

Occupational Exposure to Needle Stick Injuries among Health Care Personnel in a Tertiary Care Hospital: A Cross Sectional Study

Ramesh Holla*, Bhaskaran Unnikrishnan, Pradhun Ram, Rekha Thapar, Prasanna Mithra, Nithin Kumar, Vaman Kulkarni and Bhagawan Bhagyamma Darshan

Department of Community Medicine, Kasturba Medical College, Manipal University, Mangalore-575001, Karnataka, India

Abstract

Background: Health care personnel are at increased risk of contracting blood borne pathogens due to their occupational exposure to blood and body fluids. According to the World Health Organization, out of 35 million health workers worldwide, about 3 million receive percutaneous exposures to blood borne pathogens each year.

Objectives: 1) To know the extent of occupational exposure to needle stick injuries among health care personnel of tertiary care hospitals. 2) Assessing the relationship between occurrence of needle stick injuries with the work experience and awareness regarding universal precautions among health care personnel.

Methods: A cross sectional study was conducted among health care personnel of three tertiary care teaching hospitals attached to a medical college in coastal south India. The data was collected from the health care personnel by using a self-administered, pre tested, semi structured questionnaire. Analysis was done by using SPSS Version 11.5.

Results: Majority of the health care personnel (n=127, 67.2%) were aged between 25 and 45 years. More than half of the health care personnel (n=109, 58.1%) were doctors followed by staff nurses (n=62, 33.4) and hospital supportive staffs (n=18, 9.5%). Needle stick injuries was observed among 71.9% (n=136) of health care personnel. Majority of the needle stick injuries were observed among the health care personnel who had a work experience of five and more than five years and it was found to be statistically significant. Needle stick injuries were more among health care personnel who were unaware of universal precautions.

Conclusions: The proportion of needle stick injuries was more among health care personnel and this can be reduced by training the workers regarding universal precautions and making sure that they are adhering to these norms.

Keywords: Needle stick injuries; Health care personnel; Hospital; Coastal South India

Introduction

Health care personnel are at increased risk of contracting blood borne pathogens due to their occupational exposure to blood and body fluids [1-4]. More than twenty diseases can get transmitted through needle stick injuries including Hepatitis B, Hepatitis C and HIV [5]. Occupational exposure to blood can result from percutaneous injury (needle stick or other sharps injury), mucocutaneous injury (splash of blood or other body fluids into the eyes, nose or mouth), or contact with non-intact skin [6-10]. Hence not only doctors and nurses even laboratory technicians, housekeeping personnel and hospital waste handlers are at risk of harboring the blood borne infections [2,11]. According to the World Health Organization, out of 35 million health workers worldwide, about 3 million receive percutaneous exposures to blood borne pathogens each year; two million of those to HBV, 0.9 million to HCV and 170,000 to HIV. These injuries may result in 16,000 HCV, 66,000 HBV and 1000 HIV infections [6]. More than 90% of these infections occur in developing countries. The measures which can be taken to reduce these occupationally related blood borne infections to health care personnel includes eliminating unnecessary injections, adhering to universal precautions, immunization against Hepatitis B, provision of personal protective equipment and the management of exposures [7,11-14].

In this background, the present study was undertaken to know the extent of occupational exposure to needle stick injuries among health care personnel of tertiary care hospitals. The present study also aims at assessing the relationship between occurrence of needle stick

injuries with the work experience and awareness regarding universal precautions among health care personnel.

Materials and Methods

A cross sectional study was conducted at three tertiary care teaching hospitals attached to Kasturba Medical College (KMC), Mangalore during 2011. Ethics committee approval was obtained from the Institutional Ethics Committee of KMC, Mangalore. The sample size was calculated assuming 50% of health care personnel had occupational exposure to blood or blood products during their work. Taking 15% relative precision and confidence interval of 95% the sample size was calculated to be 171. Adding 10% as non-response error, final sample size was 189. Health care personnel were approached individually and explained about the objectives of the study. A written informed consent was taken from those who were willing to participate.

