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RESEARCH ARTICLE

A CROSS SECTIONAL STUDY TO EVALUATE NEEDLE STICK AND SHARP INJURIES AND THEIR RELATED SAFETY MEASURES AMONG HEALTH CARE WORKERS IN SHERI- KASHMIR INSTITUTE OF MEDICAL SCIENCES, SOURA SRINAGAR J &K, INDIA

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Abstract

Background: Needle stick and sharp injuries are common in health care workers. They are always exposed to an increased risk of needle stick and sharp injury because of their competitive work environment and work related stress. They are one of the main ways of transmitting large numbers of pathogenic micro organisms in health care institutions. These injuries caused pose a risk of blood borne pathogens among health care workers. lack of knowledge regarding transmission of blood born diseases and safety measures can make the health care workers and also the patients at risk of transmission of infectious diseases like HIV, Hepatitis B and Hepatitis C. Needle stick and sharp injuries are not reported to concerned department of a hospital, hence the aim of the study was to evaluate the needle stick and sharp injuries and other related factors among health care workers in selected areas of SKIMS for effective protection.

Methods: A cross sectional study design was chosen. Sample of 120 health care workers were selected by using simple random technique. Data was collected by self structured questionnaire.

Results: It was observed that doctors have got the highest occurrence of NSI and sharp injuries (52.5%). recapping of needle (42.5%) was the most common cause for NSI among nursing staff, injection manipulating sharp in patient among doctors (32.5%), and transferring of body fluid from the syringe(35%) was found common incident in technicians. Only staff nurses (2.5%) had reported NSI to their concerned supervisors. The major reasons for not reporting NSI were increased workload(72.5% doctors , 62.5 nurses) and lack of knowledge about reporting the injuries (37.5% technicians) injuries. 65% of doctors had good knowledge regarding NSI. (55%) staff nurses had average levelof knowledge and technicians (67.5%) had poor levelof knwedge regardng NSI. Before disposing of the sharp boxes maximum doctors(20%)ensure that the box is secured and correctly assembled, staff nurses(20%) make sure that it is properly labeled before disposal and the maximum technicians(17.7%) says that before disposing of sharp box it should be locked up until it is collected. After administration of injection to patients doctors (70 %) and staff nurses (60%) destroy the needles, where as technicians (67.5%) re-sheath the needle. Doctors (27.5%) and (35%)staff nurses use gloves while separating the needle from syringe were as (30%) Of technicians

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separate needle bare handed. 70% of doctors have received vaccination in the past, of which 35%(14) of them had complete their 3doses schedule of Hepatitis B vaccine, where as 60% of staff nurses have received vaccination in the past, of which37.5%(15) had complete their hepatitis B vaccine doses and only 32.5% technicians have received vaccination of which 22.5%(9) with complete doses of vaccination. 30% of doctors, 60% staff nurse and only 27.5% of technicians have checked the antibody titers after Hepatitis B vaccination.

Conclusions: The study revealed a high prevalence of needle stick and sharp injuries. There is a need of some supportive measures such as improving injection practices, planning training programmes targeting safe handling and disposal of sharp objects and reporting of incidents to concerned authorities are essential for the effective prevention of these incidents among studied health care workers.

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Introduction:-

Occupational exposure to blood means sticking sharp objects into the body mucosa contact with blood secretions.[1] Percutaneous injury with blood and body fluids through contaminated needles and sharp and cutting tools is one of the most important occupational hazards, which is the cause of mortality and morbidity due to infection with blood transmitted pathogens among health care workers (HCWs)[2].certain work practices such as administering injections , blood sampling, recapping and disposing needles, handling trash , during the transfer of body fluid from a syringe to a specimen container are measure activities causing needle stick and sharp injuries.[3] Needle stick and sharp injuries pose the greatest risk of occupational transmission of serious blood born infections such as hepatitis B virus(HBV), hepatitis C virus(HCV) and human immunodeficiency virus (HIV) to health cae workers and patients.

According to a WHO study, the annual estimated proportions of health-care workers (HCW) exposed to blood-borne pathogens globally were 2.6% for HCV, 5.9% for HBV, and 0.5% for HIV, corresponding to about 16,000 HCV infections and 66,000 HBV infections in HCW worldwide. World Health Organization (WHO) estimates that about 3 million of HCWs are at risk of occupational exposures to blood-borne viruses each year, and 90% of these infections occur as a result of exposures in developing countries.[5] In another report, the risk of transmission through serum after a percutaneous injury with a patient with hepatitis B was reported between 6% and 30%, and depending on the HBe Ag level, it was from 1% to 3% for hepatitis C and approximately 0.3% for HIV .[6] The average risk of transmission of HIV to a health care worker after percutaneous exposure to HIV-infected blood has been estimated as 3 in 1000.[7]

The risk of exposure to NSI by HCWs varies in different section of the hospital and from one type of procedure to the other.[8] Studies have shown that injuries caused by sharp and cutting tools occur mostly among the female employees, anesthesia technicians, and surgeons, employees with long working hours, employees doing recapping tasks, those who do not wear gloves and employees not appropriately trained regarding risk procedures .[9] The most important factors involved in NSIs events are the knowledge level of blood-borne diseases and standard precautions and adherence to observe them.[10]

In the Health care sector, although nurses and doctors are more exposed to NSIs, many HCWs did not have sufficient level of knowledge to protect themselves from injury and they did not take the necessary precautions.[11]

In India, authentic data on NSI are scarce. However, several studies consistently found that a very high proportion of HCWs receive NSI while performing their work, both in India and internationally. Factors associated with an increased risk of occupational exposure of NSI differ from place to place. While developed countries are busy with designing new protective devices and improving their policies, the developing world still struggles with the lack of basic equipment, inadequate policies and poor adherence to them Many of these injuries could have been easily avoided if suitable preventive measures has been introduced earlier Knowledge on the transmission of blood borne

disease in health care facilities is very limited and unsafe practices are common. Additionally there is a lack of regulation and polices to protect health care workers from exposure.[12]

Thus, the present study aimed to determine the prevalence and factors related to NS and sharp injuries, knowledge regarding needle stick and sharp injuries ,and safety measures taken by health care workers in a tertiary care hospital SKIMS.

Objectives:-

1. To evaluate the frequency and other factors related to needle stick and sharp injuries among health care workers.
2. To assess level of knowledge regarding needle stick and sharp injuries and related safety measures among health care workers

Materials and Methods:-

This cross-sectional study was conducted from April 2018 to October 2018 among a random sample of 120 health care workers. The study inclusion criteria were only health care Workers who were at risk of NSI with at least 6 months job experience. Among 160 health care workers 120 participated in the study which consisted of 40 doctors,40 nurses, and 40 technicians and they were selected randomly using table of random numbers and interviewed using semi-structured questionnaire after obtaining proper consent. The questionnaire consisted of information related to socio-demographic variables, frequency of NSI and related factors, reporting of needle stick and sharp injuries, knowledge regarding NSI, and safety measures related to needle stick and sharp injuries. The questionnaire was distributed to study participants and the collected data was analyzed using SPSS with the help of statistical methods.

