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# **Knowledge, attitudes and practices of health care workers regarding needle stick injuries at a tertiary care hospital in Pakistan**

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## **Abstract**

**Objective:** To assess the knowledge, attitude and practices of HCWs regarding needle stick injuries at the Aga Khan University Hospital.

**Methods:** A cross-sectional study was conducted on medical personnel. A structured pre-tested questionnaire was administered during June-July 2003. The data was analysed by SPSS 13.0. Percentages of the categorical variables were computed and compared by Chi square test at a 5% level of significance. Odds ratios and their 95% CIs were also computed.

**Results:** Of 80 participants, 29 were doctors and 51 were registered nurses. About 45% reported having a needle stick injury in the past. Frequency of injury was significantly higher among doctors ( $p < 0.001$ ). The most common reason identified was stress or being over burdened followed by careless attitude. More than 50% of the injuries occurred while injecting or drawing blood samples. The risk of getting infections was well known amongst both the groups. Two third of participants were familiar with the prevention protocols and practices of nurses were generally safer than doctors ( $p < 0.001$ ).

**Conclusion:** Despite knowing the risks, frequency of needle stick injury was generally higher especially among doctors reflecting bad practice and careless attitude towards work. Mandatory reporting, proper follow-up and constant reinforcement are recommended to reduce the rate of nosocomial transmission to health care workers (JPMA 58:57;2008).

## **Introduction**

Needle stick injuries (NSI) in healthcare settings are a global issue. Occupational exposures to percutaneous injuries are a substantial source of infections with blood borne pathogens among health-care workers (HCWs).<sup>1,2</sup> Reported risk associated with transmission of hepatitis B virus (HBV) to a non-immune health care worker ranges from 2% if the source patient is Hepatitis B e antigen negative, to 40% if the patient is positive.<sup>3,4</sup>

Similarly, studies of HCWs exposed to hepatitis C virus (HCV) by a needle-stick or any other percutaneous injury have found that the incidence of anti HCV seroconversion averages at 1.8% (0-7%) per injury.<sup>5</sup> The calculated rate from meta-analysis of worldwide studies for HCWs exposed to HIV infected blood through percutaneous injuries is 0.3-0.4% per injury.<sup>6-9</sup>

Estimated prevalence of Hepatitis B in our population is 3-4% and Hepatitis C is 6%.<sup>10,11</sup> Therefore the collective prevalence would be around 10%. This information suggests that a sizeable number of HCWs are at

potential risk of infections with blood borne pathogens after a needle stick injury. Therefore, the aim of this study was to assess the knowledge, attitude and practices of HCWs regarding needle stick injuries at the Aga Khan University Hospital (AKUH).

## **Methods**

Aga Khan University hospital is a teaching tertiary care university hospital of 550 beds. A cross-sectional study was conducted and a sample of 80 conveniently selected HCWs, comprising of 29 doctors and 51 registered nurses, was selected. A structured pre-tested questionnaire containing both open and close-ended questions was administered during the period of June-July 2003. The data was entered in the Epiinfo 6.04d software and transferred to SPSS 13.0 software for statistical analysis. Percentages of the categorical variables were computed in descriptive analysis and compared by Chi square test. Odds ratios (ORs) and their 95% confidence intervals (CIs) were calculated to assess the strength of associations. A p-value of  $< 0.05$  was considered as statistically significant. The responses for questions on practices were 'Always',

'Mostly', 'Sometimes' and 'Never'; and for the final analysis, the first two and last two were merged together.

## Results

Out of 80 participants, 36 (45%) reported having a needle stick injury at least once during their clinical practice and the frequency of NSIs was significantly higher among doctors (72%) as compared to nurses (29%) (OR = 6.3;  $p < 0.001$ ). The most common reason identified for NSI among both doctors and nurses was stress/being overburdened (41%) followed by carelessness (38%). The majority of the injuries occurred while injecting or drawing

