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Research Article

**NEEDLE STICK INJURIES AMONG HEALTHCARE
PROFESSIONAL'S WORKING IN A TERTIARY CARE
HOSPITAL IN KARACHI**

¹Salimah Sohail Dossa, ²Musarrat Jehan, ³Imran Bakar, ⁴Aneel Aslam,
⁵Zameer Haider Leghari, ⁶Muhammad Adnan Kanpurwala

¹Head of Clinic Network, Sina Health Education & Welfare trust; ²Assistant professor, Department of Pathology, Jinnah Medical and Dental College, Karachi; ³Assistant Professor, Department of Pathology, Hamdard College of Medicine and Dentistry; ⁴Professor, Department of Anesthesia, Karachi Institute of Medical Sciences; ⁵Medical Officer, Department of Medicine, Lifecare Hospital. Musaffah, Abu Dhabi; ⁶Professor, Department of Physiology, Karachi Institute of Medical Sciences.

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Abstract:

Objective: To understand the knowledge of needle stick injuries and healthcare professional's practices at tertiary care hospital, Karachi. To recognize associated factors to implement a suitable action plan.

Methodology: The study was accomplished among 404 healthcare employees of tertiary care hospitals, Karachi. Data was collected by self-administered questionnaire and then analyzed through SPSS V 19.0.

Results: Out of 404 healthcare workers, 83.17% were actively involved in the act of administration any form of injection during their duties. But only 28.96% of the total population is trained and educated regarding needle stick practices ($p < 0.001$). Apart from, the study pointed out that 71.3% HCPs are not aware in the department. The policies systematized because they are actually unaware of the institutional policies and protocols for occupational health and safety ($p < 0.001$). Not only that, but 64.9% participants refused to use the universal precaution at the workplace. It is due to either lack of resources, carelessness or too much workload. 37.1% HCPs reported that sharps boxes are available all the time for their health safety ($p < 0.001$). 62.1% HCPs has sustained needle stick injuries either once or more in last 12 months. Unfortunately, 85.3% people are inoculated with Hepatitis B virus ($p < 0.001$).

Conclusion: Each organization needs to implement rules to avoid needle stick injuries. Tertiary care health staff must aware of it and responsible for health and safety of the healthcare workers. The healthcare workers must conscious about their health. Frequent trainings and education sessions, workshops or symposiums should hold to educate healthcare professionals. To evaluate competencies and effectiveness of training programs; pre and post-test must conduct to monitor the effectiveness, whereas vaccination programs must conduct for healthcare employees to protect and prevent them from health care workplace hazards.

Key Words: Health Care Professionals (HCPs), Needle Stick Injuries (NSI)

Corresponding author:

Muhammad Adnan Kanpurwala,
Professor, Department of Physiology,
Karachi Institute of Medical Sciences,
Email: drmuhammadadnan@hotmail.com, Cell: 923002364983

QR code



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INTRODUCTION:

A needle stick injury can be defined as percutaneous injury to healthcare workers by any sharp object and there is a risk to develop blood borne diseases such as (Human Immunodeficiency disorder) HIV, (Hepatitis B virus) HBV and (Hepatitis C virus) HCV. A study was conducted at tertiary care hospital of Nepal, in order to find out the information related to frequency, causes, and knowledge related to needle stick injuries [1].

Needle stick injuries are the second common incident to cause the transmission of blood borne disorders. Frequency of needle stick injuries were higher in HCWs. There is a need to report such types of incidents. Serological tests, hepatitis B vaccination and follow up after the exposure [2]. Exposure to needle stick injuries is more common among nurses and doctors in healthcare industry. Most of the employees are lack of knowledge related to such incidents and there was no precautions were taken by them. There is a need to take safety measures in order to control infections. According to the WHO report, about 4 annually in Africa and Asia are being exposed to the needle stick injury [3].

A study was conducted in Iran, showed a high frequency of needle stick injuries among nurses. Training programs, injection practices and working plan management are some of the safety measures can be taken to reduce the chances of such injuries. Among healthcare personnel, students of nursing are at higher risk of these incidents with sharps or cutting edge [4] [5]. Healthcare staff is partly responsible for safety against pathogens as they must deal sharps safely. Employer must need to provide a safe environment to staff to avoid such circumstances [6] [7].

Previous studies also pointed out that the continuing education about standard protocols to all categories of workers can help to prevent from transmission of viral pathogens [8] [9]. Most of the cases reported for NSIs for nursing personnel rather than physicians [10]. Previous study demonstrated that needle stick injuries chances can reduced with the use of safety engineered devices rather than training alone. Whereas the training combined with safety engineered devices more reduces the risk to such accidents [11, 12]. It was estimated that about 385,000 injuries by sharps happens in US a year. Sharps injuries occurs due to frequent passing of contaminated suture needles in OR. Operative Armour is the secure needle which is required to protect surgeons from NSIs [13].

