

# Planned Teaching v/s Self Instructional Booklet on Knowledge & Practice of Prevention & Post Exposure Prophylaxis of NST

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**Abstract:** A needle stick injury can expose health worker to number of blood borne diseases that can cause serious or fatal infections. The pathogens that pose the most serious health risks are Hepatitis B virus, Hepatitis C virus & human immunodeficiency virus. Therefore preventing needle stick injury is essential to protect health care workers from infection. Needle stick injuries are common among health workers, especially nurses, while giving injections, transferring a body fluid between containers using needle & syringe and also while disposing the used needles. **Methodology:** Research design: experimental two group pre test and post test designed. **Setting of study:** urban health centers from randomly selected municipal corporations. **Population:** nurses working at selected urban health centers. **Sample size:** forty. **Sample techniques:** Non probability convenient sampling in randomly selected Municipal Corporation. The various findings of the study show that, the knowledge and practices of nurses regarding prevention and post exposure prophylaxis of needle stick injury have improved through teaching. Analysis of data showed that there was significant difference between pre and post tests of both interventions and planned teaching is significantly effective to that of self instructional booklet on knowledge and practices of nurses.

**Keywords:** Needle stick injury, Prevention, Pre-exposure prophylaxis

## 1. Introduction

A needle stick injury can expose health worker to number of blood borne diseases that can cause serious or fatal infections. The pathogens that pose the most serious health risks are Hepatitis B virus, Hepatitis C virus & human immunodeficiency virus. Therefore preventing needle stick injury is essential to protect health care workers from infection.

Needle stick injuries are common among health workers, especially nurses, while giving injections, transferring a body fluid between containers using needle & syringe and also while disposing the used needles.

Needle stick injury may expose the health care worker to HIV infection, which through progressive destruction of immune cell [CD 4cells], leads to AIDS. Opportunistic infections, specific malignancies, etc. are part of a complex case definition which comprises the AIDS.

Hepatitis B & C are also other fatal infections which can be prevented by following the universal precautions & infection control measures strictly.

## 2. Literature Review

The investigator probed into available sources from printed material and internet i.e. books, journals, Fact sheets, CDCs and modules, news and event's reports. This chapter deals with selected reviews, which are related to objectives of the proposed study. The review of literature is carried out under following headings -

- 1) Epidemiology of needle stick injury.
- 2) Hazards of needle stick injury.
- 3) Factors increasing risk of needle stick injury.
- 4) Procedures increasing risk of needle stick injury.

- 5) Prevention of needle stick injury and knowledge, practices and attitude of health care workers about it.
- 6) Post exposure prophylaxis of needle stick injury and knowledge, practices and attitude of health care workers about it.
- 7) Interventions to improve knowledge, practices and attitude of health care workers about prevention and PEP of needle stick injury.
- 8) International efforts for needle stick prevention: Act and group ( ISIPS ).

Polit D and Beck (2009) "A review of literature is written summary of the state of existing knowledge on research problem. The task of reviewing of research literature involves the identification, selection, critical analysis and written description of existing information on a topic.12

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## Epidemiology of Needle Stick Injury

Rajasekaran M, Sivagananam G, Thirumalaikolundusubramanian P, Namasivayam K, Ravindranath C., While studying injection practices in southern part of India, found that per capita injection rate was 2.4 per year. The ratio of therapeutic to immunization injection was 6.5:1. The proportion of injections given with disposable syringe and needle was 35.4%.[36] Stein AD & Makarawo TP in survey at Birmingham, UK found thirty seven percent of respondents reported they had suffered a needle stick injury with a used needle. [39] Whitby RM in his survey found 1836 "dirty" NSI reported, most were sustained in nursing staff (66.2 %) and medical staff ( 16.8 %).[13]

A report on injection practices in India, submitted to ministry of India in February, shows in March 2000, it was estimated that 0.6 to 0.8 million needle stick injuries and other per-cutaneous injuries occur annually among health care workers.[42]

Jayanath ST, Kirupakaran H, Brahmadathan KN, Gnanaraj L, Kang G from Christian medical college, Vellore found that, in period of one year ( July 2006- June 2007 ), the 296 HCWs reporting Needle stick injuries were 84 ( 28.4% ) nurses, 27 ( 9.1 % ) nursing interns, 45 ( 15.6 % ) cleaning staff,[64] (21.6 %) doctors, 47 (15.9 %) medical interns and 24 (8.1 %) technicians.[28]

Makary MA, Al-Attar A, Holzmüller CG. from Baltimore, USA found that, 83 % of surgeons in training at 17 medical centers had a needle stick injury during training. By the end of final year of their training, 99 % of residents had needle stick injury. Out of it 53 % had involved a high risk patient.

