

## Needle stick injuries among nurses of two tertiary care hospitals of Lahore: A KAP study

Shamaila Hassnain,<sup>1</sup> Zarbakht Hassan,<sup>2</sup> Sehar Amjad,<sup>3</sup> Muhammad Zulqarnain,<sup>4</sup> Khurram Arshad,<sup>5</sup> Zunaira Zain<sup>6</sup>

### Abstract

**Objective:** To estimate the prevalence of needle-stick injuries in female nurses of a public and private hospital and compare the findings.

**Methods:** This cross-sectional study was conducted at one public and one private tertiary care hospital in Lahore, Pakistan, from March to June 2015, and comprised female nurses who were selected using non-probability purposive sampling. A structured questionnaire was used to interview the subjects. Data analysis was done using SPSS 17.

**Results:** Of the 386 participants, there were 193(50%) from each of the two hospitals. The prevalence of needle-stick injuries was found to be 85(44%) in public and 51(26.4%) in the private hospital. The highest proportion of injuries in both hospitals occurred while disposing or recapping needles, 36(42.4%) and 32(62.7 %) in public and private hospitals, respectively, especially in the morning shift, i.e. 42(49.4%) in public and 32(62.7%) in private hospital. Syringe needles were mostly involved, 51(60%) in public and 45(88.2%) in private hospital.

**Conclusion:** The prevalence of needle-stick injuries was higher in public hospital.

**Keywords:** Needle-stick injuries, Prevalence, Nurses, Tertiary hospitals, Lahore. (JPMA 67: 1874; 2017)

### Introduction

According to the Canadian Centre for Occupational Health and Safety (CCOSH), "Needle stick injuries (NSIs) are wounds caused by needles that accidentally puncture the skin. NSIs are a hazard for people who work with hypodermic syringes and other needle equipment. These injuries can occur at any time when people use, disassemble and dispose of needles. When not disposed of properly, needles can be concealed in linen or garbage and injure other workers who encounter them unexpectedly".<sup>1</sup>

NSIs are the commonest occupational hazard to which a health care worker is exposed.<sup>2</sup> Worldwide, 2 million out of 35 million health workers experience percutaneous exposure to infectious diseases each year and 37.6% of hepatitis B virus (HBV), 39% of hepatitis C virus (HCV) and 4.4% of human immunodeficiency virus / acquired immune deficiency syndrome (HIV/AIDS) cases are attributed to needle stick injuries (World Health Organisation (WHO), 2002; World Health Report, Geneva).<sup>3</sup> More than 90% of blood-borne infections occur among health care workers in developing countries. The Centre for Disease Control (CDC) estimates that between 600,000 and 1,000,000 NSIs occur each year.<sup>4</sup>

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<sup>1</sup>Department of Community Health Sciences, <sup>2-6</sup>Final Year M.B,B.S. Students, Fatima Memorial College of Medicine & Dentistry, Lahore.

**Correspondence:** Shamaila Hassnain. Email: sash\_04@yahoo.com

A huge obstacle in correctly identifying NSIs in the developing countries is the fact that so many of them go unreported; only 2 million NSIs are reported by health care workers every year. About 40-70% cases of NSIs are unreported in developing countries.<sup>4</sup> In the United States, 1 out of every 3 cases of NSI goes unreported.<sup>5</sup>

In Pakistan, the prevalence of NSIs is high, i.e. about 55%.<sup>6</sup> This reflects the need for awareness amongst health care workers about such injuries and the need to prevent them.

Awareness regarding the injuries becomes especially important in a country like Pakistan where the burden of diseases spread by percutaneous injury, such as hepatitis B and hepatitis C, is significant at 7.6% in the general population.<sup>7</sup>

The high prevalence of NSIs in healthcare workers warrants the study of the associated factors and devising and implementation of prevention strategies to thereby decrease the chances of acquiring such infections. The current study was planned to estimate the prevalence of NSIs among nurses of a public and private hospital and to compare the findings.

### Subjects and Methods

This cross-sectional study was conducted at Jinnah Hospital, a public facility, and Fatima Memorial Hospital (FMH), a private tertiary care hospital, in Lahore, Pakistan, from March to June 2015, and comprised female nurses.

The study protocol was approved by the institutional review board (IRB) of Fatima Memorial College of Medicine and Dentistry, and permission for data collection was obtained from the IRB of Allama Iqbal Medical College. This was followed by approval from the principals/heads of the nursing departments of the institutions concerned. Non-probability purposive sampling was used to select the subjects.

