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Needle Stick Injury: Inevitable or Avertable

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Introduction- Healthcare workers across the globe are exposed to infectious agents' day in and day out. Increased reliability on diagnostics has increased usage of needles by healthcare personnel while fulfilling their clinical obligations. This has made healthcare personnel prone to injuries. Needle stick injury is an occupational hazard in hospital settings^{1,2}. Healthcare workers are at great risk of needle stick injury while administering injections, withdrawing blood, disposing needles, handling linen, biomedical waste segregation etc.^{3,4,5,6,7}. The risk of acquiring HIV through needle stick is 0.3%; while, such risk is 3% for hepatitis C, and 30% for hepatitis B8. These injuries are also seen to induce considerable psychological aftermaths such as phobia, anxiety and stress in affected individuals^{9,10}.

Needle stick injury are injuries caused by needles such as hypodermic needles, blood collection needles, intravenous stylets and needles used to connect parts of intravenous delivery systems (National Institute for Occupational Safety and Health). The incidence of needle stick injuries among health-care workers varies in different countries. For instance, its prevalence has been reported to be about 66% in Egypt, 45% in Pakistan, 31.4 % in Germany, 46.8% in Saudi Arabia, 45% in Turkey, 50% in Australia and Taiwan and 79.5% in India. It seems that these injuries are more prevalent in developing countries¹¹.

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Needle Stick Injury: Inevitable or Avertable

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I. INTRODUCTION

Healthcare workers across the globe are exposed to infectious agents' day in and day out. Increased reliability on diagnostics has increased usage of needles by healthcare personnel while fulfilling their clinical obligations. This has made healthcare personnel prone to injuries. Needle stick injury is an occupational hazard in hospital settings^{1, 2}. Healthcare workers are at great risk of needle stick injury while administering injections, withdrawing blood, disposing needles, handling linen, biomedical waste segregation etc.^{3, 4, 5, 6, 7}. The risk of acquiring HIV through needle stick is 0.3%; while, such risk is 3% for hepatitis C, and 30% for hepatitis B⁸. These injuries are also seen to induce considerable psychological aftermaths such as phobia, anxiety and stress in affected individuals^{9, 10}.

Needle stick injury are injuries caused by needles such as hypodermic needles, blood collection needles, intravenous stylets and needles used to connect parts of intravenous delivery systems (National Institute for Occupational Safety and Health). The incidence of needle stick injuries among health-care workers varies in different countries. For instance, its prevalence has been reported to be about 66% in Egypt, 45% in Pakistan, 31.4 % in Germany, 46.8% in Saudi Arabia, 45% in Turkey, 50% in Australia and Taiwan and 79.5% in India. It seems that these injuries are more prevalent in developing countries¹¹.

Reporting of needle stick injury is a type of secondary prevention which is instrumental in early diagnosis and treatment. It is also required to provide psychological treatment to patients to alleviate anxiety. Even for infection control researchers, the NSIs assessment remains problematic, because official NSIs data are often conservative because of widespread underreporting¹². It is felt that organizations should have robust needle stick injury reporting mechanism and adequate infrastructure.

Despite being aware of the importance of reporting, underreporting of needle stick injuries is a known phenomenon. But little is known about the factors that may be responsible for underreporting. These factors could be individual, organization based on training based. Needle stick injury problem is magnified because of underreporting of Needle stick injuries. Ignorance, lack of understanding gravity of NSI, lack of Knowledge, non cooperation of higher staff

are some of the factors which cause underreporting needle stick injuries. Knowledge of these factors could help organizations take corrective actions and develop a milieu which encourages reporting of needle stick injuries.

The present study has been conducted with the objective to determine the frequency of needle stick injuries among nurses, their awareness about the existing reporting mechanism at the organization in event of a needle stick injury and determine factors/barriers amongst nurses for reporting needle stick injuries.

