STUDY ON KNOWLEDGE, ATTITUDE, PRACTICES ON NEEDLE STICK INJURIES IN EMERGENCY MANAGEMENT TECHNICIANS

Dissertation
At
GVK EMRI Hyderabad

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MBA Hospital & Health Management
2013–15

Institute of Health Management Research
Jaipur
2015

INSTITUTE OF HEALTH
MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

IIHMR UNIVERSITY

TO WHOMSOEVER MAY CONCERN

This is to certify that Nethaji Bolla, student of MBA Hospital and Health Management from IIHMR University, Jaipur has undergone internship training at GVK EMRI-Hyderabad from March 01, 2015 to April 30, 2015.

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.

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MANAGEMENT RESEARCH
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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **Knowledge, Attitude, Practices on Needle Stick Injuries in Emergency Medical Technicians: A Study,** and submitted by **Nethaji Bolla** Enrollment No. 18-1469,under the supervision of Professor **Nutan Jain** for award of MBA Hospital and Health Management/MBA Pharmaceutical Management of the university carried out during the period from **March 01, 2015** to **April 30, 2015** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

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PREFACE

Abstract

A Study on Knowledge, Attitude, Practices on Needle Stick Injuries in Emergency Management Technicians

Name of the Author: Nethaji Bolla

Background:

Needle stick injuries (NSI) are wounds caused by sharps such as hypodermic needles, blood collection needles, IV cannulas or needles used to connect parts of IV delivery systems. The causes include various factors like type and design of needle, recapping activity, handling/transferring specimens, collision between health care providers or sharps, during clean-up, manipulating needles in patient line related work , passing/handling devices or failure to dispose of the needle in puncture proof containers. Paramedics are the most highly trained Emergency Management Technicians (EMTs), who are exposed to blood because they treat trauma victims and perform advanced life support procedures using needles and other sharp instruments. Paramedics often work under unpredictable, adverse conditions where patients may be experiencing uncontrolled bleeding or disorientation.

Objective:

The objective of this study was to assess the knowledge, attitude and practices of EMTs on needle stick injuries of Telangana.

Data Collection Method:

Convenience sampling was used to collect data from 120 respondents from each district. Each of the 120 respondents were interviewed. This study was a questionnaire-based survey.

A semi-structured questionnaire was used as a data collection tool and data was collected through face to face interviews.

Results:

Among the victims of NSIs (N=35) 83% of them were more than 3 yrs of experience. This probably indicates that more the exposure in the field, more the chances of NSI. 40% of the NSIs happened during disposal of needled .Out of all the victims of NSIs 37% of them were reported and the reasons for under reporting noted as 50% of victims i.e 11felt it's not a significant injury, followed by 41% (09 victims) don't know where to report.

Conclusion:

Out of 120 EMTs who were interviewed, there was about 29% of NSIs found though it's not a big proportion it's an alarming situation to take the necessary measures to control.

Key words: Needle sticks Injuries, Emergency Medical Technicians (EMTs), Paramedics, Sharp Instruments.

Acknowledgement

The success of any task would be incomplete without the expression of gratitude to the people who made it possible. I hereby take an opportunity to express my sincere gratitude towards everyone who helped directly or indirectly incompletion of my Internship at GVK-EMRI.

At the onset of my report, I would like to acknowledge my sincere thanks to our institute, Institute of Health Management and Research, Jaipur for providing us platform to gain enough knowledge and skills in different aspects of health management, and GVK-EMRI for believing in my abilities. I am overwhelmed to be working with the prestigious organization GVK EMRI 108 which gives me an opportunity to contribute my bit for the noble cause of saving lives.

I offer profoundest gratitude to my thesis advisor Dr.G.V.Ramana Rao (Director Emergency Medicine Learning Centre (EMLC) & Research), GVK EMRI for mentoring me throughout my dissertation period. From finding an appropriate subject in the beginning to the process of writing thesis, Dr.G.V.Ramana Rao offered his unreserved help.

I express my deepest gratitude to Dr NutanP.Jain, Dissertation Guide from IIHMR for guiding and enabling me to keep a focused approach throughout my dissertation. Dr NutanP.Jain have always inspired me and brought me to a higher level of thinking.

I am grateful to GVK EMRI HR and Operations team for providing me data.

Finally, and most importantly, I would like to thank God for allowing me to complete my project, my beloved parents and brother for their blessings and my friends for their help and wishes for the successful completion of this Internship.

