

SELF-REPORTED EXPERIENCES AND PERCEPTIONS RELATED TO NEEDLE STICK INJURIES IN A TERTIARY CARE HOSPITAL IN COASTAL ANDHRA PRADESH

Sai Shankar Prathap¹, Anand Acharya², Hari Ramani B³

¹Associate Professor, Department of Community Medicine, Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram.

²Professor & HOD, Department of Pharmacology, Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram.

³Final Year Student, Department of Community Medicine, Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram.

ABSTRACT

INTRODUCTION

Needle Stick Injury, a preventable problem, is a serious concern for all health care providers and workers and poses a significant risk of occupational transmission of blood borne pathogens such as HIV, HBV, HCV and some others. Relevant literature is scanty from India and none could be located from coastal Andhra Pradesh. The present study aims at determining the occurrence of Needle Stick Injuries in various categories of health workers in a tertiary care teaching hospital in coastal Andhra Pradesh, factors associated with these Needle Stick Injuries, circumstances under which they occur and the responses of the health care workers following the injury. The study also aims at assessing the awareness levels of the health care workers regarding diseases transmitted through Needle Stick Injuries.

MATERIALS AND METHODS

After getting the permission from the authorities of KIMS&RF and clearance from IEC of KIMS&RF, an institution based cross-sectional study on health care providers involved in diagnosis and treatment of patients and the cleaning staff using predesigned and pretested questionnaire was done after seeking their consent. The data collected included basic demographics of the study subjects, professional status and work experience, history of Needle Stick Injury during the last three years while on their job and the relevant details, perceptions regarding Needle Stick Injuries, knowledge on diseases associated with it and information regarding training on Universal Work Precautions. The data was entered in Microsoft Excel worksheet and analysed statistically using Epi Info version 6 software.

RESULTS

Of the 353 study subjects (97 males and 256 females) who answered the questionnaire, 53% reported to have experienced Needle Stick Injuries and 94% of study subjects believed it to be an important problem. About 43 % met with Needle Stick Injury more than once in the last 3 years. Only 30% reported about the injury and 31% did nothing after the injury. Highest number of Needle Stick Injuries occurred during injection administration followed by IV cannulation and blood collection. Highest proportion of Needle Stick Injuries occurred in ward (27.81%) followed by ICU (22.46%). Highest proportion of Needle Stick Injuries were suffered by nursing interns (20.84%) followed by nursing students (18.72%).

CONCLUSION

Needle Stick Injury is an important problem in this setup with significant knowledge and practice gaps which needs to be addressed immediately. Repeated training on Universal Work Precautions is to be emphasised and adherence to the standard protocols to be strictly ensured with an effective surveillance mechanism.

KEYWORDS

Needle Stick Injury, Tertiary care hospital, Health care workers, Sharps disposal.

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Corresponding Author:

Dr. Sai Shankar Prathap,

Associate Professor, Department of Community Medicine,

Konaseema Institute of Medical Sciences and Research

Foundation, Amalapuram, East Godavari-533201,

Andhra Pradesh.

E-mail: prathapss@gmail.com

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INTRODUCTION: Health care workers face a significant risk of occupational transmission of blood borne pathogens due to percutaneous injuries caused by needle sticks and other sharps. Sharps such as blood collection needles, hypodermic needles, IV cannulas or needles used to connect parts of IV delivery system, etc. can cause wounds to the health care workers and such injuries are called Needle Stick Injuries. A Needle Stick Injury can occur in various ways such as while performing a procedure, while

handling/transferring specimens, during clean-up and disposal, etc. Hospital staff such as physicians, surgeons, nurses, laboratory technicians and waste handlers are at an increased risk of Needle Stick Injuries. This puts them at a risk of acquiring various blood borne infections due to microorganisms causing HIV/AIDS, Hepatitis B and Hepatitis C and many other diseases. US Department of Labor and Occupational Health, Safety, & Administration (OSHA) indicates that in the US, one out of every seven healthcare workers accidentally suffers from a Needle Stick Injury annually.¹ In India, around 3-6 billion injections are given annually of which about two thirds are unsafe.² Needle Stick Injuries are very much underreported and injuries recorded through standard occupational reporting systems may underestimate the true injury rate, as much as 10-fold.^{3,4} The financial impact of these Needle Stick Injuries is also very high and includes both direct and indirect costs.^{5,6} There is a scarcity of literature related to Needle Stick Injuries from India, particularly from coastal Andhra Pradesh.

