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### RESEARCH ARTICLE

## KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS NEEDLE STICK INJURY AMONG HEALTH CARE WORKERS IN A PRIVATE HOSPITAL-QUESTIONNAIRE BASED STUDY

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##### Key words:-

Needle Stick Injury, Health Care Workers, HIV, HBV, HCV

#### Abstract

**Background :** An occupational injury is loosely termed as needle stick injury (NSI), though it included injury through needle or other sharps and splashes<sup>4</sup>. They constitute major source of blood borne pathogens especially HIV, HBV, HCV. The risk of transmission after NSI is highest for HBV (2-40%), followed by HCV (2.7-10%), least for HIV (0.3%)<sup>5</sup>.

##### Purpose

1. To assess the occurrence of NSI among different categories of HCWs
2. To study various factors responsible and the circumstances under which they occur
3. To prevent these through improvement in knowledge, attitude and practice.

**Methods:** A cross-sectional, questionnaire-based study was conducted among health care workers (HCWs) in a Private Hospital (Shanthi hospital and research centre) in Bengaluru from Jan to March 2023. This study included all HCW (50), who come in contact with patients, thus exposed to sharps and other occupational hazards. Data collection was carried out using standardized questionnaire, created based on review of the literature

**Results:** out of 50, 21 were males and 29 were female. Maximum were in the age group of 20-40 yrs. 50% of the HCWs are nursing staff, followed by 20% doctors, 18% housekeeping, 12% technicians. Needle stick injury was seen in 10% of HCWs. Out of 5 HCWs, only one has sustained 2 NSIs, remaining 4 HCWs had NSI only once. It was common in nursing staff as they will be dealing with sharps frequently.

**Interpretation & Conclusion:** NSI rate is relatively low in this study compared to many other studies, even HBV Vaccination rate is good in this study. To improve the knowledge, attitude and practice towards NSI repeated training with pre and post test questionnaire is very important. More knowledge is required regarding needleless safety devices.

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#### Introduction:-

Needle stick injury (NSI) and other sharps injury pose a major risk of occupational transmission of blood borne pathogens for all health care workers (HCWs). Needle stick injuries are defined as wounds that are caused by sharp

objects like hypodermic needles, fluid collection needles and IV cannula as which are attributed due to improper handling or manipulation of needles in different activities such as obtaining or transferring sample specimens, recapping activities and failure to dispose needles in puncture proof containers.<sup>1,2</sup> An occupational injury is loosely termed as needle stick injury, though it included injury through needle or other sharps and splashes<sup>4</sup>. They constitute major source of blood borne pathogens especially HIV, HBV, HCV. The risk of transmission after NSI is highest for Hepatitis B Virus (HBV) - 2-40%, followed by Hepatitis C Virus (HCV) - 2.7-10%, least for Human immunodeficiency virus (HIV) - 0.3%<sup>5,17</sup>. Determinants of NSI include, source patient factors (e.g., titer of virus in the source patient's blood/body fluid), the type of injury and quantity of blood/body fluid transferred to the HCW during the exposure, and the HCW's immune status, lack of knowledge in HCWs (recapping needles, inappropriate disposal, overuse and unnecessary use of sharp devices), shortage of personal protective equipment and containers for sharp disposal, lack of device with safety measures, shortage of staff, lack of training.<sup>6,7</sup>

Needle stick or sharps injuries are caused by different types of needles, lancet, surgical scalpel, trocar puncture needle, vacuum tube blood collection needle, broken vial, razors, scissors, etc. during patient cares. Percutaneous exposures to blood and body fluids all through infected needle stick and sharps accidents are the main occupational hazard for morbidity and mortality from infections with blood borne pathogens among health care workers<sup>8</sup>. The risk of HBV contraction in healthcare workers is at least 3-6 times more than general population in developed countries and 6-18 times more than general population in developing countries<sup>8</sup>. Many studies have been conducted throughout the world. Globally, the reporting of NSI incidents is far below the actual and in hospitals which depend on their normal reporting systems this figure may even be up to ten times lower resulting in health-care workers not getting post-exposure prophylaxis (PEP) at the appropriate time to prevent the subsequent development of infection. NSI is not only a serious and common occupational hazard of the health-care sector but is also one of the most preventable occupational hazards among health-care workers (HCWs).<sup>9</sup> According to data from the World Health Organization (WHO), > 2 million occupational exposures occur among 35 million HCWs at risk annually and NSIs are responsible for the global incidence of 36.7% HBV, %, 39% HCV and 4.4% HIV/AIDS among HCWs for various reasons such as fatigue, carelessness, stress etc<sup>3</sup>. Potentially infectious specimens for NSI are Blood, Semen, Vaginal Secretions. Body Fluids (CSF, peritoneal fluid, pleural fluid etc), amniotic fluid whereas Urine, Saliva, Stool, Sputum, Tears, Vomitus, Sweat, Nasal Secretions are not considered infectious unless contaminated with blood and body fluids.<sup>4,16</sup> Centers for Disease Control and Prevention (CDC) estimates that about 600,000–1,000,000 NSIs occur annually. In many studies, needle recapping, unsuitable needle disposal, intravenous cannulation, and setting of drips are the most frequent activities causing NSIs<sup>10,18</sup>. Approximately 3,85,000 percutaneous injuries (needle sticks, cuts, punctures and other injuries with sharp objects) occur among HCWs in hospitals each year. They are implicated in transmission of more than 20 pathogens though HIV, HBV and HCV are most common.<sup>11</sup>

