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Knowledge, attitude and prevalence of needle stick injuries and practise of post-exposure prophylaxis among health care workers in a teaching hospital in Chennai

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ABSTRACT

Context

Needle-stick Injuries are a major occupational risk factor in spread of blood-borne diseases among healthcare workers. The most significant blood-borne diseases are HIV-AIDS, Hepatitis-B and Hepatitis-C.

Purpose

This study was aimed to measure the prevalence of needlestick injuries in a population of nurses, and knowledge about, attitude towards and practice of post-exposure prophylaxis measures with regards to needlestick injuries.

Settings, design

This is a cross-sectional descriptive study conducted in a private tertiary-care teaching hospital over a period of January to March in the year 2019.

Methods

A sample size of 364 was taken, consisting of nurses. They were selected by convenient sampling of the the hospital in which the study was conducted. They were tested with a predesigned semi-structured questionnaire, and their answers were documented.

Results

Of the 364 nurses who were part of the study, 36 of them admitted to have suffered from a needlestick injury at some point in their careers, of which 8 were injured in the last 6 months. 93.4% of the studied population had been vaccinated against hepatitis B. Only 164 (45.05%) were aware of the correct protocol for filling of the sharps box. Quite a good number of the participants were aware of the importance of Post-exposure prophylaxis in needlestick injuries and 97% were able to name at least one major blood-borne disease. Their knowledge regarding postexposure prophylaxis is moderately adequate.

Conclusions

Needlestick injuries are commonly seen in nurses, and a large number of them were aware of the health hazards and diseases spread through these injuries. All the nurses were aware of postexposure prophylaxis. Only 83% of nurses were aware of the proper protocol for filling of sharps boxes. There is a need for more frequent reinforcement of guidelines for sharps disposal.

Keywords: Needle stick injuries, post exposure prophylaxis, Health care workers.

INTRODUCTION

Needlestick injuries are defined as a "percutaneous exposure where the skin is breached by a needle or any sharp object contaminated by blood or other body fluid due to accidental pricks." [14]

Needlestick injuries are one of the most pervasive problems in healthcare industry. According to WHO World Health Report 2002 [18], of the approximately 35 million health workers worldwide, 2 million experience percutaneous exposure to infectious disease every year. Exposures at work are attributable for 40% of the Hepatitis B and C infections and 2.5% of HIV-AIDS infections among healthcare workers.

Blood borne diseases are those that are transmitted through contact of an injured skin or mucous membrane with an infected person's blood or body fluids. All healthcare workers suffer high levels of occupational exposure to blood-borne diseases. There exist more than 20 blood-borne illnesses, but the most important of these communicable diseases are the Acquired Immunodeficiency Syndrome (AIDS), Hepatitis B and Hepatitis C, all of which are majorly blood-borne. Again, the WHO Report notes that 37.6% of Hepatitis B, 39% of Hepatitis C and 4.4% of HIV/AIDS in healthcare workers are due to needlestick injuries.

Exposures to needle stick injures are often considered to be an expected hazard of the job, for all healthcare workers [11, 4]. Studies show that nurses are among those with the highest levels of exposure to needlestick injuries among healthcare workers [6], including half of all exposures in the US [2] and almost 70% of the injuries in Canada [10].

Awareness and knowledge of needlestick injuries and the diseases that can be so transmitted have been found inadequate in surveys of the same [5]. Only 4% and 61% of healthcare workers were aware that Hepatitis B and C, respectively, could be transmitted by needlestick injury. Other studies [7] have shown, however, that awareness of exposure to Hepatitis B in nurses to be significantly higher.

The risk of transmission of blood- and fluid-borne diseases is due to several factors, mainly including type of needle, overuse of injections, behaviour related to recapping of needles, lack of awareness of the hazard and training, and unsafe collection and disposal of sharps waste. [13]

The study aims to assess the prevalence of needle stick injury among health workers, mainly nurses, in a semi-rural tertiary care hospital and their knowledge of and attitude towards post-exposure prophylaxis with regards to needlestick injuries.

Studies done in India on needlestick injuries are few, and most are done in specific sectors of the health care industry with a very limited study population [14] done in an ophthalmology OT). As a result, more studies must be done in larger institutions comprising of a larger number of nurses in a larger selection of departments.

MATERIALS AND METHODS

Study design

The study was an Institutional based, descriptive, cross-sectional study.

Study setting

The study was undertaken in a tertiary care teaching hospital in Chennai.

Study period

The study was conducted over a period of three months from January to March in the year 2019.

Study subjects

The study consists of the population of nurses working in a tertiary care hospital in Chennai. This was because nurses are those individuals who handle sharps and infective material most often in their line of work.