Nethaji Bolla

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List of Abbreviations

AAEMI	Academy of Emergency Medicine in India
AAFP	American Academy of Family Physicians
AAPI	American Association of Physicians of Indian Origin
ACLS	Advanced Cardiac Life Support
AED	Automated External Defibrillator
AHA	American Heart Association
BLS	Basic Life Support
CCS	Call Center Server
CEMONC	Comprehensive Emergency Obstetrics and Neonatal Care
CHC	Community Health Center
CMU	Carnegie Mellon University
CPR	Cardio Pulmonary Resuscitation
CO	Communication Officer
DO	Dispatch Officer
EMT	Emergency Management Technician
ENT	Ear, Nose, Throat
ERCP	Emergency Response Care Physician
EME	Emergency Management Executive
ERO	Emergency Response Officer
ERS	Emergency Response Service
GIS	Geography Information System
GPS	Geography Positioning System
ILCOR	International Liaison Committee on Resuscitation
IT	Information Technology
ITLS	International Trauma Life Support
MOU	Memorandum of Understanding
MMU	Mobile Medical Van
NENA	National Emergency Number association
NFPA	National Fire Protection Association
NGO	Non Government Organization
NSI	Needle Stick Injury
PALS	Pediatric Advanced Life Support
PGPEC	Post Graduate Program in Emergency Care
PHC	Primary Health Center
PHFI	Public Health Foundation of India
PPH	Post Partum Hemorrhage
PPP	Public Private Partnership
PPE	Personal Protective Equipment
PEP	Post Exposure Prophylaxis

DISSERTATION

A Study on Knowledge, Attitude, Practices on Needle Stick Injuries in Emergency Management Technicians

1. Introduction

Needle stick injuries (NSI) are wounds caused by sharps such as hypodermic needles, blood collection needles, IV cannulas or needles used to connect parts of IV delivery systems. The causes include various factors like type and design of needle, recapping activity, handling/transferring specimens, collision between health care providers or sharps, during clean-up, manipulating needles in patient line related work , passing/handling devices or failure to dispose of the needle in puncture proof containers . Paramedics, the most highly trained Emergency Medical Technicians (EMTs), can be exposed to blood because they treat trauma victims and perform advanced life support procedures using needles and other sharp instruments. Paramedics often work under unpredictable, adverse conditions where patients may be experiencing uncontrolled bleeding or disorientation.

Patient care puts paramedics at risk of exposure to blood. These NSIs carry the risk of infection from blood borne pathogens such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), which causes AIDS.

The average risk of transmission after an occupational percutaneous exposure varies by the type of blood borne virus. The risk from a single needle stick or a cut exposure to HBV-infected blood ranges from 6%–30%, HCV-infected blood is approximately 1.8% and the risk for HIV infected blood is 0.3% [(1)]

Surveys of healthcare personnel indicate that 50% or more do not report their occupational percutaneous injuries [(2).] In addition, the emotional impact of a needle stick injury can be severe and long lasting, even when a serious infection is not transmitted. NSIs are preventable, can have a positive impact on the attitudes of health care providers thereby improving the safety culture in handling the sharps.

Injuries involving hollow-bore needles [(3)]

During or after disposal: 22%

- In transit to disposal.
- Improper disposal.
- During disposal.

After use, before disposal: 19%

- Activation of safety feature.
- Recap needle.
- During clean up.

During use: 52%

- Access IV line.
- Transfer/process specimens.
- Pass/transfer equipment.
- Collision with sharp or worker.
- Insertion or removal of needle.

2. Review of Literature

According to Boal et al report 49 percent of all exposures to blood and 72 percent of needle sticks were reported to employers. The main reason for under-reporting was not considering the exposure a ‘‘significant risk’’. Under-reporting of needle stick exposures to blood among paramedics and other emergency medical technicians (EMTs) has been documented to range from 20% to 52%. Under-reporting of exposures to blood among other healthcare workers in the United States ranges up to 96%. Reasons for not reporting exposures have included believing the risk of infection was low, being too busy, not knowing the reporting procedure, and not wanting to appear careless [(3)]

There was another study done on NSI by Newson DH in Ugandan Teaching Hospital. Acc. to the study Interns suffered more NSI (annual mean=4.8) than any other occupational group. Most NSI occurred when patients moved during procedures, when HCW re-sheathed needles, or during suturing (each reported by 55 HCW--30% of those responding). Following NSI, 60 HCW said they squeezed the site of the injury and washed it with bleach, 43 believed they had a 10% risk of HIV infection, 87 felt anxious, 54 felt depressed, 40 prayed, 24 had an HIV test, and four were counseled [(4).]