Results:-

There were 120 complete questionnaires out of the target 160 respondents. Table 1 shows the demographic profile of participants. The maximum 23(57.5) of doctors belonged to the age group of less than 30 years . The maximum 23 (57.5) staff nurses belonged to the age group of 30 to 55 years and maximum21 (52.5) technicians belonged to the age group of 30-55 years. Data presented in table 2 indicates that the proportion of male and female doctors was 55% and 45%. The proportion of male and female staff nurses was 30% and 70% while as proportion of male and female technicians was 67.5% and 32.5% respectively. Table .3 depicts that majority of the doctors and staff nurses were from intensive care units (52.5%) and (37.5%) while as majority of the technicians were from operating rooms (45%). The results shown in table 4.that working experience among doctors(52.5%) had 5-10 years, staff nurses (37.5%) had 10-15 years and and technicians (45%) had 0-5 years of experience. Data presented in table 3. Indicates.That maximum 67.5% doctors were post graduate, maximum (75%) staff nurses and (72.5%) technicians were graduate. As shown in table 6.The prevalence of needle stick and sharp injuries among health care workers was 100%. In table 7.It was observed that doctors have got the highest frequency of needle stick and sharp injuries (52.5%) followed by Technicians (15%) however it was lower among nursing staff (10%). TABLE-8 shows the most recent incident of needle stick and sharp injuries in last 12 months the findings of the present study revealed that recapping of needle (42.5%) was the most common activity responsible for needle stick injury followed by improper disposal of sharp instruments(20%) among staff nurses, injection manipulating sharp in patient was the most common procedure (32.5%) followed by recapping (25%) was found highest among doctors. The NSI caused by transferring of body fluid from the syringe(35%) was found common in technicians. According to table 9 and 10, Only staff nurses (2.5%) had reported NSI to their concerned supervisors. The major reasons for not reporting NSI were increased workload in doctors (72.5%), staff nurses (62.5%) and lack of knowledge about reporting the injuries in technicians (37.5%). Table. 11 represents level of knowedge aboutNSI among heath care workers. The table depicts that maximum doctors (65%) had good knowledge regarding NSI.maximum staff nurses (55%) had average level of knowledge regarding NSI and technicians (67.5%) had poor levelof knwedge.Maximum doctors and nurseswho had historyof needlle stick injuries knew that HIV,Hepatitis B and Hepatitis C can be transmittedthough the needle stick. Table 12 depicts, 57.5% doctors 45% staff nurses Washed injury site with disinfectant while 47.5 % technicians pressed injury site as post prophylaxis. Table 13 shows that before disposing of the sharp boxes maximum doctors(20%)ensure that the box is secured and correctly assembled, maximum staff nurses(20%) make sure that it is properly labeled before disposal and the maximum technicians(17.7%) says that before disposing of sharp box it should be locked up until it is collected and should or should wait until the next box is available. Table 14 represents that after administration of injection to patients maximum doctors (70 %) and

maximum staff nurses (60%) destroy the needles, where as maximum technicians (67.5%) re-sheath the needle after administration of injections. From the table 15 it shows that maximum doctors (27.5%)and (35%)staff nurses use gloves while separating the needle from syringe were as (30%) Of technicians separate needle bare handed. From the table 16, and 17 it is shown that 70%(28) of doctors have received vaccination in the past, of which 35%(14) of them had complete their 3 doses schedule of hepatitis B vaccine, where as 60% (24) of staff nurses have received vaccination in the past, of which37.5%(15) had complete their hepatitis B vaccine doses and only 32.5%(27) technicians have received vaccination of which 22.5%(9) with complete doses of vaccination. None of them have received Hepatitis Booster dose. From the table18 it is shown that 30% (12) of doctors have checked the antibody titers after vaccination, maximum, 60% (24) staff nurse have checked the antibody titers after vaccination and only 27.5% (11) of technicians have checked the antibody titers after Hepatitis B vaccination.

Discussion:-

Jaybhaye DR et al in their study on Needle stick injuries among health care workers in tertiary care hospital of rural India, revealed that prevalence of NSI was 49.1%, and staff nurses had highest percentage 50.0% (54), followed by resident doctors 25.9% (28) and interns 22 (20.37%). In our study followed by Technicians (15%) however it was lower among nursing staff (10%). [13]

Another study. "A study done by Sharma R et al on study of prevalence and Response to needle stick injuries among health care workers in a tertiary care hospital in Delhi, India." reported 79.5% of health care workers had needle stick injuries and 22.4% of them reported to health authority, in our study the prevalence of NSI was observed highest among doctors (52.5%). [14]

A study by Shriyan A et al in their study on incidence of occupational exposures in a tertiary health care center at Mangalore, Karnataka revealed that of the 59 who had NSI 61.1% (36) of them reported to infection control committee, 16.8% reported to the emergency room and personal physician, one of them contacted employee health officer. but in our study Only staff nurses (2.5%) had reported NSI to their concerned supervisors .[15]

Pavithran VK et al., in their study titled „knowledge, attitude, and practice of needle stick and sharps injuries among dental professionals of Bangalore, India" reported majority of them (88.0%) responded diseases like HIV, Hepatitis B and Hepatitis can be transmitted due to needle stick injuries and 79.0% of them had injuries while doing some procedure. In our study the level of knowledge among doctors (65%) had good knowledge regarding NSI.staff nurses (55%) had average levelof knowledge regarding NSI and technicians (67.5%) had poor levelof knwedge.[16]

Conclusion:-

Overall, the result of this study revealed that needle stick injury occurred at a higher rate when compared to other studies, and consequently the risk of blood-borne infection via needle stick injury might be higher. The majority of the needlestick and sharp injuries occurred among doctors, most events occurring during the recapping of used needles. improper disposal of sharp instruments among staff nurses, injection manipulating sharp in patient was the most common procedure followed by recapping among doctors. The NSI caused by transferring of body fluid from the syringe was found common in technicians. As per as the reporting of NSI is concerned,only staff nurses had reported NSI to their concerned supervisors. The major reasons for not reporting NSI were increased workload and lack of knowledge about reporting the injuries. Doctors had good knowledge regarding NSI. staff nurses had average levelofknowledge and technicians had poor levelof knwedge. doctors as well as nurseswho had historyof needlle stick injuries knew that HIV,Hepatitis B and Hepatitis C can be transmittedthough the needle stick. Before disposing of the sharp boxes maximum doctors ensured that the box is secured and correctly assembled, staff nurses made sure that it is properly labeled before disposal and the maximum technicians locked up until it is collected or waited until the next box was available. After administration of injection to patients maximum doctors and technicians re-sheath the needles and staff nurses destroyed the needles after administration of injections. Doctors and staff nurses use gloves while separating the needle from syringe were as technicians separate needle bare handed. Majority of doctors and nurses have received vaccination in the past but not completed the all three doses, majority of technicians have even not received vaccination. None of them have received Hepatitis Booster dose. Majority of health care workers have not checked the antibody titers after Hepatitis B vaccination.

Recommendations:-

The recommendations from the study are: • An on-going education programme on safe working practices including safe handling and disposal of sharp objects should be designed with periodic evaluation of such programme.

1. An administrative policy prohibiting the recapping of needles must be instituted.
2. health care workers should be involved in the evaluation and selection of an appropriate needleless safety device, training and on-going training in its appropriate use, as well as on-going evaluation of the usability and acceptability of such a device.
3. Staff members should be involved in the planning of systems to improve the reporting of needlestick injuries so that appropriate protective measures can be taken.
4. Measures should be put in place to ensure that the recommended course of hepatitis B vaccination is followed; this should include exploring how checking of antibody to hepatitis surface antigen could be made possible, and providing this at a subsidized rate should be considered, given the importance of the knowledge of one's immunity to the success of this immunization.

Part-a demografic distribution

Table 1:- Distribution of sample according to age.

Age	**Group**					
	Doctor		**Staff nurse**		**Technician**	
	NO.	%	NO.	%	NO.	%
<30	23	57.5	17	42.5	19	47.5
30-55	17	42.5	23	57.5	21	52.5
55	0	0	0	0	0	0
TOTAL	40	100	40	100	40	100

