

## PREVALANCE AND FACTORS ASSOCIATED WITH NEEDLE STICK INJURIES AMONG HEALTH CARE WORKERS IN A TERTIARY CARE LADY READING HOSPITAL PESHAWAR

ABBAS KHAN, HAMEEDULLAH, HASHMATULLAH KHAN, MUHAMMAD KAMRAN HASSAN  
 ABBAS MASOOD, MUSHTAQ AHMAD, AMIR GHAFUOR KHAN  
 Department of Medicine, Lady Reading Hospital, Peshawar

### ABSTRACT

**Introduction:** Due to repeated handling of needle, health care workers (HCW) are more susceptible to needle prick injuries as compared to general population and thus are more prone to transmission of blood borne pathogen. According to World Health Organization (WHO), 2 million health care workers (HCWs) incur needle stick injuries each year. Various risk factors contribute to needle stick injuries (NST). There are numerous causes of needle prick injuries but the most important are unsafe collection, disposal of sharps objects, two handed recapping needles and extreme workload.

**Aims and Objectives:** The sole aim of our is find out the prevalence and factors associated causing needle stick injuries among HCW presenting to tertiary care hospital of Peshawar.

**Methods:** This descriptive cross sectional survey was carried out in Medical Teaching institution, Government Lady Reading Hospital Peshawar. After approval from ethical committee, 285 HCWs were randomly selected and included in the study. Informed consent was taken from participants enrolled in the study. They were asked about their personal experiences in regard to NSI. A pre-designed questionnaire was used as a source of data collection. SPSS standard version was used to interpret data. For all variable frequencies were calculated which provided numbers and percentages of responses. Then cross tabulation was done to analyze the data. p values of 0.05 was taken as statistically significant.

**Results:** Total no. of HCW included in the study were 285, Amongst them 60% (171) were doctors and 40% (n = 114) were nurses and other paramedical staff (Figure 1). Amongst these participants 64.9% (n = 185) had exposure to NSI. 57.3% (n = 106) were doctors and 42.7% (n = 79) were nurses and other paramedical staff. 48.6% (n = 90) were male and 51.4% (n = 95) were female. Majority (63.2%, n = 117) of them had experience of less than 5 years whereas 9.2% (n = 17) had experience of greater than 15 years. 25.9% (n = 48) of HCWs had single needle prick whereas 43.2% (n = 80) had 3 or more pricks during their working period (Table 1). Multiple factors at a time were responsible for NSI in HCWs' (Table 2).

**Conclusion:** It is concluded from our study that health care workers are at high risk of acquiring blood borne pathogens particularly hepatitis B,C and HIV infections as compared to general population. So strict precautions should be followed to limit the transmission of blood borne diseases through needle stick injuries.

**Key words:** Needle stick injury (NSI), Health care worker (HCW).

### INTRODUCTION

For health care workers (HCW) accidental needle prick injuries (NSI) are a professional risk. These workers are more prone to hospital-acquired transmission of various blood borne infections like hepatitis B, C and HIV, malaria, infectious mononucleosis, diphtheria, herpes, tuberculosis, brucellosis, spotted fever and syphilis as a result of contaminated needle injuries.<sup>1</sup>

WHO Reported in 2002 that among 35 million

health-care workers, 2 million suffer needle stick injuries every year. In spite of high prevalence of needle stick injuries about 40 – 70%, cases are not reported<sup>2</sup>. In the UK reported rate of sharps injuries per year vary between 0.8 and 5 per 100 persons while it is 5.5 per 100 persons in US.<sup>3,4</sup> In Pakistan annual incidence rate is very high with 12 – 27 NSI per year per 100 doctors.<sup>5</sup>

Due to needle stick injuries, risk of transmission of

HBV is 6 – 30% while it is 3% and 0.3% for hepatitis C virus (HCV) and human immunodeficiency virus (HIV) respectively among the healthcare workers<sup>6</sup>. Moreover, among health-care workers around the world, the risk of transmission of Hepatitis B, C and HIV/AIDS due to needle stick injuries are 37.6%, 39% and 4.4% respectively.<sup>2,7</sup>

There are numerous causes of needle prick injuries but the most important are unsafe collection, disposal of sharps objects, two handed recapping needles and extreme workload. In Pakistan syringes (72%) are the most injury causing instrument while nurses (67%) followed by residents especially working in the surgical department are more commonly prone to needle stick injuries.<sup>5</sup>

## OPERATIONAL DEFINITIONS

### Health Care Worker

Health care worker is a health care professional who provides medical services in a systematic way to individuals, families or communities in a health care center in the form of preventive, curative, promotional, or rehabilitative *health care* services.

