

Original Article

Needlestick injuries: A survey of doctors working at tertiary care hospitals of Rawalpindi

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Abstract

Objectives: To document frequency, nature and predisposing factors for needlestick injuries (NSI) in doctors working at tertiary care hospitals of Rawalpindi.

Methods: This cross sectional survey was conducted at Department of Medicine, Rawalpindi Medical College from July 2009 to April 2010. Five hundred doctors working at various tertiary care hospitals of Rawalpindi were contacted. Each doctor was provided a specifically designed proforma focusing on number, nature, and predisposing factors for NSI which was defined as percutaneous injury caused by hollow-bore needles, suturing needles, scalpel blades and lancets. Frequency and percentage of collected data was sought.

Results: Out of 500, 61.8% (n=309) doctors returned the filled proformas. Females were 50.8% (n=158). History of NSI was present in 85.1% (n=263) participants of which most common was from syringe needle (47.52%; n=125), surgical stitch needle (20.9%; n=55), and surgical blade (9.5%; n=25). Most of NSI took place while recapping needles (33%; n=87), surgical procedures (27.7%; n=73), and drawing blood samples (26.2%; n=69). Majority of these doctors 42.5% (n=112) attributed NSI to stress, 37.6% (n=99) to over work, and 19.7% (n=52) to carelessness.

Conclusion: NSI due to syringe and surgical stitch needle are very frequent in doctors working at various tertiary care hospitals of Rawalpindi. Most of these are sustained while recapping needle and surgical procedures in stressful and overworked circumstances.

Keywords: Doctor, Needlestick injuries (JPMA 61:63; 2011).

Introduction

Health care workers (HCW) are exposed to a number of occupational hazards. These include biological hazards like hepatitis and human immunodeficiency virus (HIV) infections, chemical hazards like medications, disinfectants and sterilants, ergonomic; incurred during lifting and transfer, and physical like radiation heat and noise etc. Needlestick injuries (NSI) are one of the biological hazards. NSI can be sustained while using a needle and afterward during recapping and disposal. Out of these 38% of NSI take place during using of needles while 62% occur afterward before and after disposal.¹ About thirty diseases like hepatitis B, hepatitis C, HIV, syphilis, malaria,

and herpes can be transmitted by NSI.² Of these, hepatitis B, C, and HIV infections are most dangerous.² Following NSI risk of transmission from infected patients to HCW are 3-10% for hepatitis B, 3% for hepatitis C, and 0.3% for HIV.³

Exact magnitude of NSI is not known because of under reporting and poor surveillance systems. In an ordinary hospital HCW have 30 NSI annually per 100 hospital beds.⁴ Estimatedly 6-800000 NSI occur per year in USA.⁵ Such data from Pakistan and other developing countries is not available, though studies focusing frequency of NSI in various HCW cohorts have been done.^{6,7} Hence, this survey was planned to note frequency, nature, and predisposing factors for NSI in doctors working at

different tertiary care hospitals of Rawalpindi.

Patients and Methods

This cross sectional survey was conducted at Department of Medicine, Holy Family Hospital, Rawalpindi from July 2009 to April 2010 after approval from the Departmental Ethical Committee. Sample size of 268 was obtained with 90% confidence level, based on the results of a published Pakistani study showing 45% frequency of NSI in HCW.⁶ Five hundred doctors working at various tertiary care facilities of Rawalpindi were contacted consecutively. Each doctor was provided a specifically designed proforma focusing on number, nature, and predisposing factors for NSI. NSI was defined as percutaneous injury caused by hollow-bore needles, suturing needles, scalpel blades and lancets. Information about age, gender, years of experience after Medical graduation (MBBS), minimum 1 year, and hepatitis B vaccination status were also collected.

Obtained data was entered and analyzed employing SPSS 12, Chicago, Illinois, USA. Mean \pm SD were calculated for continuous variables like age, years of experience, and number of NSI etc. Frequency and percentage (%) were calculated for categorical variables like gender, whether or not NSI took place, and hepatitis B vaccination status etc. Independent sample t-test at 5% level of significance was applied to find statistically significant association between doctors who had NSI or not in terms of age, and years of experience. Chi square test was applied at 5% level of significance to note association between gender, and hepatitis B vaccination status of doctors with and without NSI.

Results

Of the total 500, 309 (61.8%) doctors filled and returned proformas. Mean age of study participants was 30.32 ± 7.71 years. Females were 157 (50.8%). Mean years of experience were 3.77 ± 3.79 years. History of hepatitis B vaccination was present in 169 (54.7%) of the participants.

History of NSI was present in 263 (85.1%) of the participants. Mean number of NSI per participant was 3.64 ± 1.85 . Of these 47.52% (n=125) had NSI from syringe needle, 20.9% (n=55) from surgical stitching needle, 9.5%

Table-1: Comparison of participants with and without NSI.