Sample size calculation

A minimum sample size of 360 samples was calculated using a single population proportion formula by assuming 20% relative error and a confidence interval of 95%.

Sampling technique

The subjects were selected according to convenient sampling technique.

Inclusion criteria

Nurses working in the institution in which the survey was done and were available during the visit were included in the survey.

Exclusion criteria

Nurses that refused to fill in the questionnaire were not included in the survey.

Data collection method and Study tool

The study was conducted using a self-administered, predesigned, pre-validated, semi-structured questionnaire. It contained a total of 36 questions. The knowledge of the participants on needlestick injuries, diseases caused and the management of the injuries was graded by 13 questions, on a scale of 0 to 16.

Ethical clearance

The ethical clearance was approved by the Institutional Review Board (IRB) of the institution in which the study took place. All the study participants were informed about the objective and importance of the study. Written informed consent was obtained from all the participants aged 18 and older.

RESULTS

Socio-demographic characteristics

A total of 364 nurses took part in this study. They ranged in age from 18 to 37, and had worked in the institution for a period between 2 weeks and 7 years and had a total work experience ranging from 1 month to 15 years as nurses.

Prevalence of needlestick injury

Out of the 364 participants, 36 (9.8%) of them admitted to suffering from at least 1 needlestick injury at some point in their career. Of these, 8 of them suffered the injury in the last 6 months. All of them reported the injury immediately and sought treatment for the injury.

Table 1: Prevalence of needlestick injury among the studied population of nurses

Total number of participants	Number that suffered injuries	Percentage	Suffered injury in the last 6 months	Percentage	Percentage that sought treatment among injured
364	36	9.8%	8	2.2%	100%

Prevalence of vaccination

More than 90% were fully vaccinated according to the schedule, and 93.4 % were vaccinated against hepatitis B.

Table 2: Prevalence of vaccination in the studied population of nurses

Vaccination	Number of participants	Percentage of participants
Fully vaccinated	332	91.20%
Not fully vaccinated	12	3.30%
Uncertain	20	5.50%
Total	364	100%

Knowledge

Of the 364 participants, 108 (29.67%) of them had a moderate knowledge (scored between 8 and 12), and 256 (70.33%) had a high knowledge (scored between 12 and 16) about needlestick injuries, diseases transmitted and the management of the injuries.

Table 3: Knowledge of the study population on needlestick injury, diseases transmitted by such injuries and management.

Grading	Number of participants	Percentage
0-4	0	0%
4-8	0	0%
8-12	108	29.67%
12-16	256	70.33%

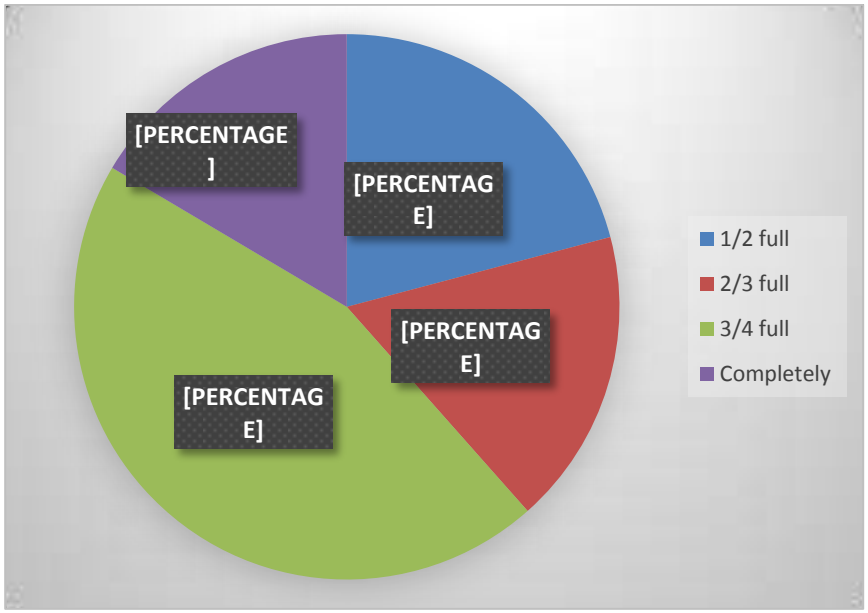
Knowledge of needle disposal

In regards to disposal of needles in the container, 76 (20.87%) said the container must be ½ filled before disposal, 64 (17.58%) said the container must be 2/3 filled before disposal, 164 (45.05%) said the container must be ¾ filled before disposal, and 60 (16.48%) said the container must be completely filled before disposal.

