



Study on prevalence of needle stick injury and its management among waste handlers in Kasturba Hospital, Bhopal (M.P.)

Padma Bhatia¹, Dileep Dandotiya^{2*}, Anshuli Trivedi³, Pradeep Dohare⁴

¹ Associate Professor, Department of Community Medicine, Gandhi Medical College, Bhopal, Madhya Pradesh, India

^{2,4} Post Graduate Student, Department of Community Medicine, Gandhi Medical College, Bhopal, Madhya Pradesh, India

³ Assistant Professor, Department of Community Medicine, Gandhi Medical College, Bhopal, Madhya Pradesh, India

*Corresponding Author: Dileep Dandotiya

Abstract

Introduction: Needle stick injuries (NSIs) are the most common source of occupational exposures to blood and the primary cause of blood-borne infections among health care workers. These injuries usually occur during activities such as transfusion, blood sampling, needle disposal, waste collection, transferring body fluids and blood. Injuries due to contact with contaminated needles, may have serious physical and psychological consequences.

Objectives: 1) to determine the prevalence of needle stick injuries amongst biomedical waste (BMW) handlers. 2) To study the knowledge and practice of needle stick injury among biomedical waste handlers

Materials & method: A cross sectional study was conducted among 200 waste handlers by pre tested semi structured questionnaire in a public sector hospital.

Results: The prevalence of needle stick injury in the present study was found to be 16.0%. Of 89(44.5%) participants had knowledge that NSI can cause hepatitis B during BMW handling and 108 (54%) participants had knowledge that it can lead to HIV infection among them.

Conclusion: A gap between knowledge and practice with regards to NSI was observed among HCWs. Practices related to pre and post exposure prophylaxis following NSI was inadequate.

Keywords: NSIs, percutaneous exposures, HCWs, BMW

Introduction

A needle stick injury (NSI), percutaneous injury, or percutaneous exposure incident is the penetration of skin by a needle or other sharp object, which was in contact with blood, tissue, or other body fluid before the exposure [1]. Globally, NSIs are the most common source of occupational exposures to blood and the primary cause of blood-borne infections among HCWs [2]. WHO reports in the World Health Report 2002, that of the 35 million health-care workers, 2.0 million experience percutaneous exposure to infectious diseases each year, 37.6% of Hepatitis B, 39% of Hepatitis C and 4.4% of HIV/AIDS in Health Care Workers around the world are due to needle stick injuries. The two most common causes of NSIs are two handed recapping and the unsafe collection and disposal of sharps waste [3]. The risks of transmission of infection from an infected patient to the HCW following a NSI are: Hepatitis B (3–10%) Hepatitis C (3%) and HIV (0.3%) [3]. Percutaneous injuries caused by needle sticks pose a significant risk of occupational transmission of blood borne pathogens such as human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) to healthcare workers (HCWs) [4]. Hence the present study was conducted among healthcare waste handlers who are involved in collection, storage and disposal of BMW.

Objectives

1. To determine the prevalence of needle stick injuries amongst biomedical waste (BMW) handlers
2. To study the knowledge and practice of needle stick injury among biomedical waste handlers

Methodology

A cross-sectional study was conducted in a Kasturba hospital, among waste handlers in the hospital. "Waste handlers" were defined as those hospital workers responsible for collection / transport of BMW generated in hospital [5]. A total of 390 workers formed our study population. The workers come to work in morning, evening and night shifts, thus convenient sampling had to be used to interview workers. Data collection was done from September-November 2017.

A semi-structured, interviewer administered questionnaire was used to collect data. Sample size was calculated using formula for proportion of prevalence $4pq/l^2$ with 15% prevalence of NSI [6] at 95% confidence interval which came out to be 196 and was rounded off to 200.

Data was entered in Microsoft excel 2007 and analyzed by Epi info 7 software.

Case definition of NSI in the present study included injuries caused by sharps such as hypodermic needles, blood

collection needles, iv cannulas, suture needles, winged needle iv sets and needles used to connect parts of the i.v delivery systems [11].

Results

Table 1: Sociodemographic profile of the study participants (n=200)

Sociodemographic profile	No.	%
Age (n=200) (Years)		
< 20 yr	7	3.5
20- 30 yr	92	46.9
30-40 yr	70	35.8
>40 yr	30	15.0
Gender (n=200)		
Male	159	79.5
Female	41	20.5
Marital status (n=200)		
Married	163	81.5
Unmarried	37	18.5
Religion (n=200)		
Hindu	126	63.0
Muslim	63	31.5
Christian	11	5.5
Educational status (n=200)		
Illiterate	33	16.5
Primary School	29	14.5
Middle School	71	35.5
High School	52	26.0
Higher secondary	12	6.0
Graduate and above	3	1.5
Total	200	100.0

The age of the study participants ranged from 18 to 60 years and the mean age was 30.8 ± 10.05 years. Of the total participants 159 (79.5%) were male and 41 (20.5%) were female. Among them, 163(81.5%) were married and 37(18.5%) were unmarried. Out of total participants maximum were Hindus 126(63%) and among all respondents maximum were literates 167(83.5%), only 33(16.5%) respondents were illiterates. (Table 1)

Table 2: Knowledge and practice about what to do after getting NSI (n=200)*

Knowledge regarding management of NSI	No.	%
Consult the doctor	182	91.0
Let the wound bleed	94	47
Wash wound with soap and water	63	31.5
Wash wound with water only	76	38
Did not do anything	15	7.5
Knowledge about NSI can cause (n=200)		
Hep-B	89	44.5
HIV	108	54%
Action taken after NSI (n=32)*		
Consult the doctor	25	78.1
Did nothing	07	21.9

*multiple response

All the study subjects (n=200, 100%) knew that personal protective equipment should be used while working. 6(3.0%) participants were not using any precautions while handling healthcare waste.