II. MATERIAL AND METHODS

1. *Type of Study*: Questionnaire based cross-sectional study
2. *Study Population*: 193 Nurses working in different departments in Tertiary teaching Hospital in North India
3. *Study duration*: Study was conducted from 1st January 2018 to 30th June 2018.
4. *Study Location*: Tertiary Care teaching Hospital in North India
5. *Sample size*: Sample size was calculated based on a previous report of the prevalence of needle sticks and sharps injuries which was 193 were selected considering a possible attrition rate of 25%. Stratified random sampling was performed.
6. *Methodology*: First, the number of staff at each department was assessed. Then, the quota for each department was calculated and selected randomly among the staff at each center. A questionnaire was prepared. The content validity of the questionnaire was determined and modified according to the comments raised by experts. Questionnaire included questions on demographic characteristics (i.e. age, gender, marital status, work experience, job, the highest qualification, working unit and the employment status), the knowledge related to sharps injuries, complications and actions needed to be taken after an injury occurred, the history of exposure to a sharp injury and its causes if occurred, and the actions they have taken after a sharp injury occurred. The characteristics of the occupational exposures including route of exposure and the procedure in which the exposure occurred, place and time of exposure occurrence and viral status of the source patient were also asked. Moreover, data on protective measures used by the HCWs, HBV immunization status and antibody titre,

number of injuries reported to the hospital and reasons for not reporting such injuries were also collected. Prior to distribution, the questionnaire was piloted to assess its feasibility and to give more information about the problem. The participants were asked to fill-out the unnamed validated questionnaire and collected by Nursing Infection Control Nurses.

7. *Data Analysis:* The data were analyzed using SPSS version 17. Chi-square and Fisher Exact tests were used for all the analyses, while p-values < 0.05% were considered statistically significant. All the participants were free to enter the study or withdraw from it whenever they wished. The questionnaires were coded then; the collected data were entirely kept secret and anonymously reported.

III. OBSERVATIONS AND RESULTS

Total of 193 nurses submitted the questionnaire Following were the observations of study :

a) *Distribution of nurses on basis of designation*

Out of total 193 nurses, 172 nurses (89.10%) were Junior Nursing Officers and 21 nurses (10.9%) are Senior Nursing Officer.

Table 1: Distribution of nurses on basis of designation

Designation	Number of nurses in study	Percent
Junior Nursing Officer	172	89.1
Senior Nursing Officer	21	10.9
Total	193	100

b) *Distribution of nurses according to experience*

Out of total 193 nurses, 81 nurses (42%) had experience < 5 years, 78 nurses (40.4%) had experience had experience between 5-10 years and 34 nurses (17.6%) had experience >10 years.

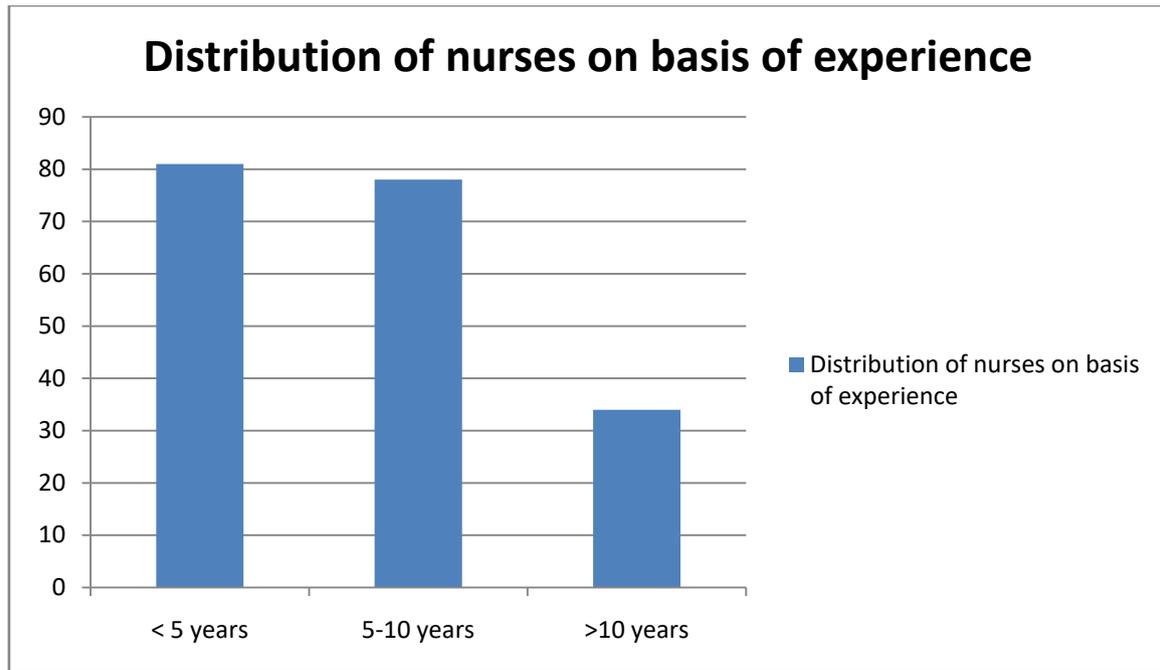


Figure 1: Distribution of nurses in experience

c) *Distribution of nurses on basis of area*

Following is distribution of nurses on basis of area posted

Table 2: Distribution of nurses on basis of area posted

Area Posted	Number of Nurses	Percentage
General Ward	49	25.4
Private Ward	2	1
Emergency	65	33.7
ICU	15	7.8
OT	27	14.0
OPD	35	18.1
Total	193	100

