Original Research Article

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A cross sectional study to evaluate needle stick injuries among health care workers in Malabar medical college, Calicut, Kerala, India

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ABSTRACT

Background: Percutaneous injuries caused by needle sticks pose a significant risk of blood borne pathogens among health care workers. Many factors are involved in transmission of infections like HIV, Hepatitis B and Hepatitis C such as overuse of injections, lack of disposable syringes, safer needle devices, sharps disposal containers, passing instruments from hand to hand, lack of awareness and adequate training. Needle stick injuries (NSI) are under reported, this study helps to know the causes and other factors related to NSI for effective prevention.

Methods: Cross-sectional study was conducted among all health care workers who consented to participated in the study in July 1st to July 31st 2016. 514 health workers were interviewed and given a pre-detested, semi-structured questionnaire was given to elicit information regarding the factors for causation of NSI and its effective prevention.

Results: 21.1% (108) of the health care workers had NSI. 45.4% were interns, followed by nursing staff (26.8%). 55.5% (60) had history of NSI while performing any surgeries or assisting procedures. Majority of them knew about the transmission of HIV (100%), Hepatitis B (99.1%) and Hepatitis C (81.4%) and Malaria (20.3). NSI reporting was observed at 46.2%. 88.2% (90) of them had completed their 3 dose schedule of hepatitis B vaccine, 48% (52) had received training on universal precautions.

Conclusions: NSI was seen more among interns and nursing staff. They had good knowledge regarding the diseases transmission due to NSI and Vaccination. Effective periodic training on universal precautions can prevent NSI.

Keywords: Health care workers, NSI, Training

INTRODUCTION

Percutaneous injuries caused by needle sticks and other sharp objects, pose a significant risk of occupational transmission of blood borne pathogens among health care workers. According WHO report 2002, of the 35 million health-care workers, 2 million experience percutaneous exposure to infectious diseases each year of which Hepatitis B (37.6%), Hepatitis C (39%) and HIV/AIDS (4.4%) are most common blood borne pathogens transmitted due to needle stick injuries in the world.²

Many factors involved in transmission of infections due to needle stick injuries which includes overuse of injections, lack of supplies of disposable syringes, safer needle devices, sharps disposal containers, passing instruments from hand to hand while conducting any procedure, lack of awareness and adequate training.³

Needle stick injuries not only possess health workers at risk of getting infections but also creates an emotional impact which can be severe and long lasting. Hence there is a need of introduction of health education programs

which can produce positive changes in both knowledge and attitude towards safety procedures that protect against them by accidental blood borne pathogen transmission. NSIs can be regarded as preventable, if healthcare workers adopt a comprehensive program that addresses institutional, behavioral, and device-related factors that contribute to the occurrence of needle stick injuries in health care workers. And the needle stick injuries are underreported, hence this study was undertaken to measure the burden, determinants of NSI and the level of awareness regarding prevention of needle stick injuries among health care workers.

METHODS

This cross sectional study was conducted among all health care workers at Malabar Medical College Hospital and Research Centre from July 1st –July 31st 2016. Health workers who are working for more than 3 months were included. Among 586 health care workers, 514 consented to participate in the study which consisted of 175 doctors, 154 were staff nurse, 121 were interns and 64 were lab technicians and they were selected randomly using table of random numbers and interviewed using a pretested, semi-structured questionnaire in the local language (Malayalam) after obtaining written consent. The data was collected using a pre tested, semi structured questionnaire, consisted of information related to socio demographic details, history related to their occupational exposure to needle stick injury in their work tenure and awareness regarding needle stick injury. questionnaire was distributed to study participants and the collected data was entered into Microsoft excel and analyzed using SPSS (Statistical Package for Social Sciences) Version 16 with the help of statistical methods like percentages and Chi square test for association regarding the various determinants of needle stick injuries at p value <0.05.

RESULTS

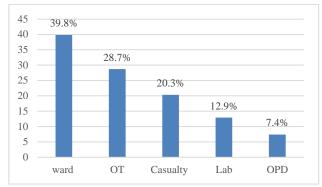
514 health workers were interviewed of which 175 were doctors, 154 nursing staff, 121 interns and 64 were lab technicians. Needle stick injuries among health care workers was observed at 21.1% (108) for the past one year. Of those who had NSI, 45.4 % (49) were interns, 26.8% (29) were nursing staff, 20.4% (20) of them were doctors, 7.4%(8) were lab technicians.