Nurses and surgeons both are at higher risk to expose by blood pathogens *via* needle stick injuries. It has been identified as a significant hazard to them. As a preventive strategy, double glove perforation is the best way to protect healthcare professionals from such accidents by sharps [14]. Moreover, they do not realize the importance of using personal protective equipments. The reason of such mishandling is probably the inappropriately trained health care workers for risk control [15, 16]. The injury phase also shows that as per clinical area, specific needle injury occurs. This factor is primary to the assessment of a curriculum, to resolve the issue that a clinical set up is suitable for the learners [16].

Increased is the risk of exposure of health care professionals to micro organisms and virus that are the result of blood-borne diseases like Human Immunodeficiency Virus (HIV) and Hepatitis B and C Virus. Already the health care professionals are at a higher risk of infected due to various hospital acquired infections in which needle stick injuries also contribute a large number of infections. Apart from that many infections and injuries also go unreported in healthcare setup due to which quantifying the precise risk of disease exposure is not possible [17].

As per World Health Organization (WHO) 'a safe injection' is the one that not only take care of the five 'Rs' that are Right Medication, Right Patient, Right Dose, Right Route and Right site but it should also be safe for the recipient, the provider and the community, which means it does not harm the recipient, does not expose the provider to unavoidable health and safety risk and does not result in the waste that could jeopardize the community. It has also been reported in a study that more than 80% of the needle stick injuries can be prevented through the practicing the usage of Personal Protective Equipments (PPE) and effective safety programs. Use of 'Universal Precaution' is considered to be a preventive measure [18].

Needle Stick Injury is also very common in developing countries. A study of injection safety was held in Saudi Arabia. It has been notified that needle stick injury in the previous one year was 14.9% of physicians and 16.5% of nurses (0.21 and 0.38 injuries/person/year respectively). Furthermore, a recent survey includes 296 healthcare participants of India; 28.4% nurses, 9.1% nursing interns, 21.6% doctors and 15.9% medical interns were exposed by such injuries [18].

In addition, the reported sharps injuries were in 0.29% consultants, 24.5% trainees, 44.7% house officers and

16.3% nurses. Another study was conducted in personnel of operation room, 58.8% as more than four needle-stick injuries per year, 36.8% one to three needle-stick injuries per year, while 4.4% reported no needle-stick injury in the last five years. The focal point of injury phase is the incidence rate. The incidence rate gives an indication of the extent of needle-stick injuries. Moreover, the existence of registered nurses during sharps injuries was analyzed. It varies with the accessibility of registered nurses, because the prominence would be on supervision [18].

METHODOLOGY:

The data was collected from the healthcare staff of tertiary care hospital, Karachi who were involved in patient care after taking the informed consent with the help of a questionnaire. Ethical review board of the tertiary hospital, Karachi has checked the questionnaire to perform research & approval was given by the ERB team. All healthcare personnel of hospital of either gender and professionals who deal with the skills using the needle of any type were included in this study. Administrative staff or

physicians who were not involved in using needle/syringes in their patient care were excluded from the study. The questionnaire was distributed to all the subjects who fall in our criteria i.e. 710 participants but received back only 500 forms. Out of these, 96 forms were rejected because of incomplete data. So, sample size restricted to 404 subjects. The data has been analyzed by the use of SPSS 19.

RESULTS:

The study conducted with the aim to study and understand the needle stick injuries and practices of healthcare professionals at a tertiary care hospital. Table 1 depicts the general information of 404 participants involved in the study including 61.62 % nursing staff inclusive of trainee nurses and midwives, and 27.96% were doctors (consultants and house officers). The rest were ancillary staff. Out of these, majority of participants were female around 66% and 34% were males. As most of the participants were mature adults, 47.3% of the participants have work experience of 2 to 4 years.

Table 1: Demographic Data

Variable (n=404)	Frequency	Percentage
Age in Years		
18-24 Years	100	24.80%
25-30 Years	210	52.00%
More than 30 Years	94	23.30%
Gender		
Female	269	66.60%
Male	135	33.40%
Job category		
Consultant	36	8.91%
House Officers	77	19.05%
Nursing Staff	179	44.30%
Trainee Nurses & Midwife	70	17.32%
Others	42	10.39%
Length of service in years (Study Hospital)		
0-2 years	151	37.40%
2-4 Years	191	47.30%
4-6 Years	36	8.90%
> 06 years	26	6.40%

Table 2 represents a concise reflection of the study in terms to determine the incident and evaluate the action towards reporting NSI amongst healthcare workers. 83.17% of the total population reported that they have been involved in the administration of injections of any form during their duties in healthcare setup, whereas, 88.61% participated in removal and disposal of needles and sharps. It has been revealed that still around 88.30% healthcare professional involves in the

practices of recapping the needles. The possible factor for needle stick injuries at a tertiary care hospital in last 12 months is around 62.10%. Out of 62.10%; 33.4% were injured twice or more than that. Out of 62.10% HCPs, only 16.3% reported to either line manager, occupational therapist, or infection control nurse, whereas, 37.90% cases left unreported and 45.79% HCPs do not remember that they were reported or not.