Another study was done bySteven T. Mast,Jonathan D. Woolwine and Julie Louise Gerberding titled “Efficacy of Gloves in Reducing Blood Volumes Transferred during Simulated Needle stick Injury” reported Needle size and penetration depth were significantly associated with transfer volume. Glove material reduced the transferred blood volume by 46%–86% in both models [(5).]

In study by S Tetali found that, as experience is increases, incidence of injury is decreases [(9).]According to ST Jayant et al there was no association between incidence of NSIs and the

shift/time of work [10]. No gender difference in needle stick injuries was observed in the study of S Salekar et al.

Rationale:

Of most concern to emergency service personnel is the risk of acquisition of blood-borne viruses such as HIV, hepatitis B and hepatitis C. The highest risk of transmission is usually from a needle stick injury (NSI). [6].

Emergency medical system (EMS) workers frequently use sharp devices in injury prone circumstances that involve limited visibility, confined spaces, rapidly moving vehicles, and uncooperative victims.

Irrespective of awareness levels of the risk associated with recapping of used syringe needles, injuries due to recapping used syringe needles were observed constantly and comparatively more throughout the worldwide. Therefore, only knowledge is not sufficient, it need to be accompanied by practice. [7]

3. Methodology

3.1Research Question

What is the Knowledge, Attitude and Practices (KAP) of EMTs on needle stick injuries in Telangana?

3.2 Objectives

- To study the proportion of needle stick injuries
- To assess the Knowledge, Attitude and Practices (KAP) of EMTs on needle stick injuries.

3.3 Data Collection Method:

Study Design: Descriptive Study

Study Location: Telangana State

Study Subjects: EMTs working in GVK EMRI ambulances in the state of Telangana.

Sampling: Convenience, Purposive Sampling was done. Telangana Comprises of 12 districts, as purposive sampling was followed first 12 respondents from each district was interviewed.

A total of 120 EMTs of GVK-EMRI ambulances in Telangana state were interviewed.

S. No.	Name of the District	Total No. of Respondents		Total
		Face to Face Interviews	Telephonic Interviews	
1	Hyderabad	12	0	12
2	Rangareddy	10	2	12
3	Adilabad	0	12	12
4	Karimnagar	0	12	12
5	Khammam	0	12	12
6	Mahabubnagar	0	12	12
7	Medak	0	12	12
8	Nalgonda	0	12	12
9	Nizambad	0	12	12
10	Warangal	0	12	12

Table 1: Distribution of respondents by districts and type of interview

Tools & Instruments for Data Collection: A semi-structured questionnaire was used as a data collection tool through face to face interviews. This study was a questionnaire-based survey.Mobile numbers of all the ambulances in Telangana state were taken from operations department and EMTs in the ambulance were interviewed through telephone. EMTs who were approachable in the districts of Hyderabad and Rangareddy, interviewed personally by face to face.

Data Analysis: Data collected was cross checked for any incomplete or partial filling. Using Microsoft Excel collected data was then be edited, coded, tabulated and organized into various frequency distributions.

4. Ethical Considerations

Informed consent was taken before starting the interview. If anyone disagreed to become part of the data collection process they were not forced by any means. Confidentiality and privacy maintained was maintained.Purpose and objectives of the research explained before to the respondents.

5. Results

5.1 Working Experience of EMT

Table 2 gives information about the work experience among EMTs in the sample. Most of the respondents had more than 3 years of work experience i.e 93 out of 120. Around two percent in the sample are female and rest are male.

S. No.	Working Experience	Number	Percentage of Respondents
1	Less than one year	11	9.1%
2	Between 1-3 years	16	13.3%
3	More than 3 years	93	77.5%

Table 2 Percentage distribution of respondents by their Working experience (n=120)

5.2 EMTs having Needle Stick Injuries

The results presented in figure 1 revealed that about 29% (n=35) EMTs have had NSIs till 25th April 2015.