d) *Needle Stick Injury experienced during course of career*

Out of total 193 nurses, 112 nurses (58%) had experienced needle stick injury while 81 nurses (42%) had not experienced needle stick injury.

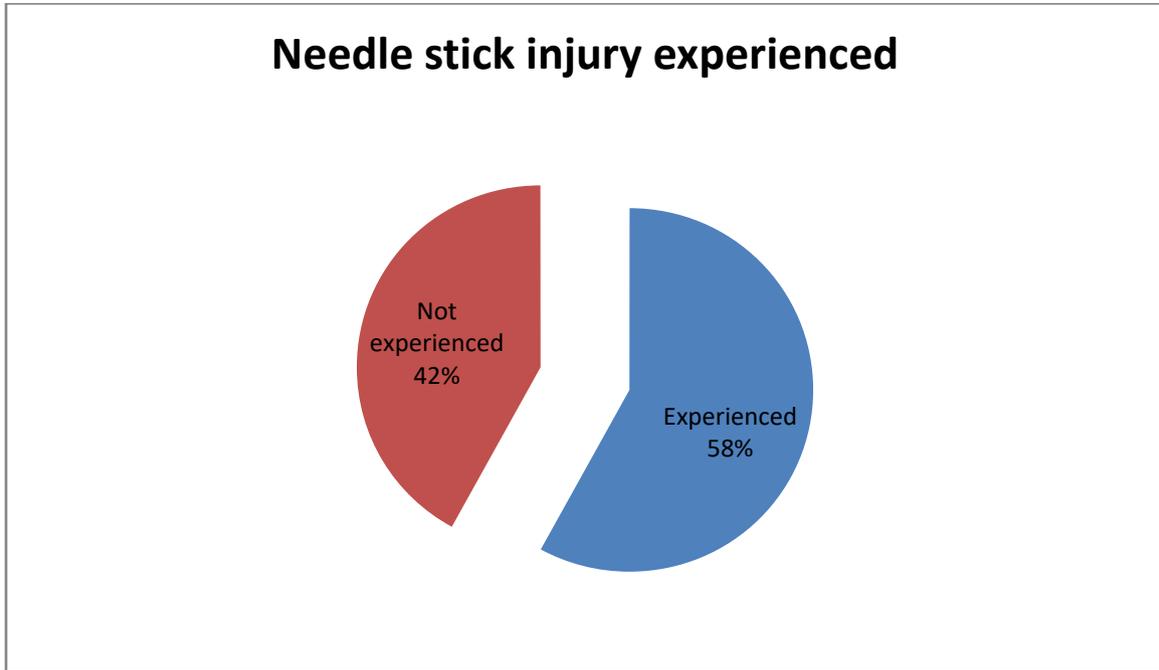


Figure 2: Needle Stick Injury experienced during course of career

e) Out of nurses who had experience needle stick injury, frequency of needle stick injury experiences

Table 3: Frequency of needle stick injury

Frequency of needle stick injury	Number of nurses	Percentage
1-3 times	85	75.89
3-5 times	26	23.21
Total	111	100

f) Frequency of needle stick injury reported

Out of 112 nurses who had needle stick injury, 63 nurses reported needle stick injury. Out of these 60 nurses (95.23%) had reported it 1-3 times and 3 nurses (4.7%) had reported it 3-5 times. 3 nurses did not give any response