**Table 1. Descriptive characteristics and answers to questions by the participants.**

Characteristics	Nurses n = 51		Doctors n = 29	
	n	%	n	%
<b>History of NSI</b>				
Yes	15	29	21	72
No	36	71	8	28
<b>Times NSI</b>				
Once	8	54	11	52
Twice	3	20	6	29
More	2	13	4	19
Don't remember	2	13	-	-
<b>Measures taken after NSI \$</b>				
Knew about patient & disease	12	80	17	81
Allowed injury to bleed	14	93	20	95
Washed injury with soap & water	13	87	14	67
Notified IC office within 24 hours	11	73	8	38
<b>Knowledge<sup>§</sup></b>				
Diseases that NSI can transmit				
Hepatitis-B	46	90	28	97
Hepatitis-C	43	84	27	93
HIV	46	90	28	97
<b>Practices</b>				
Received hepatitis B vaccine	42	82	28	97
Use tray to keep syringes	45	88	12	41
Use gloves	45	88	11	38
Bend/break needles by hand	16	31	6	21
Moving around with uncapped needles	12	24	1	3
Use sharp disposal containers	42	82	25	86
Received sharps related training	45	88	10	35
<b>Strategy for prevention of NSI</b>				
Training of HCWs	49	96	26	90
Avoiding needle recap	46	90	26	90
Use of tray to carry syringes	45	88	24	83
Use of sharp disposal containers	45	88	27	93
Avoiding needle breaking/bending by hand	44	86	26	90
Avoiding leaving open syringes	44	86	27	93

<sup>§</sup> Percentages do not add to 100 due to multiple responses.

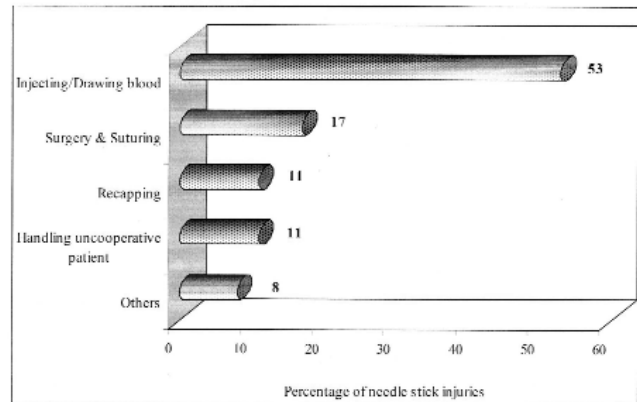


Figure. Sharp injuries by injury circumstances.

**Table-2 Comparison of doctors with nurses regarding frequency of NSIs, attitude, training and practice during clinical work.**

Characteristic	Nurses n=51		Doctors n=29		P	OR	95% CI	
	n	%	n	%			Lower	Upper
Experienced NSI #	15	29.4	21	72.4	<0.00*	0.2	0.1	0.4
Reported to infection control office with in 24 hours ‡	11	73.3	8	38.1	0.037*	4.5	1.1	18.9
Received sharps management training	45	88.2	10	34.5	<0.001*	14.3	4.5	45.4
Use tray to keep syringes	45	88.2	12	41.4	<0.001*	10.6	3.4	33.3
Use gloves	45	88.2	11	37.9	<0.001*	12.3	3.9	38.5
Bend/break needles by hand	16	31.4	6	20.7	0.304	1.8	0.6	5.1
Moving around with uncapped needles	12	23.5	1	3.4	0.019 *	8.6	1.1	71.4

\*  $p < 0.05$

# OR (for doctors vs. nurses) = 6.3 (95% CI = 2.3-17.4)

‡ Percentages calculated among those who experienced NSI

blood samples (53%) followed by surgery and suturing (17%) and recapping syringes (11%) (Figure 1).

The risk of getting hepatitis B, C and HIV from NSIs was well known amongst both doctors and nurses ( $\geq 88\%$ ). At least 86% of the HCWs were aware of NSI prevention protocols and 84% of participants said that they use yellow box specified for sharp disposal. When questioned as to how they thought that NSIs could be prevented, 94% HCWs were of the opinion that training is important (Table 1).

It was observed that more nurses compared to doctors, 73% vs. 38%, notified the infection control office within 24 hours of injury (OR = 4.5;  $p = 0.037$ ). About 88% of the nurses used a kidney tray to carry syringes or sharp items as opposed to 41% doctors ( $p < 0.001$ ). Similarly, higher number of nurses wore gloves during invasive procedure. However, more nurses (24%) were in the habit of transferring uncapped needles as compared to doctors (3%) (OR = 8.6;  $p = 0.019$ ). It was also observed that the

nurses were more likely than doctors to have received formal training in the management of sharps (OR = 14.3;  $p < 0.001$ ) (Table 2).