***Corresponding author:** Dr. Ramesh Holla, Assistant Professor, Department of Community Medicine, Kasturba Medical College, Manipal University, Mangalore-575001, Karnataka, India, Tel: +91-9741736093; Fax: +91 824 2422271; E-mail: 13rameshholla@gmail.com

Received January 16, 2013; **Accepted** March 17, 2014; **Published** March 19, 2014

Citation: Holla R, Unnikrishnan B, Ram P, Thapar R, Mithra P, et al. (2014) Occupational Exposure to Needle Stick Injuries among Health Care Personnel in a Tertiary Care Hospital: A Cross Sectional Study. J Community Med Health Educ S2: 004. doi:10.4172/2161-0711.S2-004

Copyright: © 2014 Holla R, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Health care personnel comprising of doctors, nurses and support staffs were, enrolled in the study based on convenient sampling. The data was collected using a pre tested, semi structured questionnaire. The questionnaire consisted of information related to socio demographic details, history related to their occupational exposure to needle stick injury in their work tenure. The questionnaire was distributed to study participants and the collected data was analyzed using SPSS (Statistical Package for Social Sciences) Version 11.5 and results obtained were expressed in proportions. Chi square test was used to assess the relationship between work experience and awareness regarding universal precautions with needle stick injuries among health care personnel and Pvalue <0.05 was considered as statistically significant.

Results

Baseline characteristics of the study participants were shown in Table 1. The age of the health care personnel who were enrolled into the study ranged between 19 and 61 years (mean age of 35.53 ± 9.45 years). It is observed that majority of the health care personnel (n=127, 67.2%) were aged between 25 and 45 years followed by those aged less than 25 years (n=35, 18.5%). Male and female distribution is almost equal (n=94, 49.7% and n=95, 50.3% respectively). More than half of the health care personnel (n=109, 58.1%) were doctors followed by staff nurses (n=62, 33.4) and hospital supportive staffs (n=18, 9.5%). While analyzing the experience of the health care personnel, it was observed that majority of them (n=137, 72.5%) had a work experience of more than 5 years followed by those who had a work experience of less than 5 years (n=52, 27.5%). The work experience of the study participants ranged between 1 and 12 years (mean work experience of 4.57 ± 1.69 years).

When the exposure to needle stick injuries was analyzed based on the work experience of the health care personnel; it was noticed that, 50% of the health care personnel (n=26) had a exposure to needle stick injuries among who had a work experience of less than 5 years (n=52) and more than three fourth (n=110, 80.3%) had exposure to needle stick injuries among who had a work experience of more than 5 years which was found to be statistically significant (P value 0.00003). The present study has shown that among 183 health care personnel who were aware of universal precautions, 71.5% (n=131) had exposure to needle stick injuries during their work tenure, where as it was 83.3% (n=5) among those who were not aware of universal precautions (n=6). However this difference was not statistically significant. Relationship between work experience and awareness regarding universal precautions with needle stick injuries is shown in Table 2.

Age groups (Years)	Number	Percentage
<25	035	18.5
25-45	127	67.2
>45	027	14.3
Sex		
Male	94	49.7
Female	95	50.3
Occupation		
Doctors	109	58.1
Nurses	062	33.4
Support staff	018	09.5
Work experience (Years)		
<5	052	27.5
≥5	137	72.5

Table 1: Baseline characteristics of study participants (n=189).

Work experience (Years)	Exposure to needle stick injuries		Total (%)	P Value*
	Yes (%)	No (%)		
<5	026 (50.0)	26 (50.0)	052 (100)	0.00003
≥5	110 (80.3)	27 (19.7)	137 (100)	
Total	136 (71.9)	53 (28.1)	189 (100)	
Awareness regarding universal precautions				0.53**
Yes	131 (71.5)	52 (28.5)	183 (100)	
No	005 (83.3)	01 (16.7)	006 (100)	
Total	136 (71.9)	53 (28.1)	189 (100)	

*Chi square test **Fischer's exact test

Table 2: Relationship between work experience and awareness regarding universal precautions with needle stick injuries (n=189).