Table 2: To determine the incidence & to evaluate the action taken towards to reporting of needle stick injuries amongst healthcare workers

Variables (n=404)	Yes	No	Don't Know/Don't Remember
Administration of injections during work	83.17%	16.83%	0%
Assistance in Removal of Needle	88.61%	11.39%	0%
Recapping Needles	88.30%	11.60%	0%
Sustained any NSI during 12 months	62.10%	37.90%	0%
More than 2 Injuries in 12 Months	33.4%	28.7%	37.9%
Incident form filled	16.3%	37.90%	45.79%

Table 3 highlights the healthcare professionals with no knowledge regarding needle stick injuries. Only 28.7% people are aware about the organizational/hospital policies related to "Health and Safety". Moreover, only a minimal percentage of people that is 35.10% were following Personal Protective

Equipment. Only 37.10% HCPs reported the presence of sharps boxes in the clinical area at the time of needle stick injury. Whereas, 37.62% people were confused at the time of an incident that they do not know whether there was a danger box or not.

Table 3: To understand the knowledge, practice, skills and attitudes of Healthcare Professionals towards needle stick injuries.

Variables (n=404)	Yes	No	Don't Know / Others
Knowing Hospital policies	28.70%	71.30%	0
Following Universal precautions (Following complete PPE)	35.10%	64.90%	0
Sharp Box placed in clinical Area	37.10%	25.20%	37.62%
Incident Report to Infection Control Dept	15.3%	53.7%	30.9%
Received training in the prevention and/or treatment of needle stick injury	29.0%	71%	0
Read any copy of the hospital's "Health and Safety Policy", on the safe and ethical disposal of clinical wastes during the last two years	35.1%	64.9%	0
How Many staff has been immunized with HEP B vaccine	75%	11.1%	13.9%

Table 4 encompasses a cross tabulation of demographics with needle stick injuries. It mentions the following facts: majority was nursing staff 63.7% that sustained needle stick injuries in the last year. Out of total population, needle stick injuries were sustained in last year for 9.5% among 12 to 24 years of age, 70.1% among 25 to 30 years and 13.1% was present in

>30 years of age. On gender basis, female sustained more injuries than male staff i.e. 59.7%. By concerning the age with years of experience, it is evident that as majority of the population sustained needle stick injuries were around 25 to 30 years. The study also proved that 52.9% people had healthcare experience between 2 to 6 years.

Table 4: Association of NSI with demographic factors

Those who have sustained any Needle Stick Injury during the last 12 months? (n=274)	YES %	NO %	P.Value
Job category			
Consultant	4.7%	15.6%	p < 0.001
House Officers	24.7%	9.8%	
Nursing Staff	43%	46.4%	
Trainee Nurses & Midwife (waiting for Result)	20.7%	11.7%	
Others	6.6%	16.3%	
Age in Years			
18-24 Years	9.5%	37.9%	p < 0.001
25-30 Years	70.1%	22.2%	
More than 30 Years	13.1%	39.8%	
Gender			
Female	59.7%	77.7%	p < 0.001
Male	40.3%	22.3%	
Years of Experience			
0 - 2 Years	42.6%	28.7%	p < 0.001
2 - 4 Years	40.6%	58.1%	
4 - 6 Years	12.3%	3.2%	
More than 6 Years	4.3%	9.8%	

Table 5 demonstrates a concise view which indicates that needle stick injuries sustained due to the lack of knowledge, practices, and policies of people. Hence, it shows that only 26.2% people who sustained injuries, filled forms for incidents. Majority of them about 73.7% HCPs were not recorded but at least reported

injuries to the management. Unfortunately, only 25.4% HCPs who sustained needle stick injuries were trained. Only 32.6% out of the total population, sustained needle stick injuries were conscious about policies of organization.

Table 5: Knowledge, attitude and practices related to NSI

Variables (n=404)	YES %	NO %
Knowledge of filling incident form	26.2%	60.5%
Practice of reporting the injury	73.7%	26.2%
Training	25.4%	74.5%
Policies	32.6%	67.3%

DISCUSSION:

Our study showed that a lack of knowledge and practices are insecure for nurses as compare to other HCWs in a tertiary healthcare hospital; where the study was conducted. Our findings demonstrated that, nurses are not following the protocols during their clinical practices such as disposal of sharps in danger box. In the tertiary healthcare hospital, all HCWs deal sharp needles and intervenes medication. Needle stick injuries are higher among nurses as compare to others.