It is estimated that worldwide, contaminated injection alone cause around 8-16 million HBV infection, 2.4 to 4.5 million HCV infection and 80,000 to 160,000 HIV infections. WHO has estimated that between 2000-2030, 16 000 HCV infections due to sharps injuries will result in 142 early deaths, 66 000 HBV infections will lead to 261 (86-923) early deaths, and 1000 HIV infections will lead to 736 (129-3578) premature deaths. These various BBV infections can be prevented by various preventive strategies like pre-exposure prophylaxis for HBV, post exposure prophylaxis, precautions to prevent NSIs.<sup>2,14,15</sup>

### **Objectives:-**

1. To assess the occurrence of NSI among different categories of HCWs
2. To study various factors responsible and the circumstances under which they occur
3. To prevent these through improvement in knowledge, attitude and practice

### **Methods:-**

A cross-sectional, questionnaire-based study was conducted among health care workers (HCWs) in a Private Hospital (Shanthi hospital and research centre) in Bengaluru from jan to march of 2023, to assess knowledge, attitude and practices regarding needle stick injuries. This study included all HCW's ( 50 in number), who come in contact with patients, thus exposed to sharps and other occupational hazards. Data collection was carried out using standardized questionnaire, created based on review of the literature. The participants were explained the need of the study, identity will not be disclosed, and were assured that this survey is only for research purposes. Each participant completed a questionnaire. Ethical committee clearance was taken.

Results were calculated using SPSS software. To compare the relationship between variables and the occurrence of NSI, the Chi-square test was used and odds ratios (OR) were calculated using logistic regression. A p value of < 0.05 was considered statistically significant.

**Inclusion criteria:**

All health care workers who come in contact with sharps and other occupational injuries, in SHRC.

**Exclusion criteria:**

Other staffs of hospital who do not come in direct contact with sharps and other occupational injuries (office staff, HR staff etc)

**Results:-**

The study includes 50 HCWs from a private NABH accredited hospital. Out of 50 , 21 were males and 29 were female. Maximum were in the age group of 20-40 yrs. 50 % of the HCWs are nursing staff, followed by 20% doctors, 18% housekeeping, and 12% technicians. 40% of HCWs has experience of <5 yrs. Needle stick injury was seen in 10% ( 5 out of 50) of HCWs. Out of 5 HCWs , only one has sustained 2 NSIs , remaining 4 HCWs had NSI only once. Among 5 HCWs, 3 are nursing staff, 1 is doctor, 1 is housekeeping staff. It's common in nursing staff as they will be dealing with sharps frequently.

**Table 1:- Socio-Demographic Data.**

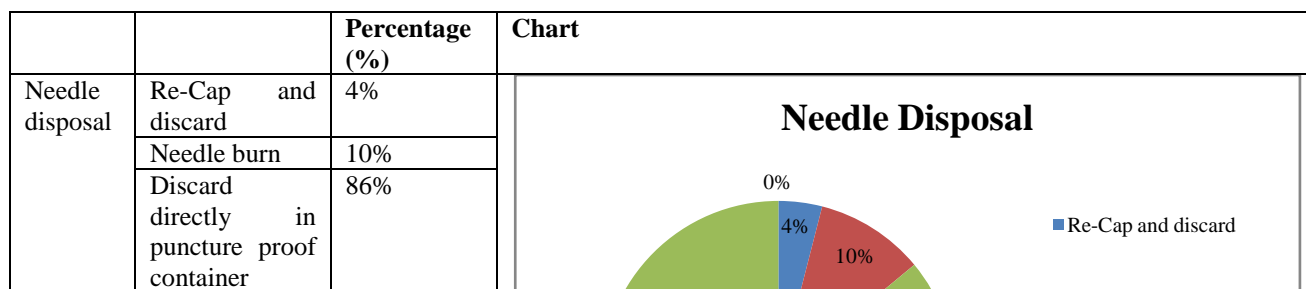
		Numbers(N=50)	Percentage (%)
Age (yrs)	< 20	0	0%
	20-30	25	50%
	31-40	20	40%
	41-50	3	6%
	>50	2	4%
Sex	Male	21	42%
	female	29	58%
Occupation	Doctor	10	20%
	Nursing staff	25	50%
	Technician	6	12%
	House keeping	9	18%
	Others (Specify)	nil	--
Duration as HCW(yrs)	<5	20	40%
	5-10	15	30%
	11-15	8	16%
	16-20	4	8%
	>20	3	6%
Needle stick /occupational injury	Yes	5	10%
	No	45	90%
If yes, how many	1	4	8%
	2-3	1	2%
	4-5	-	-
	>5	-	-
Hepatitis B Vaccination	Yes	42	84%
	No	7	14%
	Not sure	1	2%
Checked Anti - HBs titer after vaccination	Yes	26	52%
	No	20	40%
	Not sure	4	8%