### Needle Stick Injury

Needle stick injuries are damages which are produced by needles that puncture/pierce the skin accidentally.

## MATERIALS AND METHOD

This descriptive cross sectional survey was conducted in Medical teaching institution Government Lady Reading Hospital (LRH) Peshawar. After approval from ethical committee, 285 health care professionals work in LRH Peshawar during study period involved in clinical work were selected randomly and enrolled in the study. Before administration of the questionnaire, informed consent was taken from all participants enrolled in the study. All the participants were enquired about their experiences regarding NSI during their carrier.

### Sample Selection

#### Inclusion Criteria

- Health care workers during study period involved in clinical work irrespective of age and sex after random selection were included.
- Percutaneous injuries of all depths i.e. superficial, moderate and deep were included.
- Amongst sharps, only needle stick injuries i.e. injuries with syringes/needles for IM or IV use or blood sample collection, or by phlebotomist for various purposes, needles for subcutaneous/sub dermal injections or needles used for suturing etc are included in the study.

#### Exclusion Criteria

- Health care workers exposed to blood or body fluid through all other means e.g., splash were excluded.
- Injuries with sharps other than needle sticks e.g. scalpels, broken glass and other objects contaminated with blood from a source patient were excluded.

#### Statistical Analysis

A pre-designed questionnaire was used as a source of data collection. The questionnaire consisted of a simple tick box format. The data was analyzed using SPSS version 17. Frequencies were calculated for all variables, which gave the numbers and percentages of responses. The data was then analyzed by using cross tabulation. The significance level is taken as 0.05.

## RESULTS

Total no. of HCW included in the study were 285, with 58.9% (n = 168) from the medicine & allied and 41.1% (n = 117) from surgical & allied department. Amongst them 60% (171) were doctors and 40% (n = 114) were nurses and other paramedical staff (Figure 1).

Amongst these participants 64.9% (n = 185) had exposure to NSI. 56.2% (n = 104) of the HCW belonged to medical and allied and 43.8% (n = 81) to surgical and allied department. 57.3% (n = 106) were doctors and 42.7% (n = 79) were nurses and other paramedical staff. 48.6% (n = 90) were male and 51.4% (n = 95) were female. Majority (63.2%, n = 117) of them had experience of less than 5 years whereas 9.2% (n = 17) had experience of greater than 15 years. 25.9% (n = 48) of HCWs had single needle prick whereas 43.2% (n = 80) had 3 or more pricks during their working period. In 66.5% (n = 123) the needle was sterilized and in 33.5% (n = 62) it was used (Table 1).

Multiple factors at a time were responsible for NSI in HCWs. Most of the injuries (66.5%, n = 122) occurred in emergency situation in emergency department due to unexpected body movement (35.1%) of the patients, heavy work load and fatigue (14.6%) and lack of experience (13%). Injuries while suturing or due to improperly disposed sharps by others were responsible in 29.2% and 15.7% of the cases respectively. Other contributing factors include poor lightening at work place (14.6%), handling instruments in OT room (18.9%), removing needle cap (28.6%), recapping needle (41.1%), and bending needle by hand (8.1%). Injuries while inserting IV line occurred in 14.6% (Table 2).