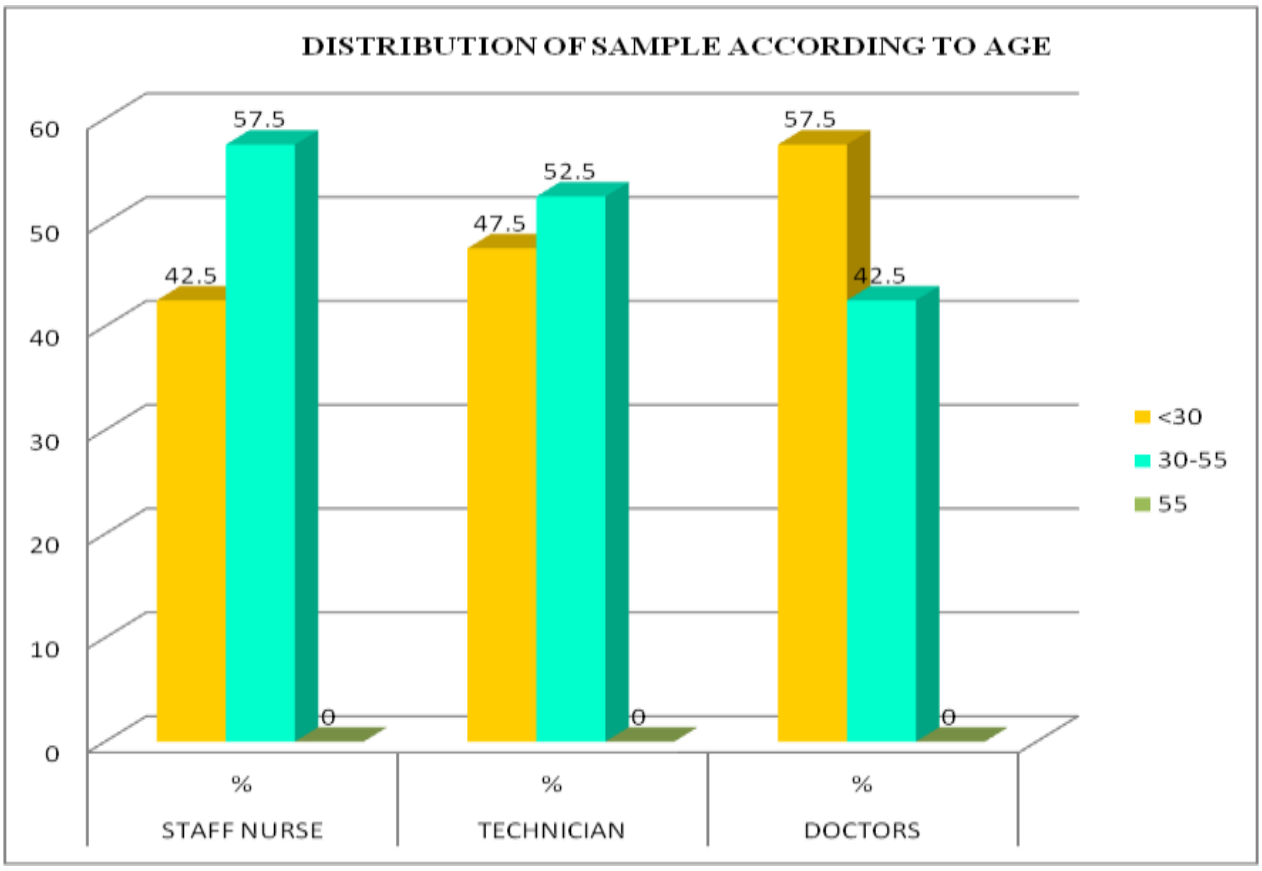


Table 2:- Distribution Of Sample According To Gender.

Gender	Group					
	Doctors		Staff nurses		Technicians	
	No.	%	No.	%	No.	%
Male	22	55	12	30	27	67.5
Female	18	45	28	70	13	32.5
Total	40	100	40	100	40	100

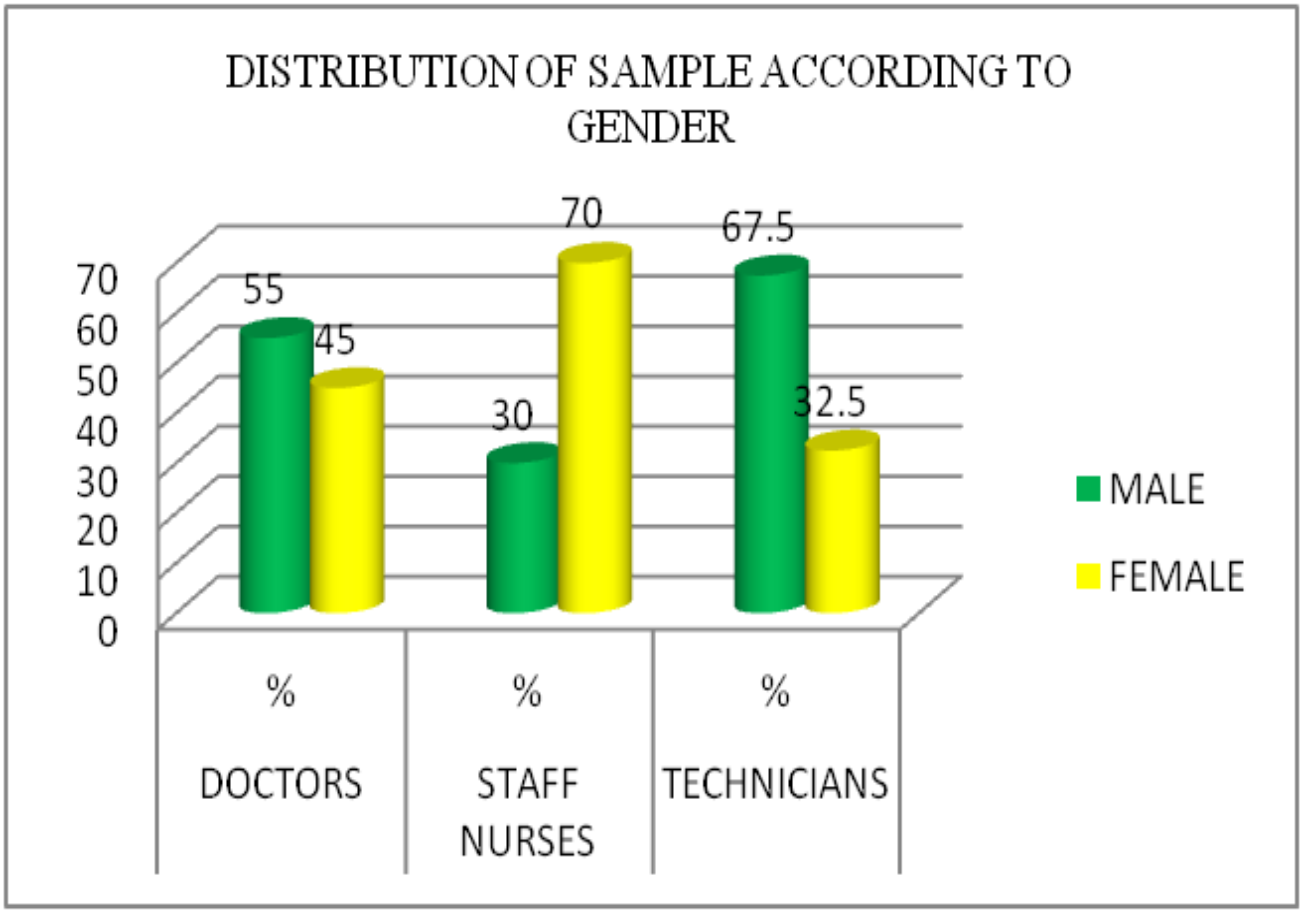
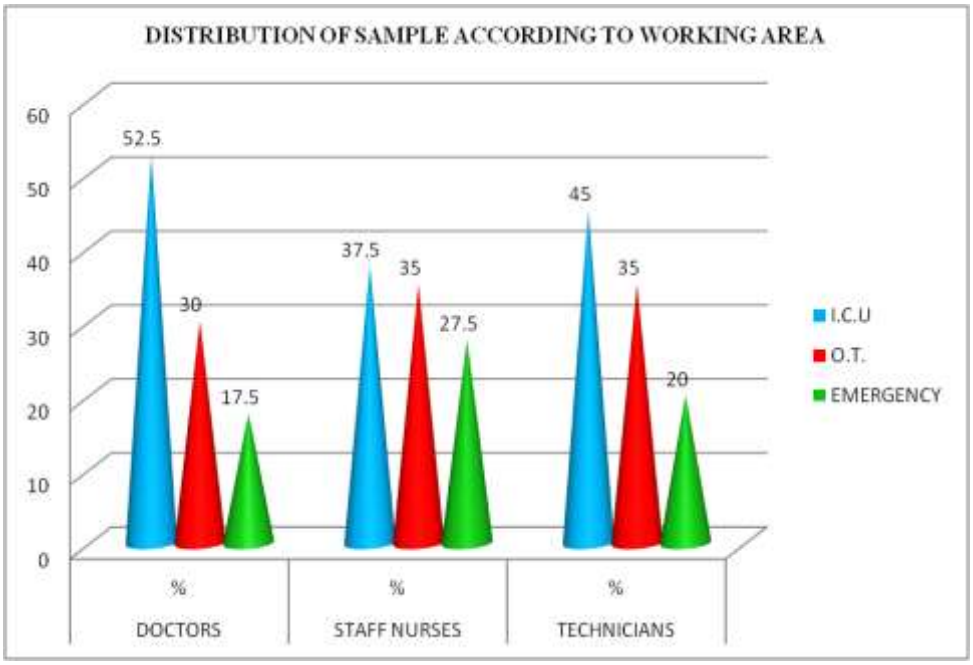


Table 3:- Distribution Of Sample According To Working Area.