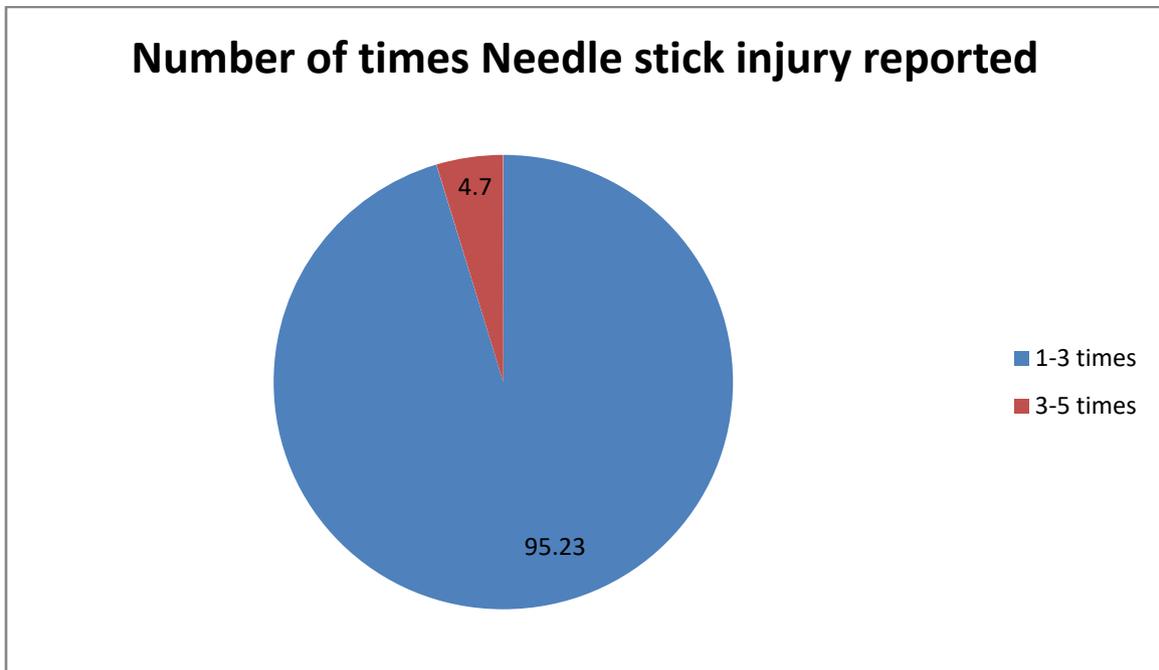


Figure 3: Number of times needle stick injury reported



g) Reasons the Needle Stick Injury have not been reported

Table 4: Reasons the Needle Stick Injury have not been reported

Sr No.	Reasons the Needle Stick Injury has not been reported	Number of Nurses reporting the reason of not reporting	Percentage of nurses among who had experienced needle stickinjury
1	Needle stick injury by sterile needle	32	28.57
2	Lack of awareness about policy	39	34.82
3	Lack of knowledge about NSI	84	75
4	Workload	24	21.42
5	ART side effects	7	6.25
6	Infrastructure	30	26.78
7	Patient report negative	13	11.60

