



INJECTION SAFETY AND PRACTICES FOLLOWING NEEDLE STICK INJURIES: AN OCCUPATIONAL RISK TO HEALTH CARE PROVIDERS IN GUJARAT

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ABSTRACT

Background: An occupational exposure to blood can result from percutaneous (needle stick or other sharps injury) and mucocutaneous injury (splash of blood or other body fluids into the eyes, nose or mouth), or blood contact with non-intact skin. Beside transmission of infectious diseases, it indirectly affects health care delivery services especially in developing countries where demand is high in compare with manpower resources.

Materials and method: The study was a cross sectional conducted among health care workers from a district of Gujarat. During the study, only one injection per health worker was taken into the consideration for better analysis.

Results: Out of 251, 147 (58.56%) had needle stick injury in last one year and majority health workers were nursing staff. It was found that there was significant association who had NSIs previously before one year and injuries within last year and injuries occurred while giving the injections (48%). Only 32% of HCWs had done reporting about their NSIs to the concern authority and 20% followed the protocols of post exposure prophylaxis guidelines.

Conclusion: Under reporting and lack of sensitivity on needles tick injuries had layered up during the study along with safe injection practices. Close monitoring on injection practices, surveillance on NSIs by quality assurance committee and structured communication plan should be in place to avoid health worker at risk and hazard of needle stick injuries.

Keywords: Needle stick injuries, Occupational risk, Health Care Worker

INTRODUCTION:

An occupational exposure to blood can result from percutaneous (needle stick or other sharps injury) and mucocutaneous injury (splash of blood or other body fluids into the eyes, nose or

mouth), or blood contact with non-intact skin.¹ Needle stick injury (NSI) is the most common form of occupational exposure to blood which results in transmission of blood borne infections. There is a growing concern about needle stick

injury in present time. Health care workers like physicians, surgeons, nurses, lab technicians, and waste handlers remains at higher risk of accidental needle stick injury as their environment constitutes the same.

Needle stick injury (NSI) that may look innocuous at first is a serious hazard as it carries the risk of transmission of infections like HIV, Hepatitis B, and Hepatitis C that cause serious and fatal illnesses.² These injuries can occur during minor as well as major operative procedures, in the OPDs (routine medical procedures and investigations), in immunization clinics etc. Globally health care workers incur 2 million infections per year due to needle stick injuries. But majority of needle stick injuries (NSI), 40 to 75% remain unreported.³

This under reporting should not create false impression of lower incidence of accidental needle stick injuries. Beside transmission of infectious diseases, it indirectly affects health care delivery services especially in developing countries where demand is high in compare with manpower resources. The aim of this study was to estimate the incidence and circumstances of needle stick injuries in a selected population of health care workers of a district of Gujarat, India.

MATERIALS AND METHODS:

Study design: The study was a cross sectional conducted among government health care workers from Jamnagar district of Gujarat. A pre-designed and pre-tested profoma was used to obtain data for the study. The study duration was 8 months from Sept 2012 to April 2013.

Selection criteria: The total health care provider of a district was counted 750 who were working in the district's government hospitals. In the sampling frame, all the 750 were included and then sample size was calculated by $4pq/\epsilon^2$ method for a cross-sectional observational study. Since P value from previous studies on the topic of present study is not available an anticipated P value is taken which should be taken as 63% as per given in Model injection center practical manual on sample size determination in health studies by IPEN STUDY: An Assessment of injection practices in India.⁴ At $p=0.63$ (63%) & $\epsilon=10\%$, a sample size of 226 would be needed with the no response ration of about 10% of this sample size (248) gives 251 study subjects for the study.

Study Subject: In the sampling frame out of 750 study population, 251 of medical officers, post graduate students, interns, nurses and laboratory technicians from the various clinical and para-clinical departments of a tertiary health center, 6 urban health centers and 8 primary health center units were selected for detailed study to achieve 95% confidence interval. The each health care professional strata was included by simple random sampling and according to their proportion in the sampling frame. During the study, only one injection per health worker was taken into the consideration for better analysis. Out of the 251 study subjects, 33.3% (84) the PG students, 2% (5) Medical officers, 5% (12) interneers, 44% (110) of the Nurses, 3.7% (10) laboratory technicians, 12% (30) female health workers were included from tertiary level hospital, urban health centers (UHCs) and Primary Health Centers (PHCs) of the study areas of the district.