Working Area	Group					
	Doctors		Staff nurses		Technicians	
	NO.	%	NO.	%	NO.	%
I.C.U	21	52.5	15	37.5	18	45
O.T.	12	30	14	35	14	35
Emergency	7	17.5	11	27.5	8	20
Total	**40**	**100**	**40**	**100**	**40**	**100**



EXPERIENCE	GROUP					
	DOCTORS		STAFF NURSES		TECHNICIANS	
	NO.	%	NO.	%	NO.	%
0-5 YR	12	30	9	22.5	18	45
5-10 YR	21	52.5	14	35	14	35
10-15 YR	7	17.5	15	37.5	7	17.5
>15 YR	0	0	2	5	1	2.5
TOTAL	**40**	**100**	**40**	**100**	**40**	**100**

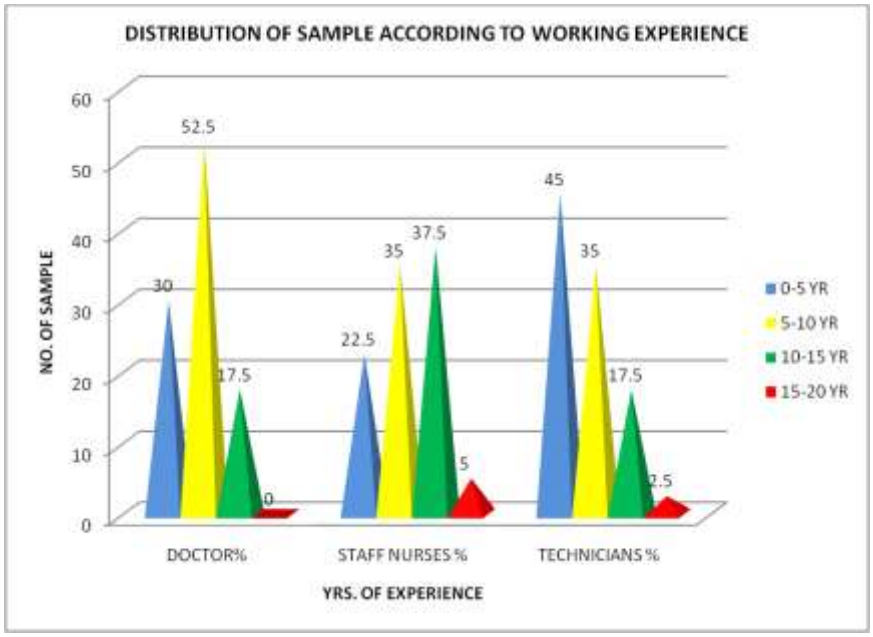
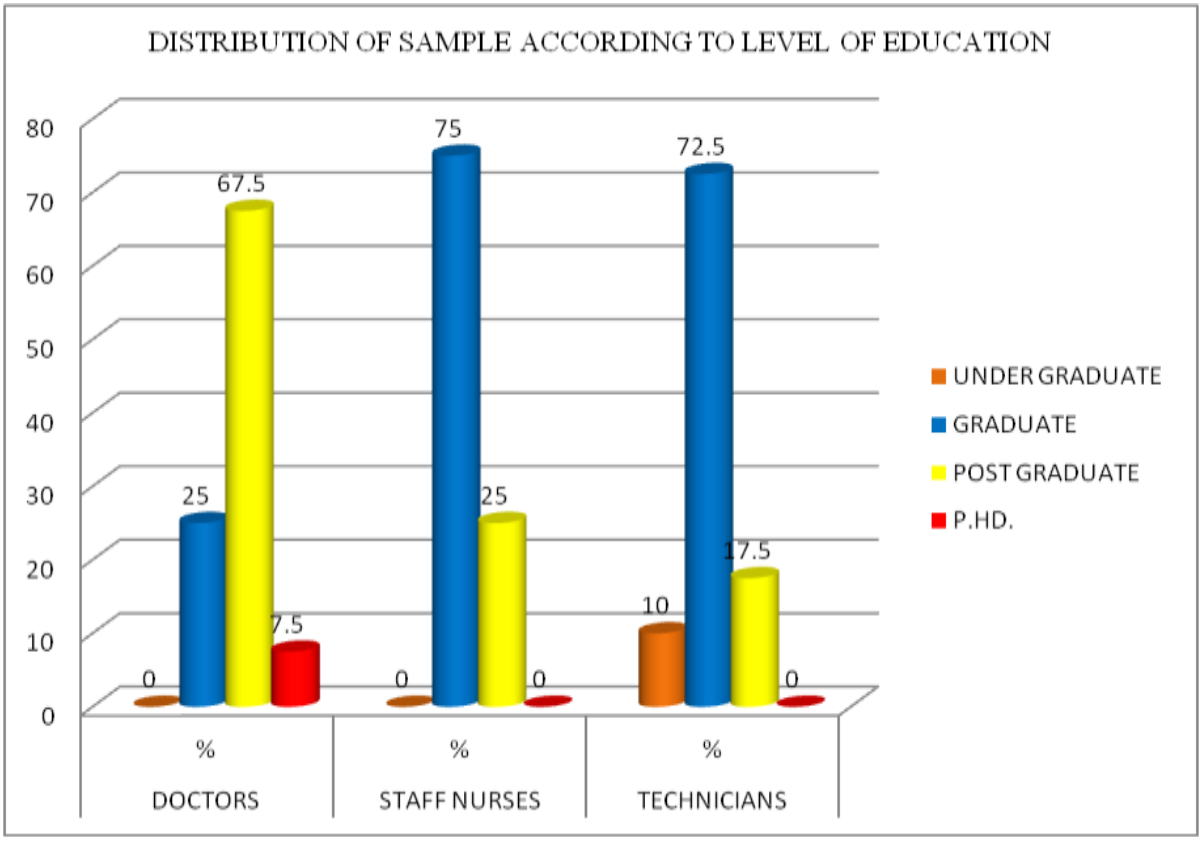


Table 4:- Distribution Of Sample According To Working Experience.

Table-5:- Distribution Of Sample According To Level Of Education.

Level of education	Group					
	Doctors		Staff nurses		Technicians	
	No.	%	No.	%	No.	%
UNDER GRADUATE	0	0	0	0	4	10
GRADUATE	10	25	30	75	29	72.5
POST GRADUATE	27	67.5	10	25	7	17.5
P.HD.	3	7.5	0	0	0	0
TOTAL	**40**	**100**	**40**	**100**	**40**	**100**



Part - ii:- The prevalence and factors related to needle stick and sharp injuries

Table-6:- Occurrence of needlestic injuries in last 12 month.