Majority of them experienced needle stick injuries at ward (39.81%) followed at Operation Theatres (28.7%) and in casualty (20.3%) (Figure 1).

Figure 2 shows, 29.6% (32) of them had needle stick injuries while conducting some procedures, 25.9% (28) while collecting blood and 24.1% (26) recapping of needle.

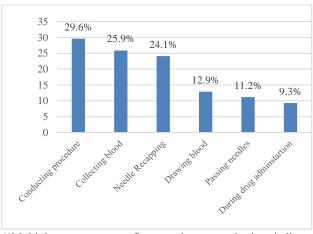
Of the 514, 14.4 % (74) of them wore gloves while doing some procedures at health care setting had history of

needle stick injuries. From the Table 1 it is evident that, gloves are not protective in preventing needle stick injuries.



(*Multiple responses, figures in parenthesis indicate percentage).

Figure 1: Occurrence of needle stick injuries.



(*Multiple responses, figures in parenthesis indicate percentage).

Figure 2: Causes for needle stick injuries.

Table 1: Association of NSI with the use of gloves.

Use of	NSI		Total
gloves	Yes	No	
Yes	74 (14.3%)	60 (11.7%)	134 (26.0%)
No	34 (6.7%)	346 (67.3%)	380 (74.0%)
Total	108 (21.0%)	406 (79.0%)	N=514

(N=514, Chi square value= 124.1, d.f=1, p value<0.05).

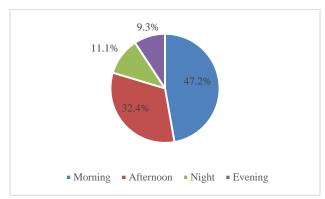
From the pie chart (Figure 3), of the 108 who had needle stick injuries 47.2% (51) of them had injuries in the morning and 35 (32.1%) experienced it in the afternoon.

From the above Table 2 it is evident that, 11.7% (60) had history of needle stick injuries while performing any surgeries or assisting procedures, which was statistically significant at p value<0.05. 53 (49.1%) washed their hands with soap and water, 32.4% (35) did not responded. whereas 25% (27) of them applied antiseptics after needle stick injuries (Figure 4).

Table 2: Association of NSI with the assisting or performing of surgeries.

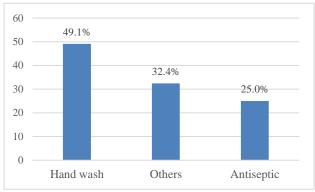
Assisting or	NSI		
performing surgeries	Yes	No	Total
Yes	60 (11.7%)	121(23.5%)	181(35.2%)
No	48 (9.3%)	285 (55.5%)	333(64.8%)
Total	108 (21.0%)	406 (79.0%)	N=514

(N=514, Chi square value= 23.683,d.f=1 p value<0.0001).



(*figures in parenthesis indicate percentage).

Figure 3: Time of needle stick injury.



(*Multiple responses, figures in parenthesis indicate percentage)

Figure 4: First-aid measures taken after needle stick injury.

Knowledge, attitude and practice regarding diseases transmission and vaccination

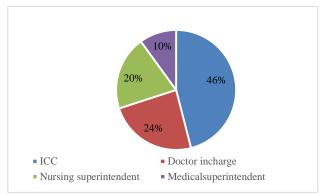
All those who had history of needle stick injuries they knew that HIV (100%), Hepatitis B (99.1%) and Hepatitis C (81.4%) and Malaria (20.3) can be transmitted through the needle stick injuries.55.5% (60) of them checked patient's blood for hepatitis B, hepatitis C and HIV after needle stick injuries. 63.8% (69) have undergone HIV, hepatitis B diagnostic test after NSI.

94.4% (102) have received hepatitis B vaccine in the past of which, 88.2% (90) of them had completed their 3 dose schedule of hepatitis B vaccine and 66.6% (62) have taken hepatitis B booster dose. Of the 90 those who have

completed the 3 dose schedule 28.9% (26) of them have checked the antibody titer after vaccination.

Needle stick injuries reporting

46.2% (50) of those who had needle stick injuries reported to some authority at hospital, of which 46.0% (23) of them reported to infection control committee, 24.0% (12) to doctor, 20.0% (10) to nursing superintendent and 10.0% (5) of them reported medical superintendent respectively (Figure 5).



(*figures in parenthesis indicate percentage).