The sample size was calculated using 95% confidence level, 5% margin of error, and based on literature revision, assessed prevalence was taken as 55%.<sup>6</sup>

Sample size = 380.3184, which was rounded to 386 to compensate for any refusal

All female nurses who were registered and working at the hospitals were included. Student nurses, retired nurses, nurses on sick or maternity leave, undergraduate medical students, interns, junior residents, senior residents and professors were excluded. Information regarding knowledge, attitudes and practices relating to NSIs was collected through a structured questionnaire. The purpose of the study was explained to each participant and written informed consent was obtained. All participants were assured of the confidentiality of their personal information. There were no ethical issues in the questionnaire as well. SPSS 17 was used to analyse data. The primary objective was to determine the prevalence of needle-stick injuries in both hospitals and the secondary objective was to make a comparison between the prevalence, knowledge, attitudes and practices of the nurses relating to needle-stick injuries in each hospital representing private and public health sector to find any causes that may contribute to a higher prevalence and for the control of which prevention plans could be implemented. Frequency tables, pie charts, bar charts and percentages were used to represent the data.

## Results

Of the 386 participants, there were 193 (50%) from each hospital. The mean age of the nurses was  $28 \pm 6.34$  years in FMH and  $28 \pm 6.13$  years in Jinnah Hospital. Educational qualification of most of the nurses at each hospital was diploma; FMH, 134 (69.4%) and Jinnah, 130 (67.4%), followed by Bachelor of Science (BSc); FMH, 56 (29%) and Jinnah, 60 (31.1%), while only 3 (1.6%) nurses in each hospital had a master's. Moreover, 133 (68.9%) nurses at FMH and 136 (70.5%) at Jinnah were staff nurses. Besides, 110 (57%) nurses at FMH were single as compared to 77 (40%) at Jinnah, whereas 110 (57%) nurses at FMH and 92 (47.7%) at Jinnah had a work experience of less than or equal to 10 years. Further, 83 (43%) at FMH and 101 (52.3%) at Jinnah had an experience of more than 10 years.

(% of nurses out of a total of 193 female nurses in each hospital)

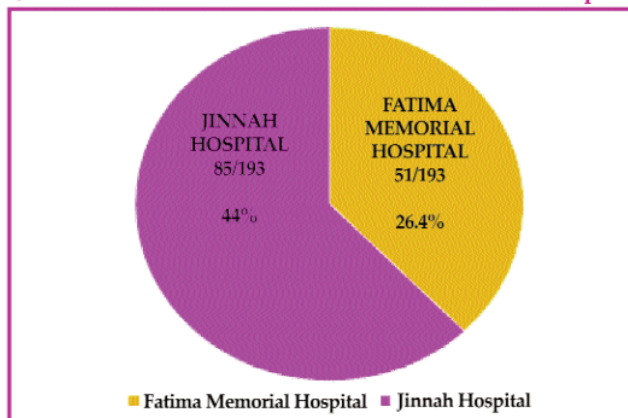


Figure-1: Experience of needle-stick injury in the past one year.

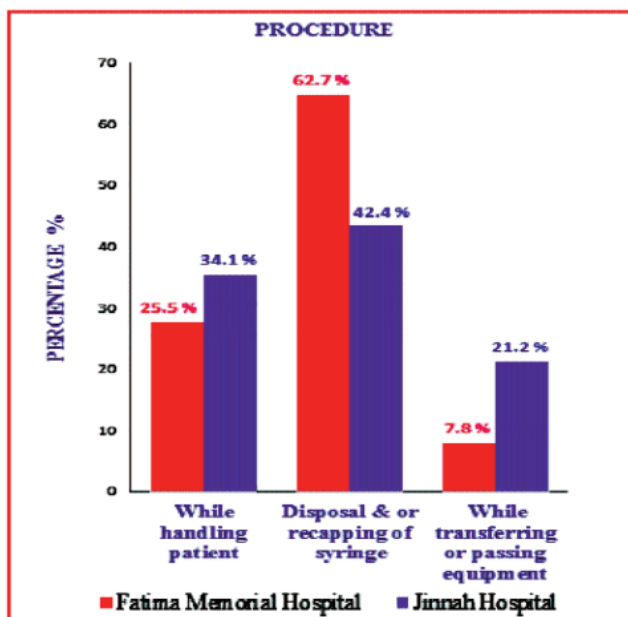


Figure-2: Procedure during which the latest injury occurred.

Moreover, 85 (44%) nurses at Jinnah Hospital experienced NSIs in the past one year compared to 51 (26.4%) at FMH (Figure-1).

The working shift in which most injuries occurred was the morning shift in both hospitals; 32 (62.7%) at FMH and 42 (49.4%) at Jinnah Hospital. The next shift with most injuries was evening shift; 13 (25.5%) at FMH and 23 (27.1%) at Jinnah Hospital. The shift with least injuries encountered was the night shift; 6 (11.8%) at FMH and 20 (23.5%) at Jinnah Hospital.