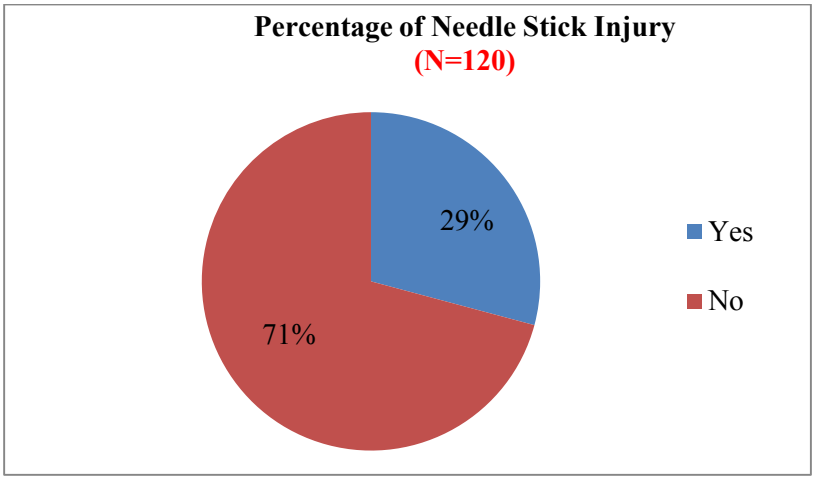

Figure 1 Proportion of EMTs who had Needle Stick Injuries during last 2 months

5.3 Mechanism of Needle Stick Injuries among Victims

Table 3 represents as per the responses received from the EMTs through questionnaire, it is found that most of the NSIs happen during Disposal and Insertion/ Removal of needles, with the percentages of 40% and 37% respectively followed by 23% during recapping.

Mechanism	Number	Percentage
Recapping	8	23%
Insertion / Removal	13	37%
Disposal	14	40%

Table 3 Percent distribution of EMTs by Mechanism of NSI (n=35)

5.4 Type of case during NSI

Table 4 shows that out of 35 respondents, 32 percent were trauma cases, 54 percent were medical reasons and 14 percent were others, which could be due to other reasons like alcoholic and poisoning.

Mechanism	Number	Percentage
Trauma	11	32%
Medical	19	54%
Others	5	14%

Table 4 Percent distribution of EMTs by Type of NSI (n=35)

5.5 Reporting about incidence of NSI:

According to table 5 around 63 percent of respondents reported about NSI.

Reporting	Number	Percentage
Reported	13	37%
Not reported	22	63%

Table 5 : Percent distribution of EMTs by Reporting about incidence of NSI (n=35)

5.6 Reasons for under reporting:

As per table 6, around 50 percent of respondents considered NSI as not a significant injury and 41 percent of respondents does not even aware where to report these NSI.

Reasons for not reporting	Number	Percentage
No significant injury	11	50%
Don't know where to report	9	41%
Don't know the risk associated	2	9%

Table 6: Percent distribution of EMTs by Reasons for not reporting (n=22)

5.7 Willingness on reporting of NSI:

S.No	Willingness	Number	Percentage
1	Willing to report	93	77%
2	Not willing to report	27	23%

Table 7 percent distribution of willingness of NSI reporting

Willingness and opinion of all 120 EMTs were questioned in the questionnaire by asking them "Do you think needle stick injuries need to be reported?" , and the responses noted as shown in the Table 07. Out of 120 EMTs 93 were willing report the NSI which is 77%

5.8 Respondents using Gloves while handling patients

According to table 8, around 94 percent respondents used gloves while handling patients

Response	Number	Percentage
Yes	113	94%
No	7	06%

Table 8 Percent distribution of EMTs by using Gloves while handling patients (n=120)

5.9 Practice of destroying needles:

Result mentioned in table 9, shows only 74 percent respondents destroy needles after use.

Response	Number	Percentage
Destroy the used needles	89	74%
Don't destroy	31	26%

Table 9 Percent distribution of EMTs by their Practice of destroying needles (n=120)

5.10 Recapping of used needles:

As shown in table 9, recapping of used needles is practiced by 90 percent. Of those who reported in affirmative, 74 percent said that they use both hands for recapping used needles.

Response	Number	Percentage
Yes	108	90%
Method	n=108	
Both hands	80	74%
One hand/ Scoop up	28	26%

Table 10 Percent distribution of EMTs by Recapping used needles by methods (n=120)

5.11 Gloves while handling sharp bin and bio hazard waste:

As per table 11, vast majority 96 percent of respondents reported that they used gloves while handling sharp bin and bio hazard waste.