The present study aims at determining the occurrence of Needle Stick Injuries in various categories of health workers in a tertiary care teaching hospital in coastal Andhra Pradesh, factors associated with these Needle Stick Injuries, circumstances under which they occur and the responses of the health care workers following the injury. The study also aims at assessing the awareness levels of the health care workers regarding diseases transmitted through Needle Stick Injuries.

MATERIAL AND METHODS: The protocol for carrying out the study was prepared and submitted to the Institutional Ethics Committee of Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram. After getting the clearance, the medical superintendent and the nursing superintendent of KIMS General Hospital and the principal of the KIMS College of Nursing were told about the importance of this study and their permission and cooperation was sought in carrying out this study. A predesigned, pretested semi-structured questionnaire was used to collect data from senior resident doctors, medical interns, junior resident doctors, nursing staff, nursing interns, nursing students, laboratory technicians and cleaning staff of KIMS General Hospital after giving them complete information about this study and seeking their consent. A Needle Stick Injury was defined for the present study as injury caused by blood collection needles, hypodermic needles, suture needles, IV cannulas, needles of IV sets and needles to connect parts of the IV delivery system. The data collected included basic demographics of the study subjects, professional status and work experience, history of Needle Stick Injury during the last three years while on their job and the relevant details, perceptions regarding Needle Stick Injuries, knowledge on diseases associated with it and information regarding training on Universal Work Precautions. The information provided by the study subjects in the questionnaire was entered in template created in a computer using Microsoft Excel 2007 and rechecked twice by independent persons for any errors. EPI

INFO 6 software was used for data analysis and appropriate statistical tests were done. Chi Square test was done where required to test for any significant difference between sub groups. A p-value of less than 0.05 was considered statistically significant.

RESULTS: A total of 353 health care workers participated in the study comprising of 97 males and 256 females. The study group consisted of 18(5.09%) senior resident doctors, 65(18.41%) medical interns, 36(10.2%) junior resident doctors, 23(6.52%) nursing staff, 45(12.75%) nursing interns, 94(26.63%) nursing students, 24(6.8%) laboratory technicians and 48(13.6 %) cleaning staff.

Out of the 353 study subjects, 331(93.77%) believed Needle Stick Injury to be an important problem, 271(76.77%) were aware that HIV/AIDS can be transmitted through Needle Stick Injury, 209(59.21%) were aware that hepatitis B virus can be transmitted through Needle Stick Injury and 189(53.54%) were aware that hepatitis C virus can be transmitted through Needle Stick Injury. Only 129(36.54%) had received training in Universal Work Precautions.

Of the 353 study subjects, 187(52.98%) gave a history of Needle Stick Injury in the last 3 years. A further sub sample analysis was done for the group of subjects who met with Needle Stick Injury in the last 3 years.

Of the 187 subjects who met with Needle Stick Injury in the last 3 years 107(57.22%) subjects met with Needle Stick Injury only once and the remaining 80(42.78%) subjects met with Needle Stick Injury more than once. A higher proportion of subjects who were not trained in Universal Work Precautions met with Needle Stick Injury more than once, though this was not statistically significant ($\chi^2=0.17$, $df=1$, $p=0.68$). However, only 56(29.95%) subjects reported about the Needle Stick Injury. About 75 percent of the subjects were wearing gloves at the time of Needle Stick Injury.