## Discussion

This study shows that in the institute where the study was conducted, practices of nurses are safe in comparison to doctors. Nurses are careful and follow protocols and guidelines during their clinical practices such as: use of gloves and kidney trays to carry syringes and other sharp items.

At AKUH blood sampling for various investigations and intravenous medication are done by both nurses and junior doctors. NSI was significantly higher among doctors as compared to nurses ( $p < 0.001$ ). This finding is not consistent with the study previously published from USA, where authors reported that nurses sustained the highest number of injuries (49%) and physicians had only 10%.<sup>12</sup>

Subsequent to the incident, 53% of HCWs notified the infection control office which is low but superior to other reports published earlier by Alam<sup>13</sup> 7%, McGeer<sup>14</sup> 5%, Gurubachaya<sup>15</sup> 21% and Patterson<sup>16</sup> 30%. Further analysis of the data showed that doctors were not inclined towards informing the infection control office whereas relatively higher number of nurses had reported ( $p = 0.037$ ). This finding is in concordance with the results of McCormick and Maki.<sup>17</sup> Perhaps it reflects lack of formal training or careless attitudes and practices or the prolonged working hours and work load of doctors.

At this point, it is interesting to note that Stotka and Mercier independently found that absolute reporting of sharp injuries were higher from nurses but the actual rate of occurrence was more frequent in physicians.<sup>18,19</sup>

More than half of the injuries (52.8%) occurred while drawing the blood samples or injecting the medicine. This finding indicates the importance of planning and careful handling of syringes while performing these simple procedures.

Previously, a significant number of NSI (25%) was reported as a result of recapping.<sup>20</sup> In this study it is 11% which reflects better practice among HCWs. To avoid further NSIs due to recapping, policy of no recapping of used syringes should be strictly implemented unless a safer means of recapping is available as recommended by the UK department of health.<sup>21</sup>

It is important to note that overall knowledge regarding the potential transmission of Hepatitis B, C and HIV was high among the participants and majority of HCWs were vaccinated. Most of the HCWs, after the incident, let the wound bleed to reduce the potential viral load and also

washed their hands. Additionally, two third of the participants exactly knew the post exposure prophylaxis protocol and 81% of HCWs who had a NSI were aware of the clinical diagnosis of the patient in the handling of whom the exposure occurred. This information highlights the success of existing infection control program. The regular educational activities and awareness sessions organized by infection control staff has an impact on the knowledge of HCWs.

In this study, overall practices of nurses were found to be better than the doctors, which is understandable as most of the nurses on board are graduates of the AKU School of Nursing, where the curriculum includes infection control as a subject. This finding is also endorsed by the response from nurses that 88% of them had formal sessions in the handling and disposal of sharps in comparison to doctors where positive response was only 35%.

Limitation of this study is, its conveniently selected small sample size, but the information revealed is alarming as the frequency of NSIs is high amongst HCWs. Mujeeb and his colleagues reported that about 80% of HCV positive operating rooms personnel had more than four NSIs per year in five years.<sup>22</sup> EPINET system suggests that on an average hospital, workers incur approximately 30 NSIs per 100 beds per year.<sup>23</sup> Therefore, more studies are required to assess the frequency of exposure and to identify the risk factors in local setting.

Given the serious, and even fatal, consequences of sharps injuries and the limited effectiveness of post exposure therapies, it is crucial that measures to prevent sharps injuries from occurring be adopted. Therefore, it is high time to introduce syringes and other engineered equipments with safety devices as their use in the developed world has reduced the number of NSIs significantly.<sup>24,25</sup>

In summary, we conclude that the frequency of NSI among HCW is high even with under reporting. As far as the knowledge is concerned both the doctors and nurses were able to identify the major risk factors and preventive measures.

Finally, we would like to recommend that in all health care settings, record keeping and reporting of sharp injuries should be considered as an essential part of infection control activity. Post exposure prophylaxis and follow up facility should be provided by the hospital management. Infection control teaching and training should be an integral part of the curriculum of all disciplines including medical, dental, nursing as well as for any institute providing training to paramedics. Moreover, each health care setting should have an active and dynamic infection control program. In due course this multifaceted approach will definitely improve the attitude, knowledge and practices of HCWs towards NSI.

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