OCCURRENCE OF NSI	GROUP					
	DOCTORS		STAFF NURSES		TECHNICIANS	
	NO.	%	NO.	%	NO.	%
YES	40	100	40	100	40	100
NO	0	0	0	0	0	0
TOTAL	**40**	**100**	**40**	**100**	**40**	**100**

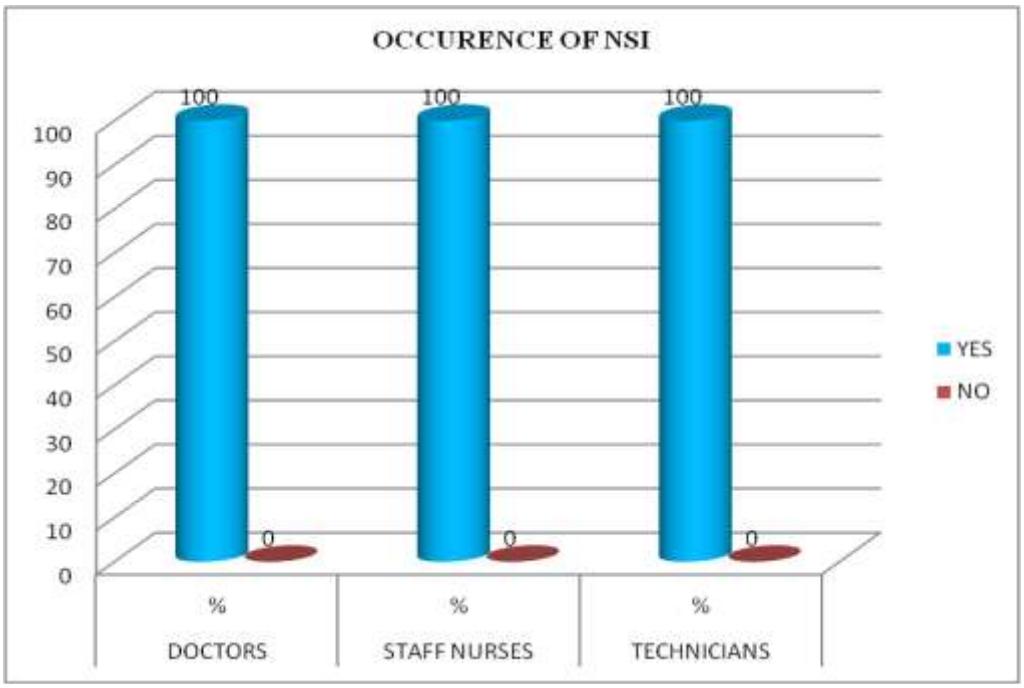


Table-7:- Frequency Of Occurrence Needlestic Injuries In Last 12 Month.

FREQUENCY OF NSI	GROUP					
	DOCTORS		STAFF NURSES		TECHNICIANS	
	NO.	%	NO.	%	NO.	%
0-1	4	10	11	27.5	26	65
1-2	8	20	22	55	5	12.5
3-4	7	17.5	3	7.5	3	7.5
>5	21	52.5	4	10	6	15
TOTAL	40	100	40	100	40	100

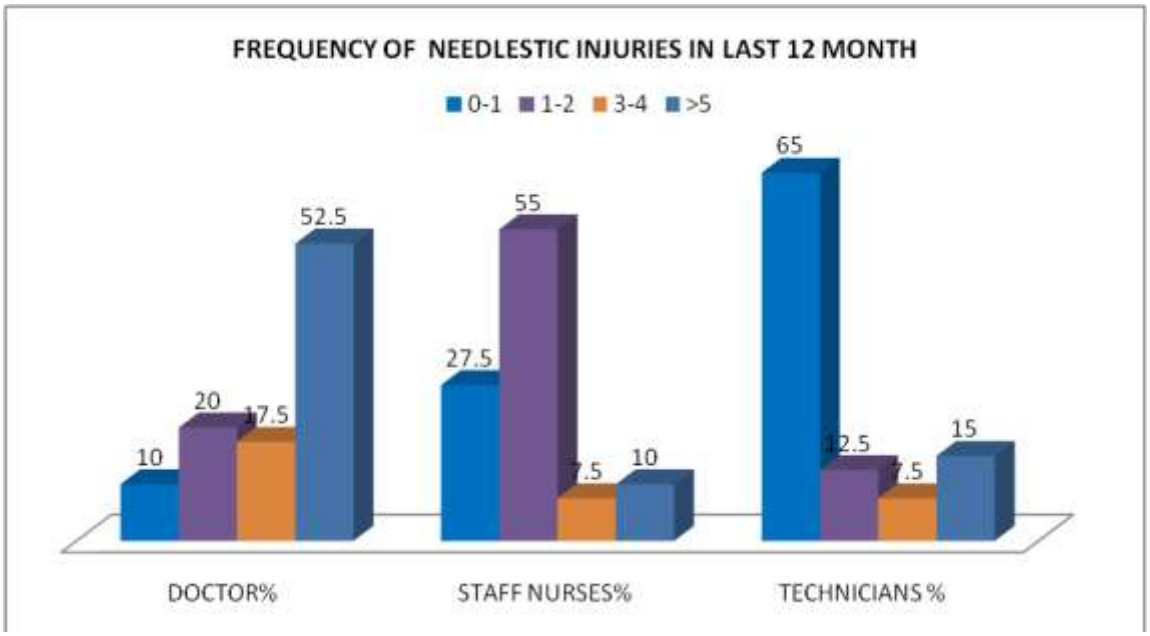


Table 8:- Most Recent Incident Happen Of Needlestic Injuries In Last 12 Month.

How the incident happen	Group					
	Doctors		Staff nurses		Technicians	
	No.	%	No.	%	No.	%
Recapping needle	10	25	17	42.5	8	20
Transferring of body fluid from the syringe	3	7.5	5	12.5	14	35
Improper disposal of sharp instruments	0	0	8	20	6	15
Transferring equipment or specimen	1	2.5	5	12.5	6	15
Setting up drugs	6	15	0	0	0	0
During stitches	7	17.5	3	7.5	0	0
During injection manipulating sharp in patient	13	32.5	2	5	6	15
Total	**40**	**100**	**40**	**100**	**40**	**100**

Table 9:- Reporting Nsi Injury.

Reporting of nsi	Group					
	Doctors		Staff nurses		Technicians	
	No.	%	No.	%	No.	%
No	40	100	39	97.5	40	100
Yes	0	0	1	2.5	0	0
Total	**40**	**100**	**40**	**100**	**40**	**100**

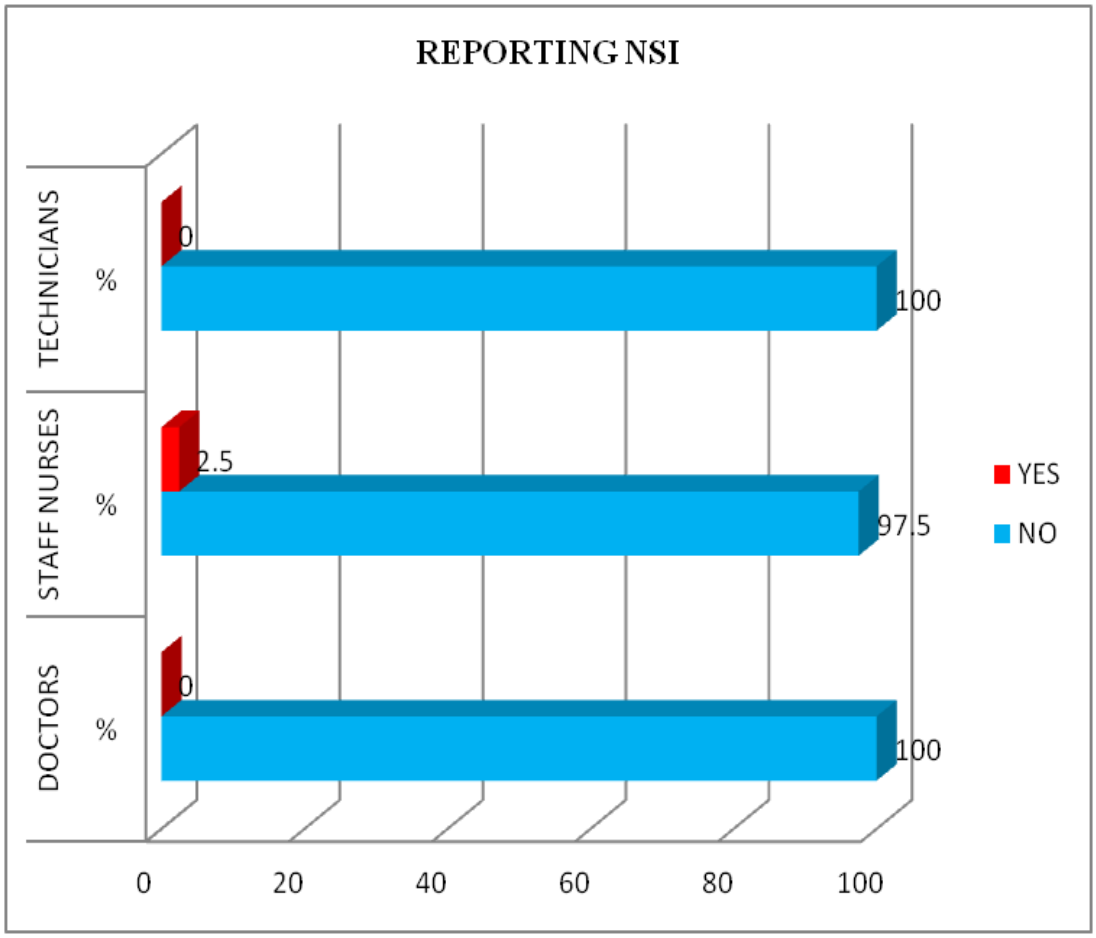
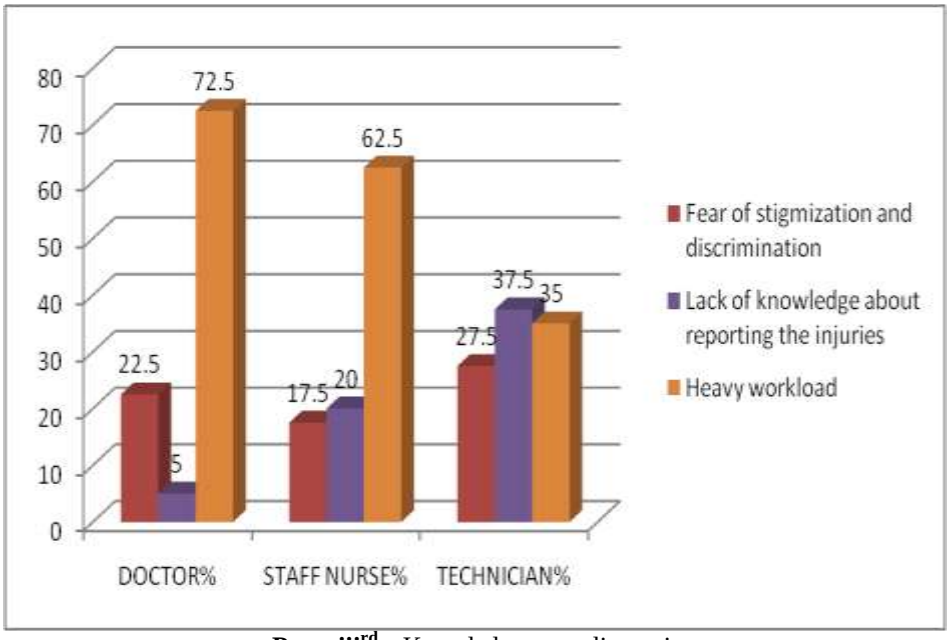