Ethical aspect: Ethical approval was taken from the institutional ethical committee of MP Shah Medical College, Jamnagar and from the district health officials before the initiation of the study. After explaining the purpose of the study, written consent for participation was taken from each of healthcare professionals. They were assured of confidentiality of their responses by the investigator and data was shared to the respected authority for better work management.

Data collection: The details of the checklist which contained history of needle stick injuries, types, pattern, reasons and practices following needle stick injuries, and events at which needle stick injuries took place starts from the assembling of the injection materials to the final disposal of the bio medical waste. The criteria were set to include events and reasons of last needle stick injuries since last one year for the data collection.

The frequency analysis and association between variables by chi square test had been applied in Microsoft Excel 2007 and SPSS 17.

RESULTS

The study showed that 147 (58.56%) study subjects had needles stick injuries within one year of the study. As far as different categories are concerned majority injuries (64%) happened in nursing staffs followed by 60.7% injuries in PG residents of the tertiary care hospitals. 53.3% Health workers of UHTCs and PHCs reported injuries followed by interneers (50%).

Table 1: Frequency distributions of needle stick injury among health care providers (N = 251)

Designation	Needle sticks injuries (%)
Primary Health Worker (N = 30)	16 (53.33)
Laboratory Technician (N =10)	4 (40)
Medical Officer (N = 5)	0 (0)
Internee doctors (N = 12)	6 (50)
Nursing Staff (N = 110)	70 (63.63)
PG Residents (N = 84)	51 (60.71)
Total	147 (58.56)

Table- 2 Association between needle stick injuries happened before 1 year and within one year of the study: (n =251)

Injury in previous years (before 1 year)	Injury within 1 year		Total (n=251)
	Yes (n=147)	No (n=104)	
Yes	145(57.7)	68(27.1)	213(84.9)
No	2 (0.7)	36 (14.3)	38 (15.1)

Chi square value = 49.872, df= 1, P value = < 0.0001, Odds ratio = 38.38

Table 3: Events during which needle stick injury occurred (N=147)

Events of Injection Procedure	Events (%)
Preparing to give injection	8 (5.5)
Drawing up the medication	3 (2.0)
Locating the injection site	7 (4.6)
Preparing the skin	5 (3.4)
Giving The Injection and procedure	70 (48.0)
Disposal of the syringes and needles	54 (36.5)

Table-4 Reasons for those who had needle stick injuries happened (N = 147)

Reasons	Frequency (%)*
Lack of training	6 (4)
In a hurry	80 (54.4)
Work overload	37 (25.1)
Inadequate or under staff	9 (6.1)
Patient's vigorous movements	91 (62)
Unstated	7 (4.7)

* Multiple reasons were the answers.

Table 5 Practices following Needle stick injury. (N=147)

Procedures followed after NSI	Events (%)
Washed Hands With Soap & Water immediately	131 (89.1)
Applied disinfectant at local Injured Site	132 (89.8)
Applied bandage at local injured site	27 (18.4)
Know where to report	65 (44.2)
Informed the needle stick injury	47 (32.0)
Counseled & tested for HIV, HBV and HCV Status	44 (30)
Started Medication under NACO PEP	30 (20.4)

Among lab technicians, 40% had reported injury and not a single medical officer of PHCs and UHTCs had reported any needle sticks injuries. (Table-1)

Table-2 showed that study subjects who had needle stick injuries before one year, had more chances of getting injuries within last year in the study. It was found that there was significant association who had NSIs previously before one year and injuries within last year. This was statistically significant. (p < 0.05) Odds ratio for the needle stick injury before one year and within one year was 38.38. It was seen that those who had injuries any time before one year had 38 times more chances to have needle stick injuries within last one year of the study.

Table-3 depicts distribution of needle stick injury that had occurred during various procedures. It was interesting to note that most injuries (48%) occurred during giving injection, which is the most important step of procedure. These were followed by injuries during disposal of syringes and needles (36.6%). The intracath application accounted 28%. It was found that most of the injuries (53%) occurred during IV injection and only 4.8% of injury occurred during arterial injection, which on the contrarily a more difficult procedure then other.

Information was also elicited regarding reasons as why injury occurred; Though multiple reasons were obtain here the main contributor to these was patient's vigorous movement during injection giving (62%). This was followed by a surprising reason; Hurry to perform procedure (54.4%). Lack of training was responsible in 4% cases. This reflects that although trained staff is available still something was missing in this context which needs to be addressed. Work overload cited as reason in 25.1% respondents which supports the need of increase in health care providers to meet growing need of population. Different reasons are depicted in Table 4.