## DISCUSSION

HCWs are exposed to numerous occupational hazards such as exposure to various airborne and blood pathogen because of their direct exposure to very sick

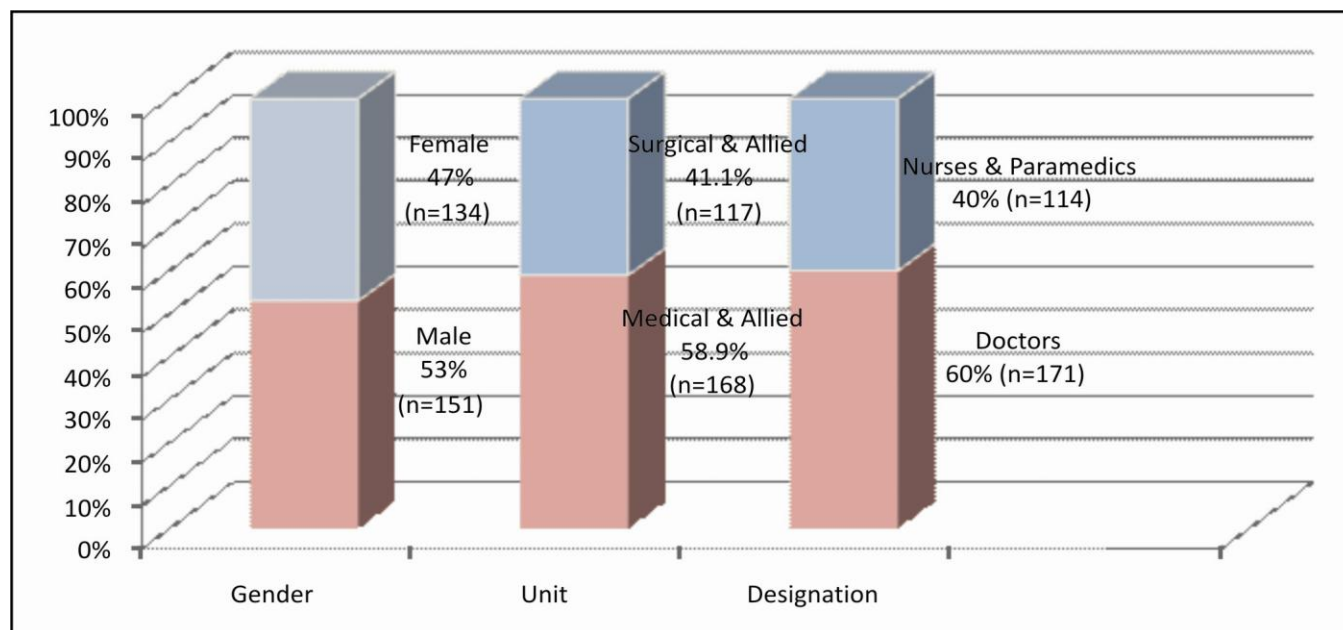


Figure 1:

Table 1: Characteristics of participants with NSI.

	No. (%)
Participants with NSI	N=185 (64.9%)
Gender	
Male	N=90 (48.6%)
Female	N=95 (51.4%)
Unit	
Medical & Allied	N=104 (56.2%)
Surgical & Allied	N=81 (43.8%)
Experience	
<5 years	N=117 (63.2%)
5 – 10 years	N=43 (23.2%)
11 – 15 years	N=8 (4%)
>15 years	N=17 (9.2%)
Designation	
Doctors	N=106 (57.3%)
Nurses & Paramedical staff	N=79 (42.7%)
Needle at the time of NSI	
Sterilized	N=123 (66.5%)
Used but not blood stained	N=32 (17.3%)
Blood stained	N=30 (16.2%)
Number of times of NSI	
Once	N=48 (25.9%)
Twice	N=57 (30.8%)
Three or more times	N=80 (43.2%)

Table 2: Prevalence of causative factors:

	% (no.)
Emergency situation	65.9% (n=122)
Suturing	29.2% (n=54)
Unexpected patient movements	35.1% (n=65)
Improper disposable by others	15.7% (n=29)
Heavy work load & fatigue	47% (n=87)
Removing needle cap	28.6% (n=53)
Recapping needle	41.1% (n=76)
Bending needle by hand	8.1% (n=15)
Inserting iv line	14.6% (n=27)
Lack of experience	13% (n=24)
Poor lightening at work place	14.6% (n=27)
Handling instruments in OT	18.9% (n=35)

and dying patients, which, coupled with increasing work-loads, can seriously threaten their health and well-being.