Table-10:- Reasons For Not Reporting Needle Stick And Sharp Injury.

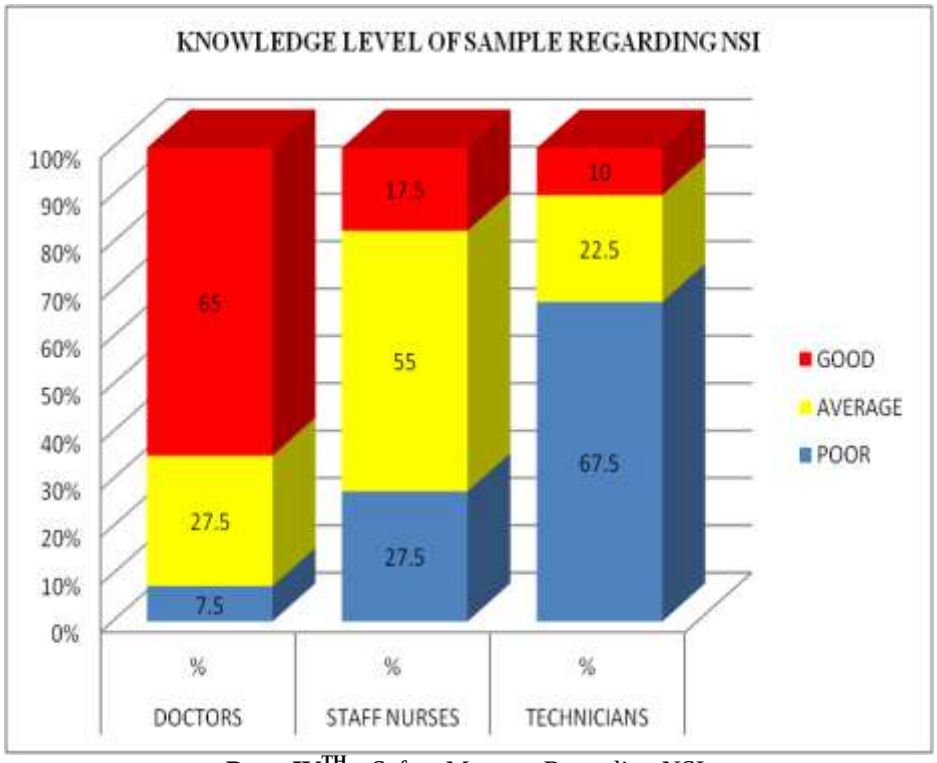
Reasons for not reporting needle stick and sharp injuries	Group					
	Doctors		Staff nurses		Technicians	
	No.	Doctor%	No.	Staff nurse%	No.	Technician%
Fear of stigmization and discrimination	9	22.5	7	17.5	11	27.5
Lack of knowledge about reporting the injuries	2	5	8	20	15	37.5
Heavy workload	29	72.5	25	62.5	14	35
Total	**40**	**100**	**40**	**100**	**40**	**100**



Part- iii[rd]:- Knowledge regarding nsi.

Table-11:- Knowledge regarding nsi.

Knowledge level				Group					
				Doctors		Staff nurses		Technicians	
				No.	%	No.	%	No.	%
Poor(0-2)				3	7.5	11	27.5	27	67.5
Averag (2-4)				11	27.5	22	55	9	22.5
Good(>4)				26	65	7	17.5	4	10
Total	**40**	**100**	**40**	**100**	**40**		**100**		



Part- IV[TH]:- Safety Measure Regarding NSI.

Table. 12:- Post prophylaxis measures done after NSI.

Post-exposure prophylactic medication	**Group**					
	Doctors		**Staff nurses**		**Technicians**	
	No.	**Doctor%**	**No.**	**Staff nurse%**	**No.**	**Technician%**
Washing injury site with soap and running water	8	20	14	35	15	37.5
Pressing injury site	9	22.5	8	20	19	47.5
Washing injury site with disinfectant	23	57.5	18	45	6	15
Total	**40**	**100**	**40**	**100**	**40**	**100**

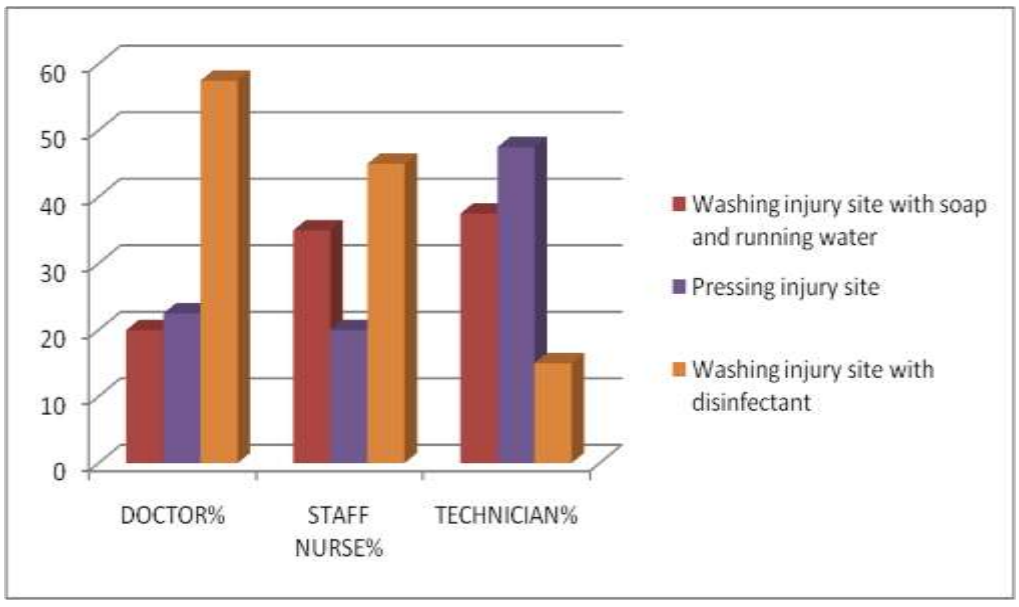


Table-13:- Activities done by health care workers with a sharps box prior to disposal.