The responses on procedures followed by health care providers after sustaining needle stick injury are depicted in Table 5. Practices of washing hands with soap and water immediately were seen 28% and 90% had applied disinfectant at the local site. But only 18.4% applied bandages at local site that is not encouraged. On further inquiring about the knowledge of what procedure are to be followed after needle stick injury, only 44.2% knew where to report injury. It was observed that only 32% of HCWs had done reporting about their NSIs to the concern authority.

This led to gross under reporting of the needle stick injuries that was observed in the study. Only 30% of the health worker had done testing after the testing of the patients. Still overall proportion was low because health care workers were taking needle sticks injuries casually as they happened to them in day-to-day work. Only 20% in the present study started medication under NACO post exposure prophylaxis which is considered poor as being health worker. Reasons could be lack of safer environment, inadequate sensitization of health worker towards hazards of needle stick injuries. Even the frequency of NSI among HCW is high even with under reporting that is alarming situation.

DISCUSSION

This study provides detailed observation on the needle stick injuries, events during which it occurred, reasons and the follow up actions taken by the study subjects. Various study had reported high proportion of injuries while routine injection procedures among health care providers in their routine work.⁵⁻¹⁰ Zafar et al showed declined in incidence rate in NSI but there was under reporting from the study subjects.¹¹ In present study, only 32% of study subject reported who had NSI and 20.4% subjects had started medications based on NACO post exposure prophylaxis guidelines. S Salelkar et al 2010, had noted that 30% of HCWs had reported their injuries.¹² Askarian et al had mentioned in their study that around 82 % of NSIs was not reported.¹³ Lai kaan lee et al found that only 40.8% needle stick injuries were reported and reporting was variable in different designations.¹⁴

Present study had found that those who had needle stick injury (n=147), 65 (44%) knew where to report and only 53 knew correctly. Among them under reporting was high. Those who faced NSIs, only 32% had reported. These findings were similar to the above-mentioned studies. The exact reasons for under-reporting remain unclear. Reasons were HCWs did not know where to report, they were not aware that every needle stick injuries should be reported, did not spare time from the work. The observed high level of under-reporting suggests that health care providers need education on prevention, especially focusing on the importance of reporting all NSIs and the possibilities of prophylaxis after exposure. This study revealed need for structure education on injuries by sharps and surveillance unit for regular monitoring, reporting and guid-

ance of NSIs. Given the serious, and even fatal, consequences of sharps injuries and the limited effectiveness of post exposure therapies, it is crucial to adopt measures to prevent sharps injuries.

R. Sharma et al 2010 had mentioned regarding reasons that caused needle stick injuries were fatigue 50%, lack of assistance 27%, rushed in 11%, and could not be prevented in 10%, these situational reasons are incorporated with human nature.⁸ It could be prevented by making regular training, there solutions to the situational problems. In the present study, majority injuries happened in a hurry or due to patients' vigorous movements. Compliance to universal precaution, improper handling of sharps and negligence towards safe practices are important issues we face at government institute. These problems are easily manageable with HCWs' training and following the safe injection practices guidelines.¹⁵⁻¹⁶

CONCLUSION

Health workers should follow WHO definition of a safe injection: safety to recipient, safety to provider and safety to community. There is need to create education tool for health care workers regarding safe injection practices and prevention of needle stick injuries (e.g., preparation of injection near the patient, do not recap or bend the needle).

Along with awareness, surveillance mechanism is required to collect data on NSI in the country and widely disseminate the data for awareness. Information regarding reporting of NSI, getting counseling and treatment should be widely disseminated. If any health worker or citizen reports with NSI to causality/emergency services in a public health facility, it is recommended that immediate guidance, counseling, free testing and free PEP medicines should be provided. A nodal contact person should be in place in all health facilities with 24 hours access to deal with immediate management of NSI. Establish standard operating procedures (SOP) for safe injections through Model Training Centers set up in teaching and tertiary care hospitals. IMEP protocols should be supervised in each health facilities by Quality Assurance Committee of the hospitals.

LIMITATION

The study was conducted in government health facilities of a district so findings were applicable to the government health facilities only, which is a limitation of study.

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