Table 4: Knowledge of the study population about proper protocol for level of filling of disposed needles in sharps containers

Level to which the container can be filled prior to disposal	Number	Percentage
1/2 filled	76	20.87%
2/3 filled	64	17.58%
3/4 filled	164	45.05%
Completely filled	60	16.48%

Chart 1



Analysis of the knowledge of protocol of disposal of needles against years of experience

When the number of years of experience that a nurse has is analysed against their knowledge as to the level that a sharps box is to be filled before disposal according to guidelines, it is found that the majority of participants (164 of 364, or 45%) answered that the container must be ¾ filled before disposal. Of these, the largest number of responses came from this who had a work experience between 1 and 5 years.

Table 5: Analysis of knowledge of level of filling of sharps container against total years of work experience

Years of experience	Level of filling of the sharps container				
	Half filled	Two thirds filled	Three quarters filled	Completely filled	Total
<1 year	20	8	28	20	76
1-5 years	44	52	124	20	240
6-10 years	8	4	8	16	36
>10 years	4	0	4	4	12
Total	76	64	164	60	364

Years of experience vs separation of needle

When the number of years that a nurse has been working in their career is analysed against their knowledge of protocol for separation of needle from a syringe, it is found that the vast majority of participants (340 of 364, or 93.4%) answered that the needle and syringe should be separated only while wearing gloves. Of these, the largest number have an average of 1 to 5 years of work experience.

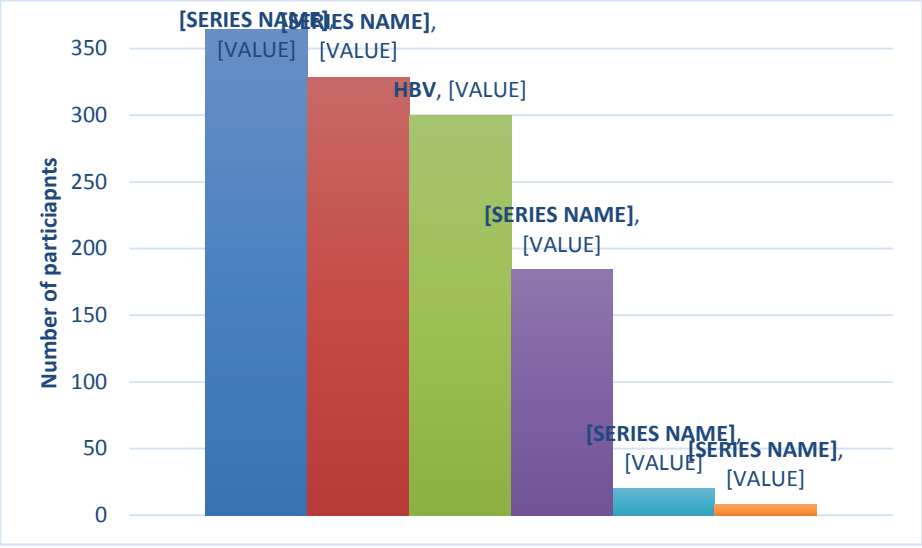
Table 6: Analysis of knowledge of protocol of separation of needles from syringes against number of years of work experience

Years of experience	Protocol for separation of needle from syringe				
	Separate using bare hands	Separate while wearing gloves	Never separate	Separate using forceps	Total
<1 year	4	64	4	4	76
1-5 years	4	228	4	4	240
6-10 years	0	36	0	0	36
>10 years	0	12	0	0	12
Total	8	340	8	8	364

Knowledge about blood-borne diseases

When asked about the diseases that are blood-borne, 328 (90.1%) named HIV/AIDS, 300 (82.41%) named Hepatitis B, 184 (50.5%) said Hepatitis C, 20 (5.4%) said Diabetes mellitus, and 8 (2.1%) named allergies as being blood-borne conditions. Smaller numbers named H1N1 and cancer as blood borne.

Chart 2



Attitude towards needlestick injury

Of all the nurses who were interviewed, 4.3% stated that they would not take Post-Exposure Prophylaxis in cases of needlestick injuries in which the blood status of the patient is unknown, 4.3 % stated that they would take prophylaxis if advised, and 91.2% stated that they would start a course of prophylaxis.

If the test results of the patient were negative, 43.9% stated that they would not take prophylaxis and 56% stated that they would take prophylaxis, after a needlestick injury.

Practice after needlestick injury

All the nurses interviewed who had been injured in the last 6 months reported their injury either immediately or at the end of their shifts to the occupational health manager (25%) or the infection control department (50%). The rest (25%) had reported the injury to friends and not any official person. Very few had any working knowledge of the drugs used in Post-Exposure Prophylaxis for HIV.