Activities done by health care workers with a sharps box prior to disposal.	GROUP					
	DOCTORS		STAFF NURSES		TECHNICIANS	
	NO.	%	NO.	%	NO.	%
Make sure that it is properly labeled	4	10	8	20	8	20
Ensure that the box is secure and correctly assembled	17	42.5	11	27.5	5	12.5
Put it in a yellow bag	6	15	7	17.5	7	17.5
Lock it up until it is collected	6	15	10	25	8	20
Wait until the next box is available	7	17.5	4	10	12	30
TOTAL	**40**	**100**	**40**	**100**	**40**	**100**

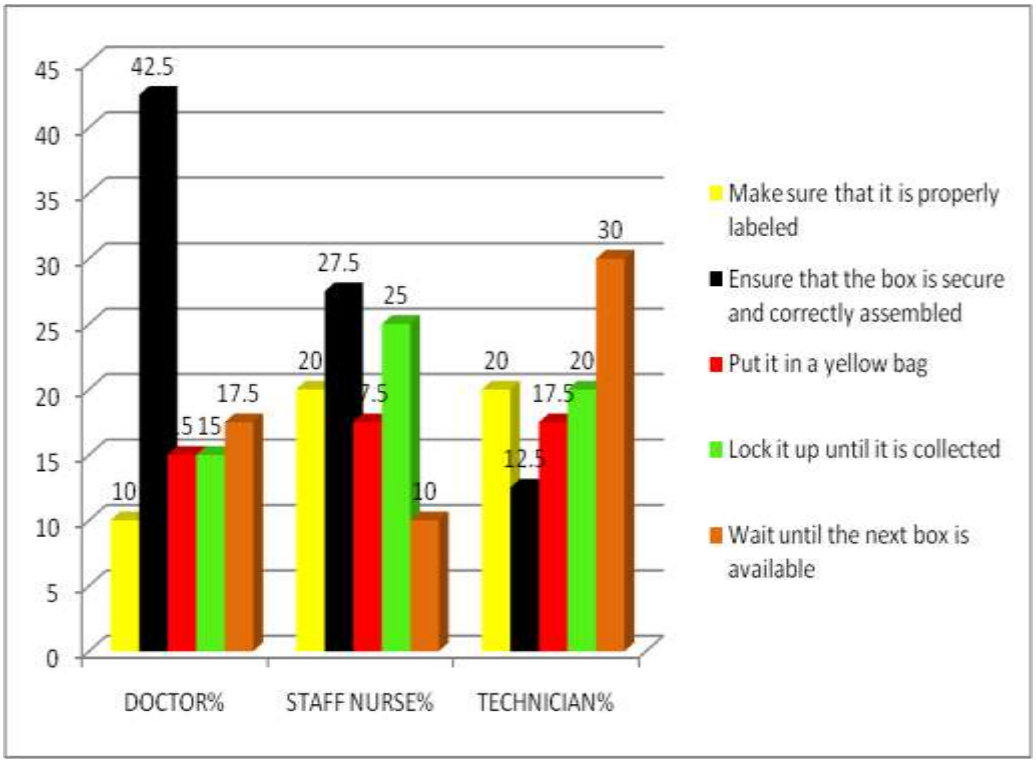


Table-14:- If you administer injections what do you do with the needle?

	Group					
	Doctors		Staff nurses		Technicians	
	No.	%	No.	%	No.	%
Re-sheath	28	70	16	40	27	67.5
Destroyed	12	30	24	60	13	32.5
Total	**40**	**100**	**40**	**100**	**40**	**100**

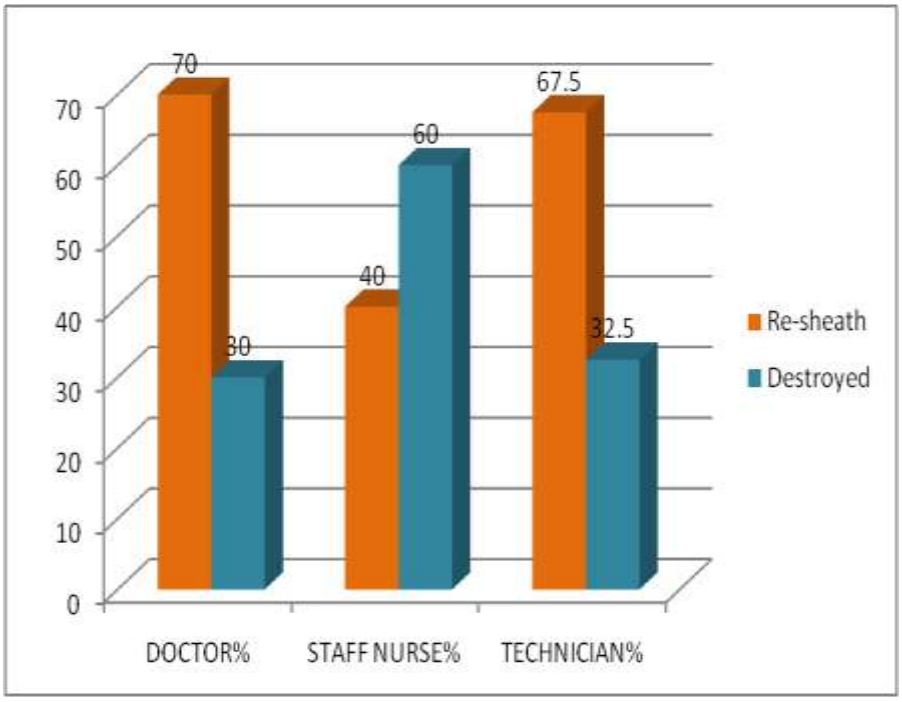


Table-15:- If you need to separate a needle from a syringe, how do you do it?

	Group					
	Doctors		Staff nurses		Technicians	
	No.	%	No.	%	No.	%
Bare hands but with great caution	7	17.5	6	15	15	37.5
Gloved hands	15	37.5	14	35	7	17.5
Forceps	11	27.5	13	32.5	7	17.5
Never separate	7	17.5	7	17.5	11	27.5
Total	**40**	**100**	**40**	**100**	**40**	**100**

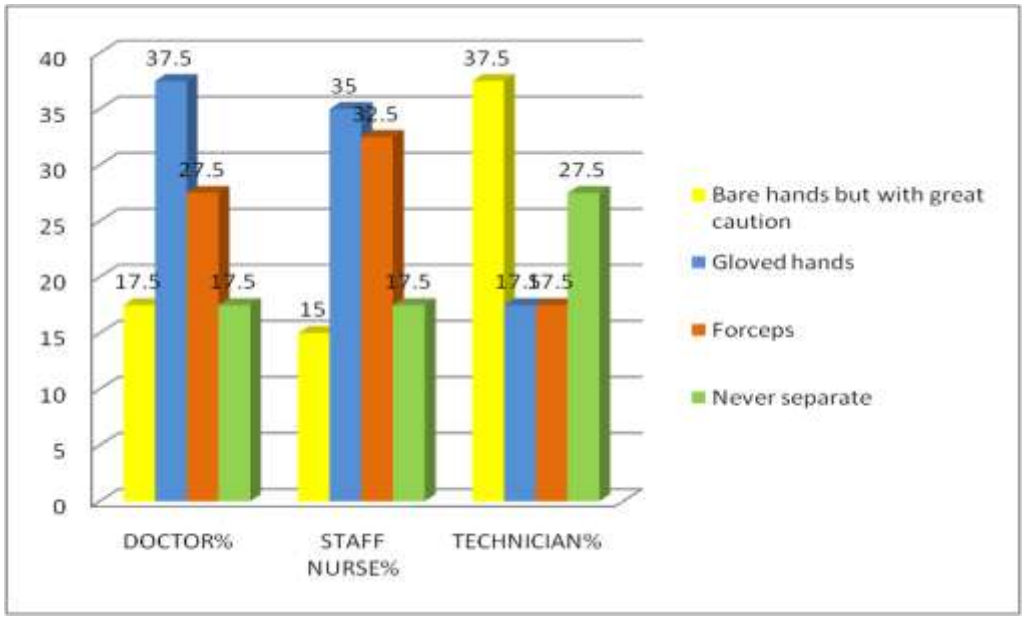


Table-16:- have you been vaccinated against hepatitis b?