Nursing interns (20.84%) received the highest proportion of Needle Stick Injuries followed by nursing students (18.72%) and cleaning staff (16.04%). Highest proportion of Needle Stick Injuries were received while working in ward (27.81%) followed by Intensive Care Unit (22.46%). Highest proportion of Needle Stick Injuries were met with in the morning time (48.13%) followed by night (19.79%). Highest proportion of Needle Stick Injuries were caused during performance of procedures (injection administration 22.99%, IV cannulation 19.25%, blood collection 18.72% and suturing 12.3%) followed by improper disposal (10.16%), collision with other person (6.42%) and improper handling (5.88%). Recapping was the reason for Needle Stick Injury in only 4.28 percent of the subjects. More than 30 percent of the subjects who met with Needle Stick Injury did nothing after the injury whereas 18.18 percent of the subjects applied pressure with cotton and spirit. About 14 percent of the subjects washed hand with plain water after they met with Needle Stick Injury.

Category	Number (%) n=187
Health Care Worker	
Senior Resident doctor	10(5.35%)
Junior Resident Doctor	18(9.63%)
Medical Intern	25(13.37%)
Nursing Staff	16(8.56%)
Nursing Intern	39(20.84%)
Nursing student	35(18.72%)
Lab Technician	14(7.49%)
Cleaning Staff	30(16.04%)
Department	
Casualty	33(17.65%)
ICU	42(22.46%)
Ward	52(27.81%)
Labour room	3(1.60%)
Laboratory	14(7.49%)
Operation Theatre	13(6.95%)
Other	30(16.04%)
Timing of Needle Stick Injury	
Morning	90(48.13%)
Afternoon	26(13.90%)
Evening	34(18.18%)
Night	37(19.79%)
Cause of Needle Stick Injury	
Blood collection	35(18.72%)
Injection administration	43(22.99%)
IV cannulation	36(19.25%)
Suturing	23(12.30%)
Recapping	8(4.28%)
Improper handling	11(5.88%)
Improper disposal	19(10.16%)
Collision with other person	12(6.42%)
Wearing Gloves at the time of Needle Stick Injury	
Yes	141(75.4%)
No	46(24.6%)
Number of times met with Needle Stick Injury in last 3 years	
Once	107(57.22%)
More than once	80(42.78%)
Reporting of Needle Stick Injury	
Reported	56(29.95%)
Not reported	131(70.05%)

Table 1: Summary of Needle Stick Injuries

Response after the injury	Number (%) N=187
Nothing	57(30.48%)
Hand wash with plain water	27(14.41%)
Hand wash with soap and water	5(2.67%)
Hand wash with soap and water and then applied spirit	2(1.07%)
Hand wash with soap and water and sent for patient's serology	1(0.54%)
Hand wash with plain water and sent for patient's serology	1(0.54%)
Hand wash with plain water and sent for patient's and victim's serology and	1(0.54%)

repeated victim's serology after 6 months	
Hand wash and TT injection	20(10.70%)
Hand wash and Band-Aid	3(1.60%)
Applied spirit and Band-Aid	8(4.28%)
Applied Band-Aid and took TT injection	2(1.07%)
Applied pressure with cloth	4(2.14%)
Applied pressure with cotton and spirit	34(18.18%)
Applied pressure with cotton and spirit followed by hand wash	1(0.54%)
Applied pressure with cotton and spirit and sent for patient's serology	1(0.54%)
Applied spirit	11(5.88%)
Applied spirit and sent for patient's serology	1(0.54%)
Applied spirit and sent for patient's and victim's serology	1(0.54%)
Took TT injection	3(1.60%)
Sent for patient's serology	3(1.60%)
Sent for patient's and victim's serology	1(0.54%)

Table 2: Response of the health care workers after the most recent Needle Stick Injury