51 % of needle stick injuries were not reported to an employee health services and lack of time was the reason given by 42 % of them.[31]

Wood AJ, Nadershahi NA from San Francisco, USA found that among the students of dental schools female students reported more needle stick injuries and fear of injury than did male students. It is hypothesized that a personal interpretation of the meaning of clinical injuries influences reporting behavior.[43]

Hsieh WB, Chiu NC, Huang FY from Taiwan during analyzing reported BBF (blood and infectious body fluid) exposures from January 2001 to December 2003 found that needle stick injuries were the most commonly reported BBF exposure, accounting for 80 % of reported cases. The total density of BBF exposures were 1.96 per 100 person-years. Interns had highest total incidence density of BBF exposure ( 4.48 % per 100 person-years ) and technicians had lowest total incidence density of BBF exposure ( 0.50 % per 100 person-years ) BBF exposures were most common in December and least common in September. Nurses had highest percentage 60.6 % of BBF exposure and other job categories including physicians, technicians, cleaning staff and interns accounted for around 10 % each. Injuries occurred most commonly during day time (57 %) [26]

Askarian M, Malekmakan L from Iran, administered questionnaire to medical, dental, nursing and midwifery students, found that 71.1 % of the respondent had needle stick injuries out of it 43.6 % occurred in patient rooms. 82 % of NSIs were not reported.[17]

## Hazards of Needle Stick Injuries

Joint commission resources, Jcaho. Infection prevention and control: current research and practice. Medical; (2007) Accidental puncture by contaminated needles can inject hazardous fluids into the body through skin. There is potential for injection of hazardous drugs, but injection of infectious fluids, especially blood, is by far the greatest concern. Even small amounts of infectious fluid can spread certain diseases effectively.[11]

NOISH CDC Alert: publication no 2000-108, has published the list of total 17 blood borne diseases. Further it states that, Needle stick injuries have transmitted many other diseases involving viruses, bacteria, fungi and other microorganisms to health care workers, laboratory researchers and veterinarian staff.[49]

ILO-CIS bulletin (1993) At least 1 ml of blood is thought to be required to cause infection in case of HIV, whereas HBV - which is much sturdier than HIV, and the circulating titer is also high - it is estimated that 0.00004 ml of blood may be enough to cause an infection as a result of needle stick injury.

Many of the diseases were transmitted in rare, isolated events. They still demonstrate, however, that needle stick injuries can have serious consequences. Staff reductions where nurses, laboratory personnel and students assume additional duties. Difficult patient care situations. Working at night with reduced lighting. Staff Experience. New staff or students tend to have more needle stick injuries than experienced staff.[54]

A Mehata and his group found at Hinduja Hospital, Mumbai, since 1998 to 2003 total 380 HCWs were reported needle stick injuries. 45% were nurses.[16].

Langgartner J, Audebert F, Scholmerich J reported that in March 1999, a medical student at University of Regensburg, Germany; got infection of dengue through needle stick injury.[29]

Wanchu A, Singh S, Bamberg P, Varma S from Chandigarh reported possible occupationally acquired infection in two Indian health care workers.[41]

## Factors Increasing Risk of Needle Stick Injuries

INC Fact Sheet (2000) A needle stick injury is the result of an accident with a needle. Several studies show that needles cause injuries at every stage of their use, disassembly, or disposal. But there is disagreement as to why the accidents are so common among health care workers or why simple solutions fail to solve the problem.[47]

NOISH CDC Alert: Nursing and laboratory staff usually experience, 30 to 50 percent of all injuries, during clinical procedures. Equipment design, nature of the procedure, condition of work, staff experience, recapping and disposal have all been mentioned as factors that influence that occurrence. 33% were attendants, 11% were doctors and 11% were the technicians.[49]

ANA surveyed more than 700 nurses in 2008 found the 89% of nurses say increasing workloads and workplace stress level impact workplace safety. 59% say when pressure mounts, they feel to work faster, even if it means taking shortcuts. Result of survey underscore the reality of nurses 82% are stereotypical self-sacrificing nature, puts patient care first before their own personal safety at work.[37]

Jayanth ST, Kirupakaran H, Brahmadathan KN, Gnanaraj L, Kang G found that among the staff who had NSIs, 49.7 % had a work experience of less than one year. Recapping of needles caused 8.5 % and other improper disposal of sharps resulted in 18.6 %.[28]