64.9% (n = 185) of the participants had NSI during their working period, which is in comparison (53% & 63%) with various studies conducted in India.<sup>5</sup> A study in Iran conducted on nurses also showed almost similar pattern (63.3%).<sup>5</sup> In Nigeria 41.8% NSI prevalence has been reported.<sup>11</sup> A survey was conducted on American surgical trainees, it was found

that during postgraduate training about 99% respondents had NSI,<sup>9</sup> whereas in other study it was 83%.<sup>9</sup> Moreover another study conducted in South Africa which showed that about 91% of junior doctors have been reported suffering a NSI in the previous 12 months.<sup>8</sup> In a similar study conducted in Karachi, showed 45% of the HCWs had NSI. A study from Rawalpindi conducted on doctors showed comparatively high prevalence (85.1%) of NSI amongst them<sup>5</sup>, whereas another study in Rawalpindi conducted on nurses showed prevalence of 67%. Study from Egypt showed prevalence of approximately 64%.<sup>8</sup>

74.1% of the participants had greater than one exposure to NSI and 25.9% had once NSI, whereas a study conducted on nurses in Rawalpindi showed 39% and 11% respectively.<sup>10</sup> 66.5% of the participants had injury from sterilized needle and 33.5% from used needle which was blood stained in 16.2% of the cases whereas the rate of injuries from high risk patients is much higher (53%) in other studies.<sup>8</sup>

65.6% of the participants with NSI had experience less than 5 years, whereas participants with >15 year's experience had exposure to NSI of 8.4%. A study from Sindh conducted on needle stick injuries showed that majority of participants (28.5%) who sustained NSI are junior doctors (interns and residents). This is mainly due to the fact that NSI are much more among less experienced HCW as compared to experienced ones.<sup>7</sup> Moreover differences NSI have also been noted regarding gender. There are more chances of NSI (53% Vs 47%) among male than female which is similar to findings in other studies.

HCWs working in medical and allied departments had more needle injuries as compared to HCWs working in surgical and allied department which is how-ever, different from other studies. A study conducted on surgical trainees showed 83% had a needle stick injury during training period.<sup>9</sup> High prevalence (93%) was also noted in American surgeons as compared to our study findings.<sup>12</sup> This might be due to the fact that most of the participants were younger with less experience who usually have rotational duties in various departments of the hospital, whereas senior HCWs usually have permanent place of work.

Most of the injuries (66.5%) among the participants occurred in emergency department due to unexpected body movement (35.1%) of the patients which is similar finding to study in Africa (23.9%)<sup>8</sup> however, in contradiction with a study performed in Islamabad which showed NSI prevalence of 9% in ER department.<sup>10</sup>

Heavy work load and fatigue contributed up to 14.6% as a cause of NSI whereas it is reported up to 57% in other study.<sup>8</sup> Lack of experience (13%) is observed more in our study as compared to other study (1.1%)<sup>14</sup> most likely due to immature exposure to clinical work and lack of experience (13%) and

inappropriate training program in our set up. In the other part of the world, various studies have been conducted showing that inappropriate training of the HCW resulted in increased risk of NSI so all the health care providers should be given proper training regarding handling sharp objects before joining practical work.

Injuries while suturing was responsible in 29.2% of the cases. Two other studies showed prevalence of 52% and 17.8%.<sup>8,15</sup> Poor lightening at work place (14.6%) which is not a major problem in rest of the world. 18.9% of the injuries occurred while handling instruments in OT room. A study showed 1.1% injuries in operating room,<sup>9</sup> while another study conducted on surgical trainees reported 72% NSI in operating room.<sup>12</sup>

Injuries while removing needle cap (28.6%) and recapping needle (41.1%) is reported more as compared to other studies (4.4% and 7.3% respectively).<sup>8,12</sup> Injuries while inserting iv line occurred in 14.6% as compared to 2.2% in other study.<sup>16</sup>

## CONCLUSION

From our study it is concluded that risk of needle stick injuries is significantly higher amongst health care providers than general population. It also identifies the common modifiable factors, which can be easily avoided by awareness of the HCWs and providing them with proper training and education.