Response	Number	Percentage
Yes	115	96%
No	5	4%

Table 11 Percent distribution of Respondents by using gloves while handling sharp bin and bio hazard waste (n=120)

5.12 Knowledge of Hepatitis B, Hepatitis C and HIV transmission by NSI

Table 12 shows that Needle stick injury can be the vehicle for Hep-B transmission and therefore, the respondents were asked about their knowledge of the same. Around 65 percent of respondents have knowledge about Hepatitis B transmission by NSI while nearly one – third of the respondents did not know. It is also important to note that six respondents had incorrect knowledge. The respondents were also asked the same for Hep C. More than 50 percent of them had either no or incorrect knowledge about it. On the contrary a vast majority of the respondents had correct knowledge that HIV can occur through NSIs.

	Yes	No	Did Not Know
Hepatitis B	**78 (65%)**	**6 (5%)**	**36 (30%)**
Hepatitis C	**50 (42%)**	**7 (6%)**	**63 (52%)**
HIV	**112 (93%)**	**5 (4%)**	**3 (3%)**

Table 12 **Percent distribution of EMTs by Hep B, C and HIV transmission by NSI (n=120)**

5.13 Immediate reaction of respondents after NSI

As per table 12 around 45 percent responses were Apply spirit after NSI, 37 percent squeeze to drain the blood out and 18 percent to wash the injured site with water and soap.

S. No	Response	Number	Percentage
1	Squeeze	44	37%
2	Wash with water and soap	22	18%
3	Apply spirit	54	45%

Table 13 Immediate reaction of respondents after NSI (n=120)

5.14 Knowledge about PEP

As per the responses mentioned in table 14 received from EMTs, only 13 percent had knowledge about PEP (Post Exposure Prophylaxis).

S.No	Response	Number	Percentage
1	Yes	16	13%
2	No	104	87%

Table 14 Percent distribution of EMTs by their Knowledge about PEP (n=120)

5.15 Ideal time for PEP

Table 15 shows that around one percent EMTs said within one hour, 2 percent said within 2 hours while 5 percent said it occurs in 72 hours.

Sr.no	Ideal time	Number	Percentage
1	Within 1 hour	1	1%
2	Within 2 hours	3	2%
3	Within 72 hours	6	5%
4	Don't know	110	92%

Table 15: Knowledge about Ideal time for PEP (n=120)

6. Discussion

In a study by Boal e all, under-reporting of needle stick exposures to blood among paramedics and other emergency medical technicians (EMTs) has been documented to range from 20% to 52%. In our study under reporting was found to be around 37 percent. In study by Boal et al, Reasons for not reporting exposures have included believing the risk of infection was low, being too busy, not knowing the reporting procedure, and not wanting to appear careless. In our study main reason for under reporting was belief that there is no significant injury due to needle. Around 50 percent of EMTs had same perception.

7. Conclusion

Conclusion of the above data taken in two parts, first is about proportion of NSIs among EMTs and secondly about KAP on NSIs.

Proportion:

- Out of 120 EMTs who were interviewed, there was about 29% of NSIs found though it's not a big proportion it's an alarming situation to take the necessary measures to control.
- Among the victims of NSIs (N=35) 83% of them were more than 3 yrs of experience. This probably indicating that more the exposure in the field, more the chances of NSI.
- 40% of the NSIs happened during disposal of needled.
- Out of all the victims of NSIs 37% of them were reported and the reasons for under reporting noted as 50% of victims i.e 11felt it's not a significant injury, followed by 41% (09 victims) don't know where to report.

8. KAP Findings

- Wearing gloves is one of most important Personal Protective Equipment while handling patient and it was found that 94% of EMTs practice that. At the same time it was also found that 96% of EMTs wear gloves while handling sharp bin and biohazard waste.
- Practice of destroying needles after use was identified in 74% of EMTs.
- 90% of EMTs (108 EMTs) practice recapping of needle after use and among these again 74% recap by using both hands which is not a recommended practice where there is a chance of NSI in moving ambulances. 26% follow one hand or the scoop up method is most recommended practice.