	NSI* (n=263)	No NSI** (n=46)	P value
Mean age (years)	30.7 \pm 7.9	27.8 \pm 5.4	0.002
Gender			0.000
Male	118	33	
Female	145	13	
Mean years of experience	4 \pm 3.9	2.3 \pm 1.8	0.000
HBV vaccination***			0.01
Yes	151	112	
No	18	28	

*Participants with NSI; **Participants without NSI; ***Whether or not vaccinated against hepatitis B virus; p value is significant when < 0.05.

Table-2: Comparison of our results with NSI frequency of HCW in neighboring countries.

Country with NSI	Study population	Number of participants	% with NSI
India ¹¹	Various HCW	79	53%
India ¹²	Various HCW*	266	63%
India ¹³	Internist*	238	37.4%
Iran ¹⁴	Nurses	180	63.3%
Iran ¹⁵	Anaesthesia personnel	203	31.7%

*Percutaneous exposure mainly.

(n=25) from surgical blades, and 22% (n=58) had combination of syringe needle, stitching needle, and or surgical blade. Incidence of NSI while recapping needle was present in 33% (n=87), 27.7% (n=73) had NSI during surgical procedure, 26.2% (n=69) while taking samples, and 12.9% (n=34) during other procedures. In 42.5% (n=112) cause of NSI was attributed to stress, 37.6% (n=99) to over work, and 19.7% (n=52) to carelessness. Comparison of study participants with or without NSI in relation to mean age, gender, mean years of experience, and hepatitis B vaccination are given in Table-1.

Discussion

NSI are very common in doctors. These are about 6 times more common in members of surgical team rather than medical.⁸ In a survey of American surgical trainees it was noted that 99% respondents had NSI during postgraduate training.⁸ From Pakistan, 12-27 NSI per year per 100 full time doctors has been reported.⁷ In another Pakistani study which included 80 participants (29 doctors and 51 registered nurses), 45% had NSI.⁶ Both these Pakistani studies were done in Karachi. In our study 85.1% participants had NSI which relates with American figures but is quiet high when compared to Pakistani data. This difference in data can be due to under reporting in other studies and focusing only doctors in this survey.^{9,10} Comparison of our results with NSI frequency in various HCW of our neighbouring countries that is Iran, and India are given in Table-2.¹¹⁻¹⁵

Experienced HCW less commonly report NSI¹⁶ as compared to younger HCW who are considered more prone to NSI, due to lack of experience and inability to deal with stressful circumstances.^{9,10} A study from United States focusing on surgical residents, mean number of NSI increased from 1.5 in first year to 7.7 5th year of residency.⁸ Gender based differences in NSI have also been noted that is males have more chances of NSI.⁸ In our survey though, females, older, and more experienced doctors had significantly more NSI when compared.

Disposable syringe usage is responsible for 35% of NSI.¹⁷ This kind of NSI most commonly occurs while recapping of needles, needle/syringe disposal, injection

administration, and drawing blood samples.^{7,9} In this survey 47.5% of NSI were due to syringe needle.

Suture needles and surgical blade related injuries account for 21 and 7.4% NSI respectively.¹⁷ NSI due to surgical stitch needle, and surgical blade were noted in 20.9% and 9.5% of participants. These kinds of NSI are sustained during suture needle and surgical blade manipulation after suture placement and during a procedure respectively.¹⁸ Many strategies can be used to prevent these injuries which include; handling suture needle with forceps instead of fingers, double gloving, blunt tip needle usage, and surgical stapler use for closure of skin.¹⁸

Most of the NSI are attributed to hurry, and are considered accidentally self-inflicted.⁸ Long working hours, and sleep deprivation increases chances of acquiring NSI three times.^{19,20} Stress, overwork and carelessness were main reasons for NSI in our survey participants.

After NSI chances of acquiring hepatitis B infection are much higher as compared to hepatitis C and HIV.²¹ Hepatitis B infection is however largely preventable as hepatitis B vaccination is 95% efficacious. Among HCW 18-85% hepatitis B vaccination coverage has been noted globally.²² In UK 90% HCW's are vaccinated against hepatitis B.²¹ In India 55.4% HCW's and 60% of Nepali HCW are vaccinated.²³ In a related Iranian study 85% participants were vaccinated.¹⁶ Of our study 54% participants had been vaccinated against hepatitis B. It is also notable that significantly more participants with NSI were vaccinated against hepatitis B compared to those who did not have NSI.

This survey shows that a lot of steps need to be taken in order to improve chances of NSI in our doctors. As NSI due to syringe needle handling while recapping were most frequently noted in this study educating doctors about ways to prevent NSI that is complying with standard universal precautions, discouraging needle recapping, and proper disposal of sharps seem most important preventive steps.⁷ Improving hepatitis B vaccination is also important in this regard. Use of safety devices for prevention of NSI is still not feasible in public sector hospitals of our country with scant resources.⁷

Conclusion

NSI are very frequent in doctors working at tertiary care hospitals of Rawalpindi. Most of these occur from syringe needles while taking blood samples and during recapping of needle and are most commonly attributed to stress and overwork. Steps are required to educate doctors regarding prevention of NSI and hepatitis B vaccination.

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