitize and educate nurses on prevention and management of needle injuries and also to unify information provided within the Hospital and to allow easy access for all users. The researcher decided to keep the content of SOP specific to the hospital need, simple and clear to understand by the nurses working in the hospital. It aimed at providing a framework for prevention and management of sharps injury that aims to protect nurses from blood borne viruses.

For both the groups the following schedule was followed. The knowledge was assessed through a pre-test. The SOP on prevention and management of needle stick injuries was implemented from third day to ninth day and the post-test knowledge was assessed on 9th (posttest-1), 40th (posttest-2) and 70th (posttest-3) day.

RESULTS

The data was analysed using SPSS version 20.0 and level of significance (p) was kept at 0.05.

Analysis of the knowledge scores revealed that the mean pre-test knowledge score was 21.00 and means post-test (day 9) and (day 40) knowledge score was 27.74 and 24.13 respectively. The "t" values calculated between the mean pre-test and post-test knowledge scores on Day 9 and Day 40 of experimental group, "t" value was 11.73 and 3.85 respectively which were found to be statistically significant at 0.05 level of significance. This indicated

that there was a significant gain in knowledge scores of nurses in the experimental group after the exposure of SOP on prevention and management of needle stick injuries. Thus SOP on prevention and management of needle stick injuries was effective in enhancing knowledge of nurses in experimental group on day 9 and day 40.

Table 1: Overall mean knowledge score of nurses regarding prevention and management of needle stick injuries between pre-test and three time point post-test levels in experimental group using paired 't' test (N=75).

Component	Time point	Mean±SD	Mean difference	SE_{MD}	't' value	P value
Overall knowledge score	Pretest	21.00±8.71	6.74	0.75	11.73	<0.001*
	Post-test (day 9)	27.74±8.30				
	Pre-test	21.00±8.71	3.13	0.813	3.85	<0.001 *
	Post-test (day 40)	24.13±8.45				
	Pretest	21.00±8.71	1.26	0.854	1.48	0.14 NS
	Post-test (day 70)	22.26±7.41				

* "t"(74)=1.96; P<0.05 level; "t"(74)=1.96; P >0.05 level

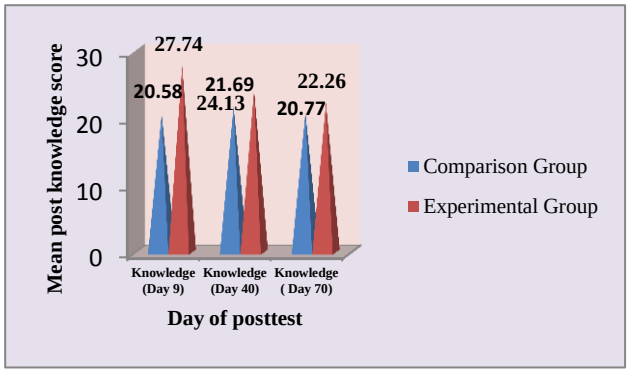

Figure 1: Bar graph showing the comparison of mean post-test knowledge (Day 9, Day 40 and Day 70) scores of nurses in comparison and experimental group.

There was no statistically significant difference (t=1.48; p=0.14) found between mean pre-test knowledge score (21.00) and post-test knowledge score at day 70 (22.26). The gradual decline in knowledge score at day 70 and no significant difference from pre-test to post-test at day 70 suggests that the knowledge score were declined with time. This could be as there was no reinforcement of the learning after the SOP implementation and thus continuous education is very vital in sustenance of knowledge.

Table 2: Area wise knowledge score regarding prevention and management of needle stick injuries on pre-test and post-test day 40 in experimental group (N=75).

Component	Time point	N	Median (range)	Z value (Mann Whitney)	p value
Concept, meaning and incidence of NSI	Pretest	75	2 (0-8)	--	--
	Posttest2 (day 40)	75	4 (0-18)	2.99	0.003*
Risk factors, causes and transmission	Pretest	75	3 (0-11)	--	--
	Posttest2 (day 40)	75	5 (0-11)	3.84	<0.001*
Prevention and management	Pretest	75	14 (2-31)	--	--
	Posttest2 (day 40)	75	15 (4-32)	3.38	0.001*

The data presented in Table 1 and Figure 1 compares overall mean knowledge score of nurses regarding prevention and management of needle stick injuries between pre-test and three time point post-test levels in experimental group using paired 't' test.

The area wise knowledge scores regarding prevention and management of needle stick injuries on pre-test and post-test day 40 in experimental group was also analysed using non parametric Wilcoxon Rank Sum test. As depicted in table 2 there was statistically significant difference between knowledge score regarding concept and incidence; risk factors, causes and transmission; prevention and management on day4 0 in experimental group as indicated by the computed Z value 2.99, 3.84, 3.38 respectively. It is inferred that there was significant

improvement found in area wise knowledge score in all the three areas that is concept and incidence; risk factors ,causes and transmission; prevention and management of NSI from pre-test to post-test at day 40 and hence SOP on prevention and management of needle stick injuries was effective in improving the knowledge of nurses.

DISCUSSION

In the current study, the mean pre-test knowledge score regarding prevention and management of NSI among experimental group was 21.00 and 20.68 in comparison group. Similar study by Mesfin YM et al showed that 48.4% of medical and health sciences students were not aware about the availability of PEP for Hepatitis B mean score of knowledge was 11.52.[6] Similar findings were revealed by Honda M et al that about 67% had fair knowledge about transmission of infectious diseases and prevention of sharp injurie.[7] Onyemocho Audu et al reported that 54.3% of HCWs had good knowledge score of key injection safety issues, while 16.7% and 29% had fair and poor general knowledge score respectively.[8]

In the present study, Implementation of SOP to the nurses in the experimental group, mean post-test (day 9) the knowledge score 27.74 was higher than pre-test.[21] Whereas in the control group pre-test knowledge score was 20.68 and mean post-test (day 9) knowledge score was 20.58. Thus, in the current study, knowledge was found to improve by Day 9 after the implementation of SOP in the experimental group with the mean difference of 7.16.

Saleh, Doa'a A et al reported similar findings that is a significant increase in knowledge post intervention. The mean post intervention knowledge score was 87.7 which was higher than pre-test (77.0).[9]

Simon LP described in her study the developed guidelines regarding prevention and management of NSI was found to be effective in enhancing the knowledge of health care workers.[10]

The mean post-test knowledge score post implementation of SOP was highest on Day 9 (first post-test evaluation) which was 27.74. However the mean post-test knowledge score on Day 40 (24.13) and Day 70 (22.26) showed a decline in knowledge scores over a period of time. These findings are in conformity to the study findings of Doa A et al which showed that the best knowledge scores were obtained in the first post education assessment, and the scores subsequently declined in second and third post education assessment. Thus continuous education, monitoring, evaluation and positive reinforcement play in pivotal role in sustainability of knowledge.

There was no significant difference in area wise knowledge scores in comparison group on day 70, however there was a significant increase in the prevention and management area mean post-test scores on day 70 in the experimental group nurses. This finding is in congruence with the finding of Doa A et al which also reported a significant increase in blood borne pathogen prevention knowledge score post intervention. The mean pre-test knowledge increased from 70.1 to 82.5 post health education intervention to nurses on universal precautions.

CONCLUSION

The present study reveals that there was a significant increase in the knowledge of nurses on prevention and management of needle stick injuries post imparting of training with the help of standard operating procedures. However, this training needs to be continuously reinforced or it may lead to decline in knowledge.

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