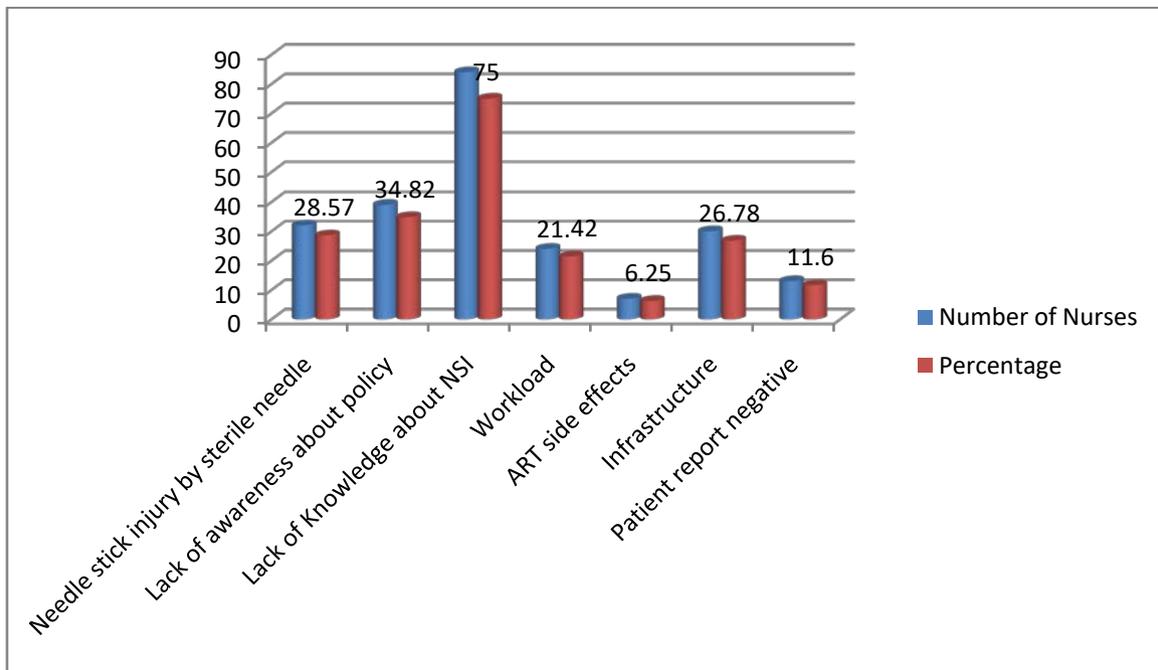


Figure 4: Reasons the Needle Stick Injury have not been reported

h) Factors responsible for occurrence of NSI

According to nurses, factors responsible for occurrence of NSI

Table 5: Factors responsible for occurrence of NSI

Factors Responsible for occurrence of NSI	Number of nurses	Percentage of nurses
NSI while Performing Procedure	148	76.66
Work Overload	115	59.58
Improper Handling during Procedure	109	56.47
Negligence during procedure	105	54.40
During BMW segregation	112	58.03

i) Study population who are vaccinated for Hepatitis B

Out of the total study population 160 (82.90 %) nurses were previously vaccinated for Hepatitis B and 33 (17.10%) population were not vaccinated for Hepatitis B

Correlation of NSI with vaccination is not significant (P= 0.9)

Study Population Who Were Aware Of Existing Policy On Needle Stick Injury In The Institute

Out of total 193 nurses, 75 (38.9 %) nurses were aware of existing policy on Needle Stick Injury in the institute while 118 (61.1%) nurses were not aware of existing policy.

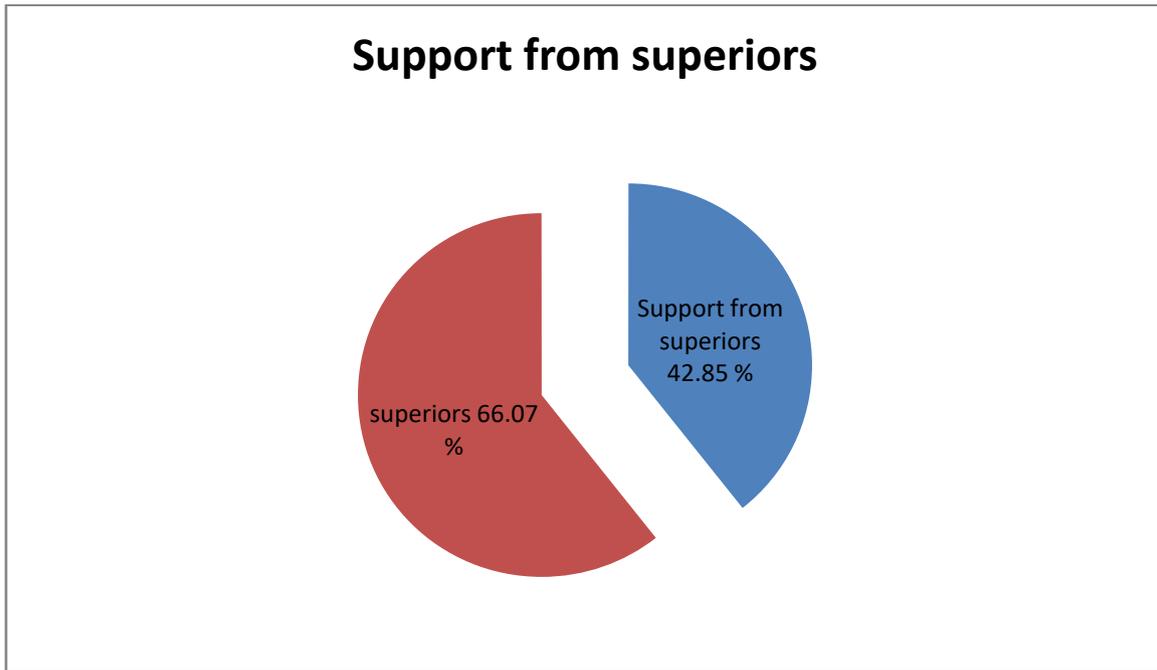
Table 6: Study population who were aware of existing policy on Needle stick injury in the Institute

Sr No.	Number of nurses who are aware of policy	Percentage
Aware of existing policy	75	38.9
Not aware of existing policy	118	61.10

The correlation of NSI with policy was strongly significant (P=0.01)

j) *Needle stick injury with support received from superiors*

Out of total 112 nurses who had experienced needle stick injury, 48 (42.85%) had received support from superiors and 74 (66.07%) had not received support from superiors



Correlations of reporting of Needle stick Injury with support of superiors was significant (P=0.000)

k) *Needle stick injury with years of experience*

The correlation between needle stick injury and years of experience was not significant (P=0.801). This indicates that needle stick injury experienced is not dependent on years of experience.