## RECOMMENDATIONS

Every health care facility should have an infection control program and occupational health department, which educate and bring awareness in HCWs about the hazards of needle stick injuries, report all the cases of NSIs and provide post exposure prophylaxis to the exposed worker.

*Address for Correspondence:*

*Dr. Hashmatullah Khan*

*Assistant Professor, MTI LRH Gastro*

*Email: drhashmat1980@gmail.com*

## REFERENCES

1. Wilburn SQ. Needle sticks and sharps injury prevention. *Online J Issues Nursing*, 2004; 9: Manuscript 4.
2. Susan Q. Wilburn, Gerry Eijkemans. Preventing Needle stick Injuries among Healthcare Workers: A WHO-ICN Collaboration: *Int J Occup Environ Health*, 2004; 10: 451-456.
3. Alexander Elder<sup>1</sup> and Caron Paterson. Sharps injuries in UK health care: a review of injury rates, viral transmission and potential efficacy of safety devices: *Occup Med*. 2006; 56 (8): 566-74.
4. Dement JM, Epling E, Ostbye T, Pompeii LA, Hunt DL. Blood and body fluid exposure risks among health care workers: Results from the Duke Health and Safety

- Surveillance System: *American J of Ind Med.* 2005; 46 (6): 637-48.
5. Khurram M, Ijaz K, Bushra HT, Khan NY, Bushra H, Hussain W. Needle stick injuries: A survey of doctors working at tertiary care hospitals of Rawalpindi. *JPMA*; 2011; 61 (1): 61-63
  6. Muralidhar S, Singh PK, Jain RK, Malhotra M, Bala M.
  7. Needle stick injuries among health care workers in a tertiary care hospital of India. *Indian J Med Res.* 2010 Mar; 131: 405-10.
  8. Zafar A, Habib F, Hadwani R, Ejaz M, Khawaja K, Khawaja R, Irfan S. Impact of infection control activities on the rate of needle stick injuries at a tertiary care hospital of Pakistan over a period of six years: an observational study. *BMC Infect Dis.* 2009; 29: 78.
  9. Tadesse M, Tadesse T. Epidemiology of needle stick injuries among health-care workers in Awassa City, Southern Ethiopia. *Tropical doctor*, 2010; 40: 111–113.
  10. Makary MA, Al-Attar A, Holzmueller CG, Sexton JB, Syin D, Gilson MM, et al. Needle stick injuries among surgeons in training. *N Engl J Med.* 2007; 356: 2693-9.
  11. H Habib, EA Khan, A Aziz. Prevalence and Factors Associated with needle Stick Injuries among Registered Nurses in Public Sector Tertiary Care Hospitals of Pakistan. 2011 – [internalmedicine.imedpub.com](http://internalmedicine.imedpub.com).
  12. Bamigboye Abiodun P, Adesanya Abidemi T. Knowledge and practice of universal precautions among qualifying medical and nursing students: a case of Obafemi Awolowo University teaching hospitals complex, ILE-IFE. *Research Journal of Medicine and Medical Sciences* 2006; 1: 112–16.
  13. Makary MA, Al-Attar A, Holzmueller CG, Sexton JB, Syin D, Gilson MM, Sulkowski MS, Pronovost PJ. Needle stick Injuries among Surgeons in Training. *NEJM*: 2007; 356:2693-2699.
  14. Chaudhary R, Agarwal P. Prevalence of needle stick injury (NSI) and its knowledge among health care workers in a tertiary care hospital in north India. *Int Conf AIDS*, 2004; 15.
  15. Alamgir H, Cvitkovich Y, Astrakianakis G, Yu S, Yassi A. Needle stick and other potential blood and body fluid exposures among health care workers in British Columbia, Canada. *Am J Infect Control*, 2008; 36: 12-21.
  16. Kermode M, Jolley D, Langkham B, Thomas MS, Crofts N. Occupational exposure to blood and risk of blood borne virus infection among health care workers in rural north Indian health care settings. *Am J Infect Contr.* 2005; 33: 34-41.
  17. Askarian M, Ghavanini AA. Survey on adoption of measure to prevent nosocomial infection by anesthesia personnel. *East Mediterr Health J.* 2002; 8: 416-21.