Previously, a cross-sectional study was published from Aga Khan University and hospital, where the author reported that NSI cases are high among doctors. Out of the total 80 workers, it has been reported that 36 (45%) had a needle stick injury once during their clinical practices and the frequency was considerably higher among doctors (72%) as compared to nurses

(29%) (OR = 6.3; p<0.001). It has been identified that nurses higher comparatively doctors which is 73% vs. 38%. It was informed by the infection control office within 24 hours of injury (OR = 4.5; p=0.037) [18].

Remarkably, our study revealed a lack of resource at healthcare organization, because only 37.10% HCPs reported the presence of sharps boxes in the clinical area at the time of needle stick injury. Whereas, 37.62% people were confused at the time of an incident that they do not know whether there was a danger box or not. Inquiry related to trainings received in prevention and/or treatment of needle stick injuries, only 29% people were reported positively. Whereas, in last two years, only 35.1% people from a tertiary care hospital has studied "Health and Safety Policy" regarding safe and ethical disposal of sharps.

In 2008, during the period of January to May, a study was conducted in two tertiary care hospitals of Karachi. It has been represented that public and private sectors where that frequency of NSIs was about 64%. The study was based on female participants (64.2%) and practitioners of medical units (62%). On the whole, 29.6% HCWs were in practice for more than five years while there was an insignificant predominance of nurses (52.7%) comparatively doctors (47.3%) [19].

Previous study showed that 720 (78.3%) HCWs completed the questionnaire. There were total 919 HCWs. There was variation in the response rate about 82.2% in surgery and 66.7% in gynecology. In general, 31.4% (n = 226/720) respondents experience an incident of needle stick injury at least once in the last one year. The number of needle stick injuries per person and year varied significantly from 1 to 55. The highest number of incidents occurred in surgeons. In occupational groups, especially physicians are on the highest possible rate of being injured by sharps. 55.1% (n = 129/234) of physicians and nurses with 22.0% (n = 90/410) accounted for such incidents in last 12 months [19].

According to our findings, majority was nursing staff about 63.7%; sustained needle stick injuries in the last year. Out of total population, needle stick injuries were sustained in last year for 9.5% among 12 to 24 years of age, 70.1% among 25 to 30 years and 13.1% was present in >30 years of age. On gender basis, female sustained more injuries than male staff i.e. 59.7%. By concerning the age with years of experience, it is evident that as majority of the population sustained needle stick injuries were around 25 to 30 years.

Healthcare workers (both male and female) from two tertiary care hospital in India were participated in the research. The old study duration was July to September 2007. Total 428 HCWs were involved in the study and out of which 80.1% experienced the needle stick injury. Nurses were at the higher risk (100%). The commonest clinical activity causes the needle stick injury was blood withdrawal (55%) and needle recapping (39%). 9 HCW were pricked with contaminated needle of HIV positive patient. Out of 9 HCW, 3 were diagnosed with HIV after repeated test over the 3 months and after that completed a full course of ART drugs [20].

According to our findings, 251 HCWs with history of needle stick injury out of 404. The higher ratio was in females. Our findings also identified the chances of NSI are more by needle recapping (88.33%). The

possible factor for needle stick injuries at a tertiary care hospital in last 12 months is around 62.10%. Out of 62.10%; 33.4% were injured twice or more than that.

CONCLUSION:

In a nut shell, needle stick injuries are common amongst healthcare professionals and are the leading occupational health hazards. Health of each employee in healthcare industry is important such as administrative, philanthropists, think tanks and other workers. The policy of development and awareness through education, training and organizational efforts must be done to minimize this hazard. In conclusion, according to the study, there is a need of educating HCW for prevention of NSI and maintenance of protocol for NSI.

RECOMMENDATIONS:

The research draws attention towards the needs of healthcare professionals. The main aim of the research was to control infection. Needle stick injury is so common in healthcare setup that there is a special need to upgrade healthcare professional's trainings; refresh their knowledge, frequent screening, vaccination, and importance of reporting incidence. According to the Occupational Safety and Health Act (1970), health, safety and medical benefits are need to be provided to health care providers working as a employee at tertiary care setup.

LIMITATIONS:

The study aimed to understand knowledge and practices of healthcare professionals towards needle stick injuries and to emphasize on an act of infection control. The study was successfully conducted with certain limitations. The toughest part was to gather participants and to enroll them in the study. Once questionnaires were distributed among the participants many of them did not respond. The critical condition of the city gave us a hard time in gathering responses from different tertiary care hospitals. Moreover, the time of the study was short as we know that tertiary care setting is a busy and crowded setup for all healthcare professionals.

Furthermore, a study depicted the present situation but not the past status such as the actual educational level of nurse participant was questionable. Because it was the randomized data; equal number of doctors, nurses, and other paramedical staff were not taken. Electronic and light shutdowns were also a huge hindrance.

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