Discussion

The present study was carried out to assess the proportion of needle stick injuries among health care personnel of tertiary care hospital has shown a higher proportion of health care personnel were exposed to needle stick injuries in their work tenure (n=136, 71.9%). A study done at Nepal among health care workers of medical college teaching hospital [5] and a study from rural North India [15] has shown similar results to the present study i.e. 70.8% and 73% respectively. Whereas the studies from New Delhi, India [1,2] has shown relatively higher proportion of needle stick injuries among health care workers of tertiary care hospital i.e. 79.5% and 80.1% respectively when compared to the present study findings. The studies from Alexandria hospital [16] Egypt (67.9%), a study from Nigeria [17] involving primary health care workers (57.1%) and a study from Pakistan [18] involving health care workers of two tertiary care hospitals comprising both public and private health sector (64%) have shown marginally lower percentage of needle stick injuries in relation to the present study observation. In contrast to the present study findings, studies from Germany [3,19] Maharashtra-India [13] and Mongolia [20,21] have shown significant lower proportion of needle stick injuries i.e. 31.5%, 49.1% and 38.4% respectively among the health care personnel.

When the exposure to needle stick injuries was analyzed based on the work experience of the health care personnel; it was noticed that majority of the health care personnel who had work experience of five and more than five years were exposed to needle stick injuries than those who had work experience of less than five years. The most common belief is that; as the work experience increases chances of exposure to needle stick injuries will come down as supported by the study done at Egypt and Malaysia [16,22]. Whereas a study from Pakistan [18] involving health care workers of two tertiary care hospitals has shown the results similar to the present study where it was observed that the odds of having needle stick injuries were higher among health care workers who were practicing for more than five years which was found to be statistically significant. The present study finding could be because of more exposure due to longer duration of service.

The present study has shown no significant difference between the exposure to needle stick injuries and awareness regarding universal precautions among health care personnel; even though exposure to needle sticks injuries were more among those who were unaware of universal precautions. A study from Mongolia [20] has shown, those health care workers who adhere to universal precautions were less likely to have needle stick injuries than those who did not adhere to universal precaution recommendation. A similar observation was made from the study done at Malaysia [23]; where it was said that level of practice of universal precaution was inversely related to the episode of needle stick

injuries; that means the episode of needle stick injuries can be reduced if the level of practice of universal precaution is improved.

Conclusions

In the present study the proportion of needle stick injuries was more among the health care personnel. Thus the prevention of needle stick injuries among the health care personnel should be an integral part of the hospital management mainly by training the workers regarding universal precautions and making sure that they are adhering to these norms.

The results of this study should be interpreted with caution as the present study was done only among health care personnel of three tertiary care hospitals attached to one medical college and hence cannot be generalized. The study has not taken into account the circumstances of needle stick injuries and the post exposure prophylaxis received following the exposure.

Acknowledgement

The authors are grateful to the study participants who voluntarily took part in the study. We wish to acknowledge the support provided by the Department of Community Medicine, Kasturba Medical College, Mangalore and Manipal University for encouraging research and its publication in international journals of repute.