IV. DISCUSSION

Needle stick injuries amongst Nurses working in Tertiary care Hospital in North India. This study attempted to unravel the various factors that hinder reporting of Needle Stick Injury among Nursing Officers in a tertiary care setup. In the present study, 58 % nursing officer had experienced needle stick injury. This result is similar with results of study conducted by Arman Azadi amongst Iranian nurses which stated that more than one third of nurses have experienced needle stick injury.¹³ The similar results may be due to similar hospital setup and similar study population.

The study showed correlation between needle stick injuries with years of experience as negative. This result was similar with result conducted by Dr .S. Salelkar and team in tertiary care hospital in Goa. The

result is similar as the study was conducted in similar environment .¹⁴ However results were contrary to study findings Telali *et al.*¹⁵ in their study in south India reported that as work experience increased the incidence of needle stick injuries decreased. The results were contrary as the study conducted by Telali et al comprised of all healthcare workers .Hence the level of knowledge and experience were very varied among study population. As a result increase in experience will increase level of knowledge.

In this study, lack of knowledge whether to report NSI was the main cause of underreporting. However lack of awareness of NSI policy, NSI by sterile needle, infrastructure, workload, infrastructure and sero negative patient report, ART side effects were other causes of underreporting. These findings were similar to findings of Arman Azadi¹³. Also studies conducted by Dr Rambha Pathak and team reported that majority of the HCWs who suffered NSI did not report to the hospital administration.¹⁶ The commonest reason cited for this was fear of being considered unskilled followed by not knowing where to report and lack of time. Another author has also reported that 90% never reported because they were not aware of the importance of post-exposure prophylaxis.¹⁷ In study conducted by Cathy



Voide et al in Infectious Diseases Service, University Hospital, Lausanne, Switzerland¹⁸ underreporting was more in doctors than other Healthcare workers. Low underreporting among 'others' and domestic staff and high underreporting among doctors is a phenomenon of desensitization: the more a HCW is exposed to NSSI-prone activities and the more NSSIs are sustained, the more relaxed the HCW becomes with respect to reporting.

In the present study, majority of participants have stated that NSI is experienced during performing any procedure. Other causes stated were due to workload and during BMW segregation. This finding was similar to findings of Dr Rambha Pathak et al in MM Institute of Medical Sciences and Research, Mullana which stated 56.9% injuries were from a hollow borrow needle and also mentions that 48 % of needle stick injury occurred during disposal of needles. In study conducted by Ruben et al, long working hours has also been found to be an important risk factor for NSI.¹⁹

The health care environment in a tertiary care hospital is a hectic and stressful one and long duty hours are common. It is important that time management is done appropriately to avoid work stress. Given the dangers of disease transmission through needle stick injuries, the surprising lack of awareness of these dangers and the corrective actions to be taken post injury makes it imperative to address this issue urgently. Healthcare staff needs to be trained in universal precautions, proper sharps disposal and action to be taken in case of injury needs to be given to all categories of health care workers. The hospital needs to have a uniform needle stick injuries policy covering safe work practices, safe disposal of sharps, procedures in event of needle stick injury, training including pre-employment training, monitoring and evaluation of needle stick injuries and procedures for reporting needle stick injuries.¹⁴ Healthcare workers need to be made aware of the needle stick injury policies.

V. CONCLUSION

Constant education, workshops or life-long short training is an integral to developing awareness amongst health care workers and improving adherence to good clinical practice and concordance with policy and procedures. Efforts should be made to explore alternatives of inventories, devices with safety measures. Ensuring adequate and continuous education and training in safe use and disposal of needles can reduce the incidence to a great extent. NSI surveillance mechanism must be developed in the hospital and preventive practices like vaccinations for hepatitis B, institution of appropriate PEP, psychological support and counseling of affected HCWs and stringent follow-up must be ensured. Averting NSI is a continuous

process and requires a stringent policy to create safe and fair environment for employees.

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