Departments where the latest NSI occurred were majorly medicine and allied including emergency department,

**Table:** Cause of the needle-stick injuries.

Casue	FMH		Jinnah Hospital	
	n	%	n	%
Workload	25	49.0	36	42.4
Rush hour	9	17.6	22	25.9
Non-cooperative patient	2	3.9	10	11.8
Carelessness	13	25.5	14	16.5
Lack of experience of a procedure	2	3.9	3	3.5
Total	51	100	85	100

FMH: Fatima Memorial Hospital.

intensive care unit (ICU), outpatient department (OPD) in both hospitals; at FMH 27(52.9%) and 58(68.2%) at Jinnah Hospital, followed by surgery and allied including obstetrics and gynaecology; 24(47.1%) at FMH and 27(31.8%) at Jinnah Hospital. Instruments that caused the latest NSIs were mainly syringe needles, 45(88.2%) at FMH and 51(60%) at Jinnah Hospital.

A majority of latest injuries occurred due to recapping of syringes in both hospitals; 36(42.4%) at Jinnah and 32(62.7%) at FMH (Figure-2).

Out of those who encountered an injury, 27(53%) at FMH and 54(64%) at Jinnah Hospital were using protective measures.

Furthermore, 24(47.1%) of those nurses who experienced a needle-stick injury at FMH and 27(31.8%) at Jinnah Hospital reported their injury. The main reasons for not reporting the injuries were lack of time at Jinnah and workload at FMH while other reasons that were identified in both included not knowing how to report, fear of confidentiality, dissatisfaction with follow-up and considering the patient low risk (Table).

Of the nurses who reported at FMH, 7(29.2%) underwent screening, 3(12.5%) got post-exposure prophylaxis and 14(58.3%) got both. Of those who reported at Jinnah, 3(11.1%) underwent screening, 6(22.2%) got post-exposure prophylaxis and 18(66.7%) got both. Out of all the nurses, only 2(1%) at FMH and 4(2.1%) at Jinnah were not at all aware of the risk of transmission of hepatitis B, hepatitis C, HIV, tetanus, etc. through NSIs.

Besides, 169(87.6%) nurses at FMH and 133(68.9%) at Jinnah Hospital had knowledge of the universal precaution guidelines regarding the use of sharp instruments. Also, 121(62.7%) nurses at FMH and 93(48.2%) at Jinnah Hospital took precautionary measures while handling sharp instruments, while 154(79.8%) nurses at FMH were aware of a reporting system at the hospital compared to 76(39.4 %) at

Jinnah Hospital.

## Discussion

The most prominent difference found in the current study was the prevalence of NSIs which was 44% in public (Jinnah Hospital) and 26.4% in private hospital (FMH). Other parameters showing worth noting results included the procedure resulting in the highest proportion of injuries which was disposal or recapping of syringes in both hospitals; 42.4% at Jinnah and 62.7% at FMH. Maximum injuries were encountered in both hospitals during the morning shift with a percentage of 49.4% at Jinnah and 62.7% at FMH. Also, the tools that caused most injuries were syringe needles in both hospitals; 60% at Jinnah and 88.2% at FMH.

The present study was one of the few studies to take into consideration the prevalence, knowledge, attitudes and practices regarding NSIs among the nurses of tertiary health care facilities belonging to both public and private hospitals, as well as making a comparison between the two. NSIs are one of the major occupational health-related issues encountered by medical personnel. NSIs are responsible for transmission of HBV, HCV and HIV, resulting in hepatitis B, hepatitis C and AIDS (and AIDS-related death as reported in a study conducted in Tanzania in 2006.<sup>8</sup> According to the WHO, almost 66,000 cases of hepatitis B, 16,000 cases of hepatitis C and 1,000 cases of AIDS occurred worldwide in the year 2000, especially amongst nurses when NSIs are taken into consideration.<sup>9</sup> In the United States, the incidence of NSIs among nurses is estimated to be 49%<sup>10</sup> and in Iran 63.3%.<sup>11</sup>

The results of our study showed the prevalence of NSIs at 44% in the public and 26.4% in the private hospital which was much lower than the 69% reported in a study conducted in Ghurki Trust Hospital, Lahore, Pakistan, in October 2009<sup>6</sup> and 70.4% reported in a study conducted in South Korea in 2013.<sup>12</sup> The difference in our results may have been due to the smaller sample size in the former and in the method opted for sample selection in the latter. The occurrence of NSIs in our study was highest amongst diploma nurses (67.4% at Jinnah and 69.4% at FMH). This was consistent with a study conducted in public hospitals of south-west Ethiopia in 2014.<sup>13</sup>

In our study, the prevalence of NSIs in the public hospital was 44% compared to 26.4% in the private one. This difference could be due to the high patient turnover in public settings as opposed to private settings. The highest proportion of injuries in both hospitals occurred while disposing of or recapping needles (42.4% and 62.7% in public and private hospital, respectively), followed by during manipulation in patient (34.1% and