DISCUSSION: In the present study, about 53 percent of the subjects reported having received Needle Stick Injury in the last three years. The nursing staff and interns experience more instances of Needle Stick Injury. Studies from New Delhi^{7,8} and another study from rural area in North India⁹ have reported higher figures in their institutions. High occurrence of Needle Stick Injuries among nurses is widely reported.¹⁰ Though 93 percent of study subjects believed Needle Stick Injury to be an important problem, only 77 percent of the subjects knew that HIV can be acquired through Needle Stick Injury, 59 percent believed that hepatitis B can be acquired from Needle Stick Injury and 54 percent believed that hepatitis C can be acquired from Needle Stick Injury. A study from New Delhi reported that most of the health care workers were aware of the possibility that Needle Stick Injury could lead to acquisition of diseases like HIV, hepatitis B and hepatitis C.⁷

In the present study, about 43 percent of the subjects reported having met with Needle Stick Injury more than once. Studies from New Delhi⁸ and from rural North India⁹ have also reported Needle Stick Injury more than once to be a common phenomenon. Wearing of gloves is a line of defence and in the present study, about 25 percent of the subjects were not wearing gloves at the time of Needle Stick Injury. Studies from New Delhi have reported similar results.^{7,8} Study from Iran reported that less than 4 percent of subjects were not using gloves at the time of Needle Stick Injury.¹¹

In the present study, Needle Stick Injuries occurred in highest proportion during the mornings followed by night. A study from Vellore¹¹ reported that there was no association between incidence of Needle Stick Injuries and shift/time of

work. The same study also reported that highest proportion of Needle Stick Injuries occurred in Ward (43.24%) followed by Operation Room (14.86%). In the present study also highest proportion of Needle Stick Injuries occurred in Ward (27.81%) but this was followed by Intensive Care Unit (22.46%).

In the present study, Needle Stick Injuries was reported to have occurred during the procedure in 73.26 percent of subjects (injection administration 22.99%, IV cannulation 19.25%, blood collection 18.72% and suturing 12.3%) followed by improper disposal (10.16%), collision with other person (6.42%) and improper handling (5.88%). Recapping was the reason for Needle Stick Injury in only 4.28 percent of the subjects. Study from Vellore¹² reported that Needle Stick Injuries occurred during procedure in 58.11 percent of cases followed by recapping device in 14.86 percent and improper disposal in 8.45 percent. A study from New Delhi reported that the commonest clinical activity to cause Needle Stick Injury was blood withdrawal (55%) followed by suturing (20.3%). The same study reported recapping as the cause in as high as 39 percent of Needle Stick Injuries.⁷

Response of the subject to Needle Stick Injury is very important and has impact on the effect of the injury. In the present study, as high as 31 percent reported that they did nothing after the Needle Stick Injury. About 32 percent of subjects reported washing the injury with water (including those who used soap also), about 11 percent applied spirit, about 7 percent applied Band-Aid and about 21 percent applied pressure with cotton. A small proportion of subjects reported that they got the serological tests done. A study from New Delhi reported that about 15 percent did nothing but about 61 percent washed the site of injury with soap and water. About 27.5 percent of the subjects had reported about the Needle Stick Injury to the authorities.⁸ Another study from New Delhi reported that about 66 percent washed their hands with soap and water, 47 percent applied spirit/alcohol, 19 percent used Band-Aid and 4 percent used pressure to stop bleeding.⁷ In the present study, about 30 percent of the subjects reported about the Needle Stick Injury to the authorities and seniors but under reporting is very high for Needle Stick Injuries at all places.⁴

CONCLUSIONS: Needle Stick Injury is a universal omnipresent occupational hazard that is seen in all categories of health care workers. It is grossly under reported but is a very important problem which can cause acquisition of life threatening microbial infections in health care workers. The occurrence of Needle Stick Injuries can be minimised to a large extent by training the health care workers periodically regarding Universal Work Precautions and safety practices in a hospital including handling and disposal of sharps. An effective surveillance mechanism should be established in every hospital to ensure that the guidelines are adhered to strictly. Facilities for prompt response and management of Needle Stick Injury need to be set up. Reporting and recording of all Needle Stick Injuries should be made mandatory. Each hospital should develop a multi-pronged approach for dealing with Needle

Stick Injury. Finally, efforts should be made to inculcate a responsible attitude among all health care workers.

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