The nurses that had been injured more than 6 months before reported the injury either immediately or at the end of their shifts but did not recall to whom they had reported.

Table 7:Reporting officer

Reported to	Number of nurses	Percentage of nurses
Occupational Health manager	4	25%
Infection control department	8	50%
Non-official person	4	25%

Table 8 : Years of experience

Years of experience	Reporting of injury
<1 year	8
1-5 years	4
6-10 years	4
>10 years	0
Total	16

Other analyses

The number of injuries sustained by the participants was compared against whether or not they assisted with administering injections to patients, and it was found that 360 had assisted in administration of injections, but only 36 (10%) of them had been injured.

The number of injuries sustained by the participants was compared against whether the participants recapped needles after use or not, and it was found that 32 of the 36 that were injured belonged to the 352 participants that do not recap used needles.

DISCUSSION

The current study aimed to address the attitude of the healthcare worker to a needlestick injury, and their likelihood to report the injury and obtain prophylaxis for the injury. Nurses are the most common sufferers of needlestick injuries [6] in the health sector due mostly to increased exposure to needles. The major factors contributing to injuries are fatigue, long working hours, recapping needles after use, and lack of proper hazard and awareness training [13].

The prevalence of needlestick injuries was found to be 9.8% for at least one injury in their career, of which 2.19% suffered injuries within the last 6 months. This is much lower than Sardesai et al ' s [15] observation who found a prevalence of 45% in their careers and Sharma et al (16) who found 79.5% in their career and 22.4% in the last month and more recently Kebede [7] who found a self-reported rate of 34.5% in the last year. It is possible that this difference could be due to an unwillingness of the questioned nurses to admit to injuries, or could be due to them forgetting past incidents of injury. It could also be due to differences in the ages of nurses working in the different institution, as nurses who have worked for longer periods may be exposed for a longer period to needles than younger nurses.

All the nurses interviewed who had been injured reported their injury either immediately or at the end of their shifts to the occupational health manager (25%) or the infection control department (50%). The rest (25%) had reported the injury to friends and not any official person. This is similar to studies by Konlan et al (8), in which many (69.4%) agreed on reporting the incident as early as possible and Mbaisi [9] in which 52.5% reported the incidence of percutaneous injury. Very few had any working knowledge of the drugs used in Post-Exposure Prophylaxis for HIV according to Bamford et al [1]. It is noted in other studies that this is due to either a lack of awareness of the significance of early reporting of injuries for effective prophylaxis, or a lack of trust in the healthcare system. Very few had any working knowledge of the drugs used in Post-Exposure Prophylaxis for HIV according to Bamford et al [1].

Studies show that around 90% of vaccinations in healthy individuals produce immunity against hepatitis B (17), and is the surest way at the moment of becoming immune. More than 90% of those questioned had been fully vaccinated, and 93.4% had been vaccinated at least once against hepatitis B. this is found to be much higher than Konlan's report [8] which found only 44.4% had been vaccinated against hepatitis B.

Most of those questioned named HIV/AIDS (90.1%) and Hepatitis B (82.41%) as blood-borne, and about half (50.5%) named Hepatitis C as blood-borne. This is similar to Gurubacharya from Nepal who reported that 4% of nurses as being unaware that Hepatitis B and Hepatitis C were blood-borne.

According to current protocols [3], sharps containers must be no more than 3/4th full at the time of disposal, which was known by 83.43% of the nurses interviewed. 16.48% said that the sharps container must be disposed of when completely full. All of the nurses interviewed disposed of needles in the sharps box. Most of them were able to answer correctly the colour of the box and all were of the location of the box in their wards. In the study by Konlan et al [8], 2.8% of nurses disposed of needles in the dustbin instead of the recommended sharps box.

Only very few nurses (3.29%) recapped needles after use. This is much lower than Phukan's report [12] in which 67% of nurses recapped their needles and Konlan et al's report [8] in which 38.9% of Nurses recapped needles after use before disposal. WHO guidelines recommend that needles not be re-capped, bent or dissembled, and must always be disposed of in hard plastic safety boxes.

CONCLUSION

Needlestick injuries are commonly seen in nurses, and a large number of them were aware of the health hazards and diseases spread through these injuries. All the nurses were aware of postexposure prophylaxis. Only 83% of nurses were aware of the proper protocol for filling of sharps boxes. There is a need for more frequent reinforcement of guidelines for sharps disposal.

Recommendations

More comprehensive, more regular modules, seminars and other forms of education

Limitations of the study

The study is limited to a single tertiary care hospital in a limited region. Only the nurses in the institution were interviewed, who form only part of the total population of healthcare workers in any institution.

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