Figure 5: Needle stick injuries reporting among health care workers.

12.8% (66) of those who had NSI, thinks that there is a need for recapping the needle after usage. Association of recapping of needle after usage of needles was not statistically significant meaning recapping of needle will not prevent the needle stick injuries after usage (Table 3).

Table 3: Association of NSI with the Recapping of needles after its usage.

Recapping	NSI		Total
of needle	Yes	No	Total
Yes	66 (12.8%)	222 (43.2%)	288 (56.1%)
No	42 (8.1%)	184 (35.8%)	226 (43.9%)
Total	108 (21.0%)	406 (79.0%)	N=514

(N=514, Chi square value= 1.183, d.f=1; p value= 0.2767).

Table 4: Association of NSI with training on universal precautions.

Training on	NSI		
universal precautions	Yes	No	Total
Yes	52 (10.2%)	215 (41.8%)	267 (51.9%)
No	56 (10.8%)	191 (37.2%)	247 (48.1%)
Total	108 (21.0%)	406 (79.0%)	N=514

(N=514; chi square value=0.609; d.f=1; p value= 0.4352).

From the Table 4 it is shown that, 10.2% (52) of those who experienced needle stick injuries had received training on universal precautions, but which was not

statistically significant meaning that adequate training is required for the prevention of needle stick injuries.

DISCUSSION

A study done by Sharma R et al on study of prevalence and Response to needle stick injuries among health care workers in a tertiary care hospital in Delhi, India reported 79.5% of health care workers had needle stick injuries and 22.4% of them reported to health authority, in our study needle stick injuries among health care workers was observed at 21.1% for the past 1 year and 46.2% (50) of those who had needle stick injuries reported to some authority. A study by Shriyan A et al in their study on incidence of occupational exposures in a tertiary health care center at Mangalore, Karnataka revealed that of the 59 who had NSI 61.1% (36) of them reported to infection control committee, 16.8% reported to the emergency room and personal physician, one of them contacted employee health officer. 8

Jaybhaye DR et al in their study on Needle stick injuries among health care workers in tertiary care hospital of rural India, revealed that prevalence of NSI was 49.1%, and staff nurses had highest percentage 50.0% (54), followed by resident doctors 25.9% (28) and interns 22 (20.37%). In our study the prevalence of NSI was observed at 21.1% for the past one year and of those who had NSI, majority of them were (45.4%) were interns followed by nursing staff (26.8%) and doctors (20.4%) respectively.⁹

Pavithran VK et al., in their study titled 'knowledge, attitude, and practice of needle stick and sharps injuries among dental professionals of Bangalore, India' reported majority of them (88.0%) responded diseases like HIV, Hepatitis B and Hepatitis can be transmitted due to needle stick injuries and 79.0% of them had injuries while doing some procedure. In our study All those had history of needle stick injuries they knew that HIV (100%), Hepatitis B (99.1%) and Hepatitis C (81.4%) and Malaria (20.3) can be transmitted through the needle stick injuries and 55.5% (60) of them had injuries while doing some procedure or performing surgeries and checked patient's blood for hepatitis B, hepatitis C & HIV after needle stick injuries.¹⁰

In our study, 25.9% (28) had needle stick injuries while collecting blood and 24.1% (26) recapping of needle. Similar findings reported from a study done by Mahesh Kumar CH et al in their study titled, "A Study of Needle Sticks Injuries in a Medical College Hospital in Northern District of Karnataka".

A study done by Jayanth ST et al on 'needle stick injuries in a tertiary care hospital' at CMC, Vellore reported that 43.2% of the needle stick injuries occurred for the past one year, 14.9% of them at operating rooms, 11.5% at casualty, 6.4% had experienced at intensive care unit. Despite regular and intensive educational efforts, most

NSIs occurred when universal precautions or standard procedures were not followed (n=223, 75.3%). In our study Majority of them experienced needle stick injuries at ward (39.81%) followed at Operation Theatres (28.7%) and in casualty (20.3%) and Of the 108 those who had needle stick injuries 48% (52) had received training on universal precautions, concludes a need for effective repeated training for the prevention of needle stick injuries. ¹²

CONCLUSION

In spite of good knowledge regarding the diseases transmission due to NSI and vaccination, majority of the NSI occurred among interns and nursing staff. So effective periodic training on universal precautions can prevent NSI.

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Institutional Ethics Committee

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