- In the questionnaire EMTs were questioned about the knowledge on transmission of 3 diseases which are transmitted by NSI. 3 diseases include Hepatitis-B, C and HIV. The data gives interesting figures and facts like 65% of EMT's have knowledge about Hepatitis B transmission and 42% have knowledge of Hepatitis C. Most of the EMT's were aware of transmission of HIV by NSI i.e 93% which was 112 EMT's out of 120.
- When EMTs were questioned about immediate action followed by NSI, 45% said that applying spirit is the right action and 37% said squeeze the injury site to drain the blood out. 18% of the EMTs gave the right action i.e wash with water and soap.
- Only 13% of EMTs were aware of PEP (Post Exposure Prophylaxis) and 2% have knowledge on ideal time for PEP which is 2hrs from the time of NSI. But about 1% of EMTs gave response for ideal time as within 1 hr and 5% as within 72 hrs. Though it's not the exact answer, within 72 hrs is maximum time PEP can be started.

9. Recommendations

On discussing with the manager, some of the steps that can be taken reduce the incidence of NSIs are:

- Emphasis on NSIs during refresher training sessions of EMTs
- Exclusive curriculum on NSIs which can be distributed in the field and can be used in the training of new EMTs.
- Proper follow up on status of vaccination of EMTs.
- Awareness on PEP needs to be developed.
- Good practices such as scoop up recapping, needle destroying and PPE needs to be encouraged.
- Support to the EMTs from field level for reporting, in case of NSI.

- Standard guide lines from Head Office for the proper line approach in case of NSI.

10. Limitations of the Study

- Study cannot be generalized to the whole population since the all causes of NSIs are not considered.
- Biases can be present due to purposive sampling.
- Communication errors as most of the interviews were conducted telephonically.

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Annexure

Questionnaire for EMTs

Interview Schedule

Informed Consent: I would like to thank you for taking the time to meet me. My name is NethajiBolla from GVK-EMRI.

I would greatly appreciate your participation in this survey.

I would like to ask you some questions Needle Stick Injuries.The interview should take about 10 minutes. Information you provide will be kept strictly confidential and used only for research.

Participation in survey is voluntary. If you choose to participate, you may withdraw at any time. However we hope that you will take part in this interview since your participation is important.You don't have to talk about anything that you don't want to and you can end the interview at any time.

Do you have any questions about what I just explained?

Are you willing to participate in the interview?

Start time: _____

End time: _____

Questions:

Q. No.	Questions	Coding Categories		Instruction	Response
1	Since how many years are you working as EMT?	Less than 1 year	1		
		1-3 years	2		
		More than 3 years	3		
2	Have you ever had a needle stick injury?	Yes	1	If "2" skip to Q. 7	
		No	2		
3	How you got the needle stick injury?	During recapping	1	In case of 99 please specify	
		During Insertion or removal	2		
		During Disposal	3		
		Other	99		
4	Was the incident of needle stick injury reported?	Yes	1	If "Yes" skip to Q 7	
		No	2		
5	Why you did not report the needle stick injury?	No significant injury	1	In case of 99 please specify	
		Don't know where to report	2		
		Don't know about the risk associated	3		
		Other	99		
6	Do you think needle stick injuries need to be reported?	Yes	1		
		No	2		
7	Do you wear gloves while injecting or handling the patient?	Yes	1		
		No	2		
8	Should needles be burnt /bent after use?	Yes	1		
		No	2		
9	Do you recap needles after use?	Yes	1		
		No	2		
10	How do you recap the needle after use?	By using one hand	1		
		By using one hand / Scoop-up method	2		
11	Do you wear gloves when handling the sharp bin/ Bio hazard waste?	Yes	1		
		No	2		
12	Can Hepatitis B be transmitted by needle stick injuries?	Yes	1		
		No	2		
		Don't Know	98		

13	Can Hepatitis C be transmitted by needle stick injuries?	Yes	1		
		No	2		
		Don't know	98		
14	Can HIV/AIDS be transmitted by needle stick injuries?	Yes	1		
		No	2		
		Don't know	98		
15	What you suppose to do or did immediately after needle stick injury?	Squeeze it	1		
		Wash it with water and soap	2		
		Leave it without doing anything	3		
		Apply spirit or antiseptics	4		
16	What you suppose to do or did immediately after needle stick injury?	PEP (Post Exposure Prophylaxis)	1		
		Don't know	2		
17	What is the ideal time for PEP after needle stick injury?	Within 1 hour	1		
		Within 2 hours	2		
		Within 72 hours	3		
		Don't know	98		

Thank you for your time and valuable contribution. Do you have any question for me?

Sign of Interviewer