	Group					
	Doctors		Staff nurses		Technicians	
	No.	%	No.	%	No.	%
Yes	28	70	24	60	13	32.5
No	12	30	16	40	27	67.5
Total	**40**	**100**	**40**	**100**	**40**	**100**

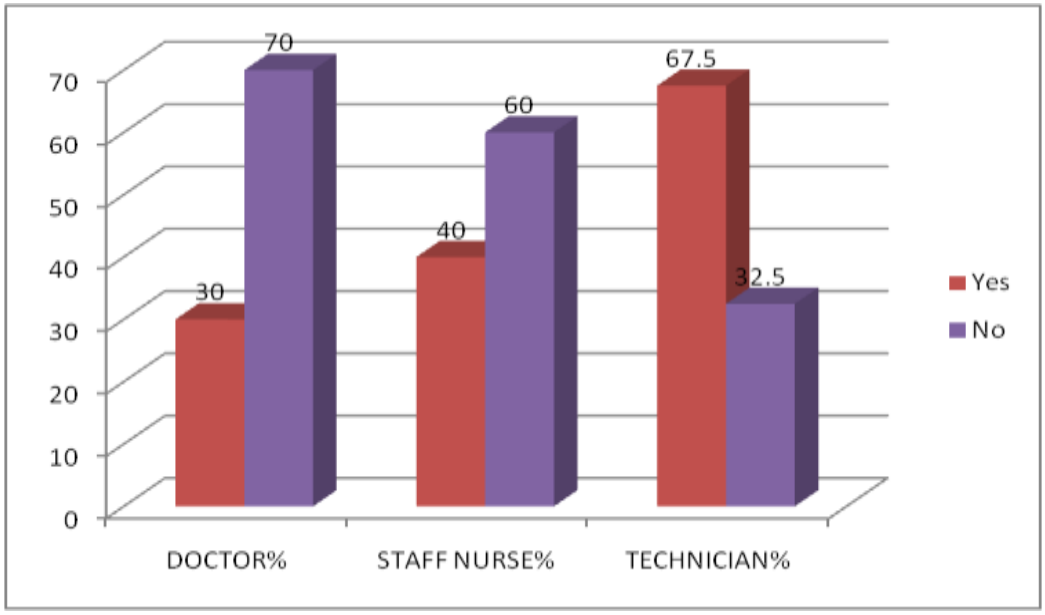


Table-17:- How Many Doses Of Hepatitis B Vaccine Have You Ever Received?

	GROUP					
	DOCTORS		STAFF NURSES		TECHNICIANS	
	NO.	%	NO.	%	NO.	%
Complete doses	14	35	15	37.5	9	22.5
Incomplete doses	19	47.5	18	45	22	55
Never received	7	17.5	7	17.5	9	22.5
TOTAL	**40**	**100**	**40**	**100**	**40**	**100**

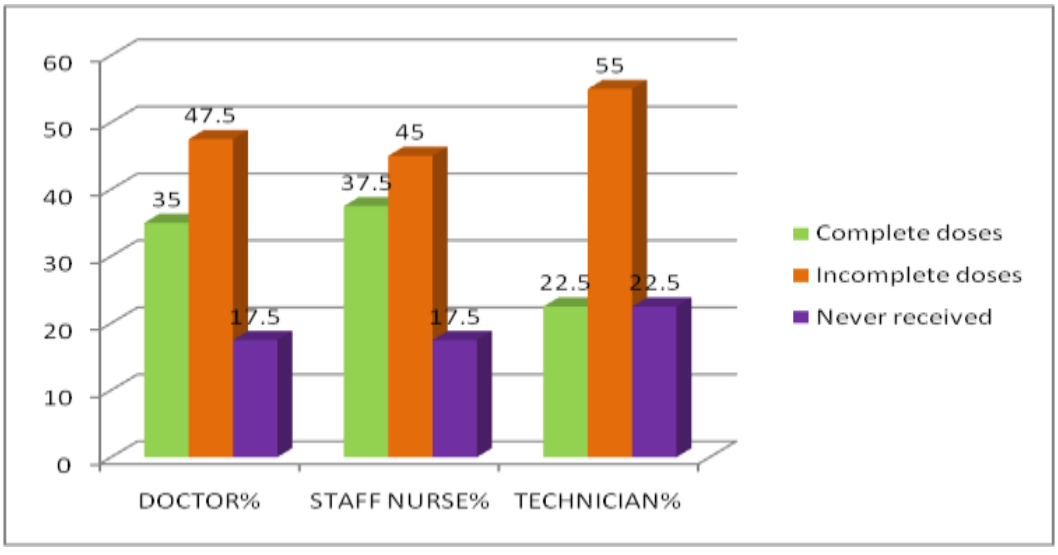
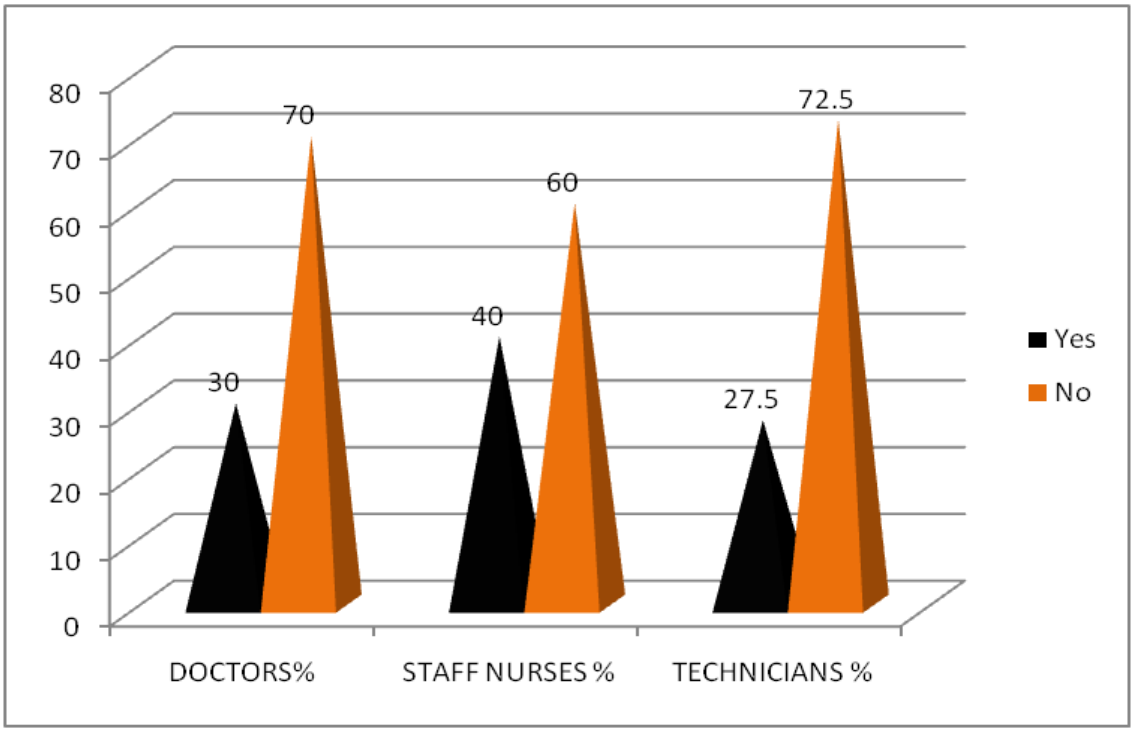


Table-18:- Have you ever checked your hepatitis b titers?

	Group					
Response	Doctors		Staff nurses		Technicians	
	No.	%	No.	%	No.	%
Yes	12	30	16	40	11	27.5
No	28	70	24	60	29	72.5
Total	**40**	**100**	**40**	**100**	**40**	**100**



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