25.5% in public and private hospital, respectively). Our results were consistent in this regard with a study conducted in 2004 in Sub-Saharan Africa.<sup>14</sup>

The instruments responsible for causing the most NSIs in our study were syringe needles; 60% at Jinnah and 88.2% at FMH which was comparable with a research conducted in 2006 in Korea.<sup>15</sup> In our study, 40% of the nurses at public hospital neither reported nor undertook any post-exposure prophylaxis which was congruent with a research conducted in 2011 in Pakistan<sup>16</sup> while only 17.6% of nurses of the private hospital did not report and neither took post-exposure prophylaxis after getting the NSI. This difference may be due to the observation that 74.1% of nurses at Jinnah had knowledge about post-exposure prophylaxis versus 88.6% at FMH, and also because 62.2% nurses at Jinnah and 78.2% at FMH considered post-exposure prophylaxis as extremely important. No immediate measures were taken by a majority of the nurses of public hospital (30.6%) whereas in private hospital majority of nurses (41.2%) only squeezed blood immediately after NSI. Our results were in contrast with a study conducted in India in 2013 where majority of nurses washed the injured part with soap and water.<sup>17</sup>

In our study, most of the nurses of public hospital did not report NSIs due to lack of time (50%) while in private the main reason for not reporting was workload (37%). Our results were different from a study conducted in Iran on medical, nursing and midwifery students in the year 2012 in which the main reason for not reporting NSIs was due to not knowing the reporting mechanism.<sup>18</sup> Also, 68.4% nurses in public hospital and 82.9% in private hospital were aware of the risk of transmission of hepatitis Band C, and AIDS which is much higher than the study conducted in Saudi Arabia in the year 2002. This difference might be due to the fact that they included all health care workers while our study comprised nurses only.<sup>5</sup> In our study, 91.2% nurses of public hospital and 86% of private hospital were vaccinated against HBV and 79.3% of public hospital and 77.7% of private hospital had completed the recommended course of vaccination which was consistent with a study conducted in 2003 in Ireland.<sup>19</sup>

The percentage of nurses who were aware of the universal precaution guidelines was 68.9% in public and 87.6% in private hospital which was consistent with a study conducted in Nepal in year 2003.<sup>20</sup> Moreover, 63.5% nurses in public hospital and 52.9% in private hospital were using precautionary measures at the time of injury which is much higher than that reported in a study conducted in Karachi, where only 10% of nurses were using precautionary measures when the injury occurred.<sup>21</sup>

In our study 60.6% of nurses of the public hospital did not know about any reporting system in their hospital while majority of the nurses in the private hospital (79.8%) did know about their reporting system. This is consistent when the results of public hospital are taken into account with a study conducted in Pakistan in 2011.<sup>16</sup> It is a matter of concern that a proper reporting system either does not exist in a public hospital or that the majority of their nurses are not aware of it even if it does where patient turnover is considerably higher than private settings and also where the prevalence of NSIs is also greater. Regarding hospital policy, 59.1% of nurses in the public hospital did not know of any hospital policy regarding NSIs which was consistent with a study conducted in 2004 in Sub-Saharan Africa.<sup>14</sup> A majority of the nurses (57%) in the public hospital had not attended any training course, whereas a majority of nurses of private hospital (63.2%) had had training regarding NSIs. This can be correlated with the prevalence of NSI in public hospitals which was higher (44%) as compared to private hospital nurses (26.4%) and that the level of training has a significant effect on the prevalence of NSIs which is supported by the finding of a study conducted in Taiwan in the year 2007.<sup>22</sup>

The current study had a few limitations. It included only female nurses, which would have affected our findings. Only one institution was used for data collection, therefore, the results obtained might not be a true representative of the situation in other institutions belonging to the same sector.

Despite the limitations, the study does highlight the fact that there is a need to educate nurses about NSIs and to encourage them to attend training courses relating to prevention of these injuries. Hospitals need to develop a proper protocol which conforms to the latest WHO guidelines for the prevention and management of NSIs. For example, recapping and bending of needles is still done at the hospitals by many nurses despite being contraindicated by the WHO. Nurses should be made aware of the benefits of taking post-exposure prophylaxis. Moreover, post-exposure prophylaxis should be provided free of cost by the hospitals. Work should be properly distributed amongst the nurses, especially during the morning shift as heavy workload was the major cause of NSIs and also an important cause of not reporting the injures. Nevertheless, further research is needed in order to analyse the risk factors and to develop better strategies to limit NSIs.

## Conclusion

The prevalence of NSIs was higher in the public hospital along with lesser knowledge and attendance of training



courses regarding NSIs.

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**Conflict of Interest:** None.

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