**Table 2:- Knowledge, Attitude And Practice Among Hcws**

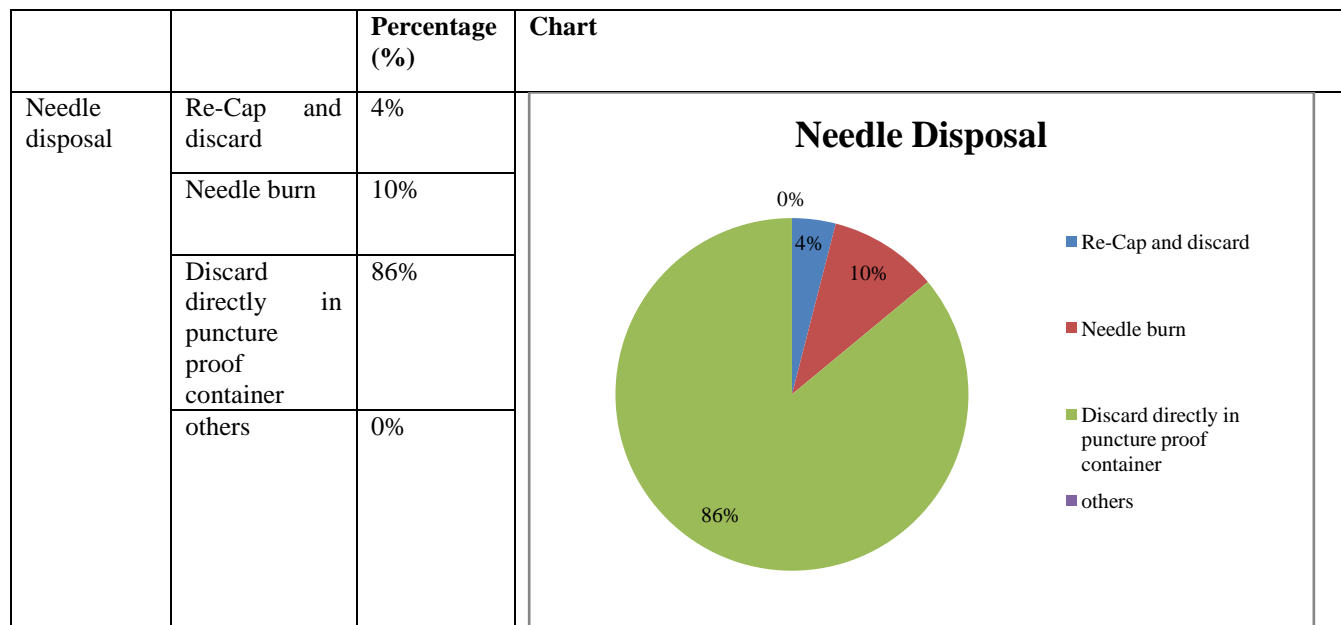
		Numbers(N=50)	Percentage (%)
Needle disposal	Re-Cap and discard	2	4%

	Needle burn	5	10%
	Discard directly in puncture proof container	43	86%
	others	nil	--
Separation of needle from a syringe	Bare hands but with great caution	2	4%
	Gloved hands	6	12%
	Never separate		--
	Forceps	42	84%
	others		--
When to change sharps container	1/2 full		--
	2/3 full	5	10%
	3/4 full	44	88%
	Completely full	1	2%
Training in NSI	Yes	45	90%
	No	5	10%
	Don't remember		--
Do you use glove for phlebotomy	Yes, all time	49	98%
	Occasional	1	2%
	Not at all		--
Viral Infections transmitted by Needle stick Injury?	HIV	3	6%
	HCV	2	4%
	HBV		--
	All of the above	45	90%
Do you have knowledge about needle less safety devices	Yes	35	70%
	No	15	30%
Do you have knowledge regarding Standard precautions	Yes	48	96%
	No	2	4%
If you have a needle stick, your immediate action will be	Wash your hand with Plain Soap and Running water	45	90%
	Keep in the mouth	nil	--
	Squeeze the finger	nil	--
	Wash your hand with antiseptic solution	5	10%