References

- Sharma R, Rasanian S, Verma A, Singh S (2010) Study of Prevalence and Response to Needle Stick Injuries among Health Care Workers in a Tertiary Care Hospital in Delhi, India. *Indian J Community Med* 35: 74-77.
- Muralidhar S, Singh PK, Jain RK, Malhotra M, Bala M (2010) Needle stick injuries among health care workers in a tertiary care hospital of India. *Indian J Med Res* 131: 405-410.
- Wicker S, Jung J, Allwinn R, Gottschalk R, Rabenau HF (2008) Prevalence and prevention of needlestick injuries among health care workers in a German university hospital. *Int Arch Occup Environ Health* 81: 347-354.
- Centers for disease control and prevention
- Gurung NS, Paudel K, Pun CB (2010) Needle stick injuries among health care workers in a tertiary care teaching hospital, Pokhara, Nepal. *Journal of Gandaki Medical College* 3: 47-50.
- Pruss-Ustun A, Rapiti E, Hutin Y (2003) Sharps injuries: Global burden of disease from sharps injuries to health-care workers. Geneva, World Health Organization.
- Kotwal A, Taneja D (2010) Health Care Workers and Universal Precautions: Perceptions and Determinants of Non-compliance. *Indian J Community Med* 35: 526-528.
- Sari SYI, Ibrahim K, Haroen H (2011) Knowledge, attitude and perceived adherence with universal precautions among health care workers in the obstetrics and gynaecology department of an Indonesian teaching hospital. *Int J Infect Control* 7: 4.
- Ferguson KJ, Waitzkin H, Beekmann SE, Doebbeling BN (2004) Critical incidents of nonadherence with standard precautions guidelines among community hospital-based health care workers. *J Gen Intern Med* 19: 726-731.
- Maharaj D1, Lawton B, Garrett S (2012) Poor compliance with standard precautions against infections during minor gynaecological procedures. *Aust N Z J Obstet Gynaecol* 52: 262-265.
- Zaidi MA, Beshyah SA, Griffith R (2010) Needle Stick Injuries: An overview of the size of the problem, prevention & management. *Ibnosina Journal of Medicine and Biomedical Sciences* 2: 53-61.
- Pournaras S, Tsakris A, Mandraveli K, Faitatzidou A, Douboyas J, et al. (1999) Reported needlestick and sharp injuries among health care workers in a Greek general hospital. *Occup Med (Lond)* 49: 423-426.
- Jaybhaye DR, Dahire PL, Nagaonkar AS, Vedpathak VL, Deo DS, et al. (2014) Needle stick injuries among health care workers in tertiary care hospital of rural India. *Int J Med Sci Public Health* 3: 48-51.
- Wilburn SQ, Eijkemans G (2004) Preventing needlestick injuries among healthcare workers: a WHO-ICN collaboration. *Int J Occup Environ Health* 10: 451-456.
- Kermode M, Jolley D, Langkham B, Thomas MS, Crofts N (2005) Occupational exposure to blood and risk of bloodborne virus infection among health care workers in rural north Indian health care settings. *Am J Infect Control* 33: 34-41.
- Hanafi MI, Mohamed AM, Kassem MS, Shawki M (2011) Needlestick injuries among health care workers of University of Alexandria Hospitals. *East Mediterr Health J* 17: 26-35.
- Musa OI (2007) Needle stick injuries among primary health care workers in a northern state of Nigeria. *CEJOEM* 13: 171-178.
- Afridi AAK, Kumar A, Sayani R (2013) Needle stick injuries – Risk and preventive factors: A study among health care workers in tertiary care hospitals in Pakistan. *Global journal of Health science* 5: 85-92.
- Wicker S, Ludwig AM, Gottschalk R, Rabenau HF (2008) Needlestick injuries among health care workers: occupational hazard or avoidable hazard? *Wien Klin Wochenschr* 120: 486-492.
- Kakizaki M, Ikeda N, Ali M, Enkhtuya B, Tsolmon M, et al. (2011) Needlestick and sharps injuries among health care workers at public tertiary hospitals in an urban community in Mongolia. *BMC Res Notes* 4: 184.
- Logez S, Soyolgerel G, Fields R, Luby S, Hutin Y (2004) Rapid assessment of injection practices in Mongolia. *Am J Infect Control* 32: 31-37.
- Rampal L, Zakaria R, Sook LW, Zain AM (2010) Needle stick and sharps injuries and factors associated among health care workers in a Malaysian hospital. *European Journal of Social Sciences* 13: 354-62.
- Norsayani MY, Noor Hassim I (2003) Study on incidence of needle stick injury and factors associated with this problem among medical students. *J Occup Health* 45: 172-178.

This article was originally published in a special issue, **Management and Prevention of Chronic Disease and Disability: a Global Challenge** handled by Editor. Dr. Syeda Zakia Hossain, University of Sydney, Australia