Out of total participants 99.0% wore gloves, 98.0% wore

masks, 31.5% wore aprons, and 20.0% wore shoe covers while handling yellow and blue/metallic containers carrying sharps. 44.5% participants knew that NSI during BMW handling can cause Hepatitis and 54.0% participants had knowledge that it can lead to HIV infection among them. Out of total participants, only 25% were aware that Hepatitis B vaccination is recommended, while only 10% had ever received partially or fully immunized Hepatitis B vaccine.

There were 16.0% participants who had a history of needle stick injuries within the past six months and 78.1% participants consulted to the doctor.

Discussion

In the present study, the prevalence of NSI in the past 6 months in the BMW handlers was found to be 16.0%. Imaad Mohammed Ismail *et al.* in his study found that 67% (20) of class IV workers out of 30 had NSI during past 1 year [7], while Sharma S *et al.*, found the prevalence of NSIs was 19% and recall period one year as compared to six months in present study. It may be because the proportion of class IV workers in their studies is much smaller, an apt comparison cannot be drawn [8]. The wide variation in prevalence and practices of NSI may be due to different length of time periods considered in different studies. In the present study, difference was observed between knowledge and practice of vaccination for prevention of hepatitis B. It can be concluded that waste handlers in the present study had a lower prevalence of NSI as compared to other studies and had good knowledge of management of NSI; however, their practice in terms of NSI prevention was not appropriate to their theoretical knowledge of the same. Also significantly higher mean frequency of NSI among housekeeping staff as compared to other healthcare workers was observed [9]. Similar findings have been observed in the study carried out on 60 nursing homes of Delhi, where workers were engaged in harmful practices such as pressing injured finger in mouth, doing nothing after injury [10].

In present study 44.5% had knowledge that NSI can cause Hepatitis B and 54% had knowledge that it can lead to HIV infection. This study finding was similar with study conducted by S Amrita *et al.* which reported that sixty two (31.1%) workers had knowledge that NSI during BMW handling can cause hepatitis and 127 (63.8%) had knowledge that it can lead to HIV infection among them [12].

Conclusion and recommendations

NSIs is a serious occupational hazard among HCWs. Though HCWs have knowledge on preventive measures there is a gap in practice / action regarding action after NSI in post exposure. Hence the reporting of NSIs needs to be made mandatory. The pre exposure prophylaxis through Hep B vaccination should be made a part of recruitment procedure and provision of immediate post exposure prophylaxis should be provided to the victims of NSI.

Limitations

There are certain limitations of the present study. Firstly the response of HCWs may vary from what they actually know and practice. Secondly the memories of events were past six months may vary from each HCW leading to the underestimation of NSIs and this might lead to recall bias.

Acknowledgement

We would like to thank all study participants for their contribution in success of our study and to the hospital administration for giving permission to conduct the study.

References

1. CDC. The National Surveillance System For Healthcare Workers (NaSH): Summary Report for Blood and Body Fluid Exposure Data Collected from Participating Healthcare Facilities (June 1995 through December 2007). US, CDC, 2011. Available from: <http://www.cdc.gov/nhsn/PDFs/NaSH/NaSH-Report-6-2011.pdf> (last accessed on September 19, 2016)
2. Centers for Disease Control and Prevention. National Institute for Occupational Safety and Health (NIOSH) NIOSH Alert: Preventing Needle stick Injuries in Health Care Settings, 1999. Publication No. 2000-108.
3. World Health Organization. Aide-Memoire for a Strategy to Protect Health Workers from Infection with Blood borne Viruses. Geneva, Switzerland: WHO, 2003.
4. Jayanth ST, Kirupakaran H, Brahmadathan KN, *et al.* Needle Stick Injuries In A Tertiary Care Hospital, Indian Journal of Medical Microbiology. 2009; 27(1):44-7
5. <https://www.in.gov/idem/landquality/2374.htm>
6. Sharma S, Gupta A, Arora A. Knowledge, attitude and practices on needle-stick and sharps injuries in tertiary care cardiac hospital: A survey. Indian J Med Sci. 2010; 64:396-401.
7. Ismail IM, Kulkarni AG, Kamble SV, Borker SA, Rekha R, Amruth M. Knowledge, attitude and practice about bio-medical waste management among personnel of a tertiary health care institute in Dakshina Kannada, Karnataka. Al Am een J Med Sci. 2013; 6:376-80
8. Sharma S. Awareness about bio-medical waste management among health care personnel of some important medical centres in Agra. International Journal of Environmental Science and Development. 2010; 1(3):251-6.
9. Jahnvi R, Manjunath M, Mahendra BJ, *et al.* Needle stick injury among healthcare workers in a government teaching hospital, Mandya. Int. J Sci. Stud. 2014; 2(7):103-06.
10. Kishore J, Agarwal R, Kohli C, *et al.* Status of biomedical waste management in nursing homes of Delhi, India. Journal of Clinical and Diagnostic Research. 2014; 8(3):56-58.
11. Muralidhar S, Singh PK, Jain RK, *et al.* Needle stick injuries among health care workers in a tertiary care hospital of India, Indian J Med Res. 2010; 131:405-410.
12. Amrita S, Sethi S, Verma A, *et al.*, Needle Stick Injuries among Healthcare Waste Handlers in a Tertiary Care Hospital of Delhi, Epidem. Int., 2017, 2(2).