Figure 1:-Knowledge About Needle Disposal.



	others	0%	
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**Figure 2:- Knowledge About Needle Separation.****Table 3:- Recent NSI.**

		Number (5)	Percentage (%)
Place of injury	OPD	Nil	-
	OT	3	60%
	Dressing room	Nil	-
	Ward	1	20%
	ICU	Nil	-
	Casualty	1	20%
	Labour room	Nil	-
	Lab /collection centre	Nil	-
Procedure during which injury occurred	Recapping	Nil	-
	Injection	2	40%
	Phlebotomy	nil	-
	While disposing to sharps container	nil	-
	Cleaning	nil	-
	During instrument handling	nil	-
	Suturing	2	40%
	Surgical procedure	1	20%
others	Nil	-	
How did most recent NSI happen	Poor disposal	2	40%
	Carelessness	Nil	-
	Accidental	3	60%
	Don't remember	Nil	-
	others	Nil	-
To whom did you report	Infection Control Team	4	80%
	Casualty (CMO/Duty Docor)	1	20%
	Nobody	Nil	-
	Don't remember	Nil	-
	others	Nil	-
If not reported NSI to anyone,	Didn't think its important	Nil	-
	Didn't know where and how to register	Nil	-

what was the reason	Registration takes a lot of time	Nil	-
	Afraid to register	Nil	-
	others	Nil	-

### Discussion:-

The Centers for Disease Control and Prevention (CDC) estimates that each year 385,000 needle sticks and other sharps-related injuries are sustained by hospital-based healthcare personnel.<sup>11</sup> HCWs are most careless, as far as their health is concerned and become victims of lifestyle diseases due to their stressful schedules and high degree of professional responsibility. Needle Stick Injury is one of the hidden problems in the health care workers, thus exposed to high risk of blood borne viral infections<sup>12</sup>. The World Health Organization (WHO) estimates that 40% of the Hepatitis B and C infections and 2.5% of the HIV infections among health care workers are due to exposure at work place.<sup>20</sup> According to the World Health Organization, more than two million occupational exposures to sharp injuries occur among 35 million healthcare providers (HPs) annually. Needle stick injuries among nurses were associated with three factors: urgency, variable

Shift work, and lower skill level related to the years of experience, academic degree, and youngerage.<sup>20,21</sup>

In this study rate of NSI is 10% which are comparable to studies conducted in Saudi Arabia in 2018 (Dammam city) as 8.4%<sup>6</sup> and 2020 (Abhacity) as 11.57%<sup>5</sup>. Other than this most of the studies have higher NSI rates of 28% in Ethiopia<sup>8</sup>, 33% in Quetta, Pakistan<sup>12</sup>, 38% in Lithuania<sup>1</sup>, 57% in Iran<sup>10</sup>, 46% in Sudan<sup>2</sup>. Global pooled prevalence of NSI is estimated to be 44.5%<sup>19</sup>. Depending on the country and hospital, the incident rate ranged from 27.4% to 66.2%<sup>1</sup>.

In this study, 90% were aware of infections (HIV, HBV, HCV) transmitted by NSI which matches with the study conducted in Sudan (95%).<sup>2</sup> In this study HBV vaccination rate among HCWs is 89% which is comparable to many studies conducted in Pakistan (88% and 83%)<sup>12,13</sup>, Saudi Arabia (87.3% and 89%)<sup>5,6</sup>. But in Sudan its only 65%<sup>2</sup> and very low in Lithuania (17%)<sup>1</sup>.

I also had questionnaire regarding recent NSI, 40% occurred because of Poor handling of needles which is most common cause in many studies.

### Conclusion:-

1. NSI rate is relatively low. In this study compared to many other studies, even HBV Vaccination rate is good in our hospital. All the employees will be vaccinated very soon. To improve the knowledge, attitude and practice towards NSI repeated training with pre and post test questionnaire is very important. More knowledge is required regarding needleless safety device.
2. Occupational injury is loosely termed as NSI, it includes
3. Percutaneous injuries, e.g. needle stick injury (NSI) or other sharp injury.
4. Splash injury: Contact with the mucous membrane, non-intact skin, Contact with the intact skin when the duration is prolonged.
5. Prompt reporting to the concerned team regarding the occupational injury is very important so that post exposure prophylaxis can be taken on time.
6. Avoidance of NSI through proper education and awareness of prophylactic measures taken in response to NSI may help prevent numerous blood borne diseases among HCW

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