Ayas NT, Barger LK, Cade BE during their study found that lapse in concentration and fatigue were the two most commonly reported contributing factors (64 % and 31% of injuries, respectively). Percutaneous injuries were more frequent during extended work compared to non-extended work. Extended work injuries occurred after a mean of 29.1 consecutive work hours; non-extended work injuries occurred after a mean of 6.1 consecutive work hours. Injuries were more frequent during the night time than during the day. [18]

Nsubuga FM, Jaakkola MS from Birmingham, UK studied NSIs among nurses in Sub-Saharan Africa. In this study multiple logistic regression analysis showed that the most important risk factor for NSIs was lack of training on such injuries. Other important risk factors included working for more than 40 hr / week, recapping needles and not using gloves when handling needles.[35]

Clarke SP, Rockett DM, Aiken LH examined practice pattern and organizational characteristics related to needle stick injury, researchers surveyed 2287 nurses in 22 hospitals, found fewer years of experience, frequent performance of vein-puncture, and recent adding of phlebotomy or intravenous responsibilities because of changing staffing patterns increased risk of injury, as did a high reported work load and low level of administrative support for nursing.[24]

Shio JS and group found NIS during internship was reported by 61.9% of 708 student respondents, of whom, 14.2% made a formal report. Vaccination against hepatitis B virus was lacking in 47.6% of students.[38]

### **Procedures Increasing Risk Of Needle Stick Injuries**

William Charney, Guy Fragla in their book „The Epidemic of Healthcare Worker Injury: an Epidemiology. states that, critical situations during clinical procedures include: Withdrawing a needle from a patient, especially if staff attend to bleeding patients while disposing of the needle.

Having the device jarred by a patient. Pulling a needle out of the rubber stopper of a vacuum tube which can jab the hand in a rebound reflex. Injuries commonly occur when workers try to do several things at the same time, especially while disassembling or disposing of needles.[14]

A Mehta, C Rodrigue, S Ghag from Mumbai, India found that, most needle stick injuries occurred during intravenous line insertion ( N =112), followed by blood collection(N = 69), recapping needles (N =36).[16]

Chanda DO from Department of community medicine, Lusaca, found 59 out of 100 interviewees sustained needle stick injuries within the year. Injuries were common among those who recap needles. 14 out of 18 doctors and 12 out of 20 nurses who recap needles sustained needle stick injuries.[53]

William N Roth, Steven B Markowitz Recapping can account for 25 to 30 percent of all needle stick injuries of nursing and laboratory staff. Often, it is the single most common cause. It is extremely dangerous to hold a needle in one hand and attempt to cover it with a small cap held in the other hand. Injuries occur three different ways:

- 1) The needle misses the cap and accidentally enters the hand holding it.
- 2) The needle pierces the cap and enters the hand holding it.
- 3) The poorly fitting cap slips off of a recapped needle stabs the hand.[15]

Joyce W Hopp, Elizabeth A Rogers: Several agencies have recommended that workers avoid recapping needles before disassembly or disposal. Despite this, some health care workers have continued the practice even when informed of the dangers. In some cases, inappropriate training or force of habit may be responsible. In a recent study, however, workers gave the following reasons for recapping despite knowing about the potential hazards:

- \* To protect themselves when disassembling a non-disposable needle device with an exposed contaminated needle.
- \* To protect themselves from exposed needles when several items were carried to a disposal box in a single trip.
- \* To store a syringe safely between uses if its contents were to be administered in two or more doses at different times.
- \* To protect other people in crowded conditions on the way to the disposal box.

Guidelines from the Laboratory Center for Disease Control recommend that workers do not recap (or bend or cut) needles but dispose of them directly into approved, puncture-proof containers.[10]

Chanda DO, in international conference on AIDS, presented report saying 48 out of 67 recap needles, 14 out of 18 doctors & 12 out of 20 nurses who recap needles sustained NSI.[53]

Dr. Neera Kewalramani : Needle stick injuries commonly occur when workers dispose of needles. They occur when staff use special containers for needles and sharps. They also occur when needles are disposed of improperly in regular garbage or lost in the workplace. Up to 30 percent of needle

stick injuries of nursing and laboratory staff occur when workers attempt to dispose of needles using sharps containers.

Accidents occur at every step:

- While carrying the needle to the disposal container, especially when needle is uncapped and mixed with other trash.
- While placing the needle into the disposal container. Especially if the container is overfilled.
- While emptying disposal containers instead of sealing them for disposal.
- Improper Disposal.

Virtually all needle stick injuries of domestic and porter staff are from needles that have either been lost in the workplace or thrown into regular garbage.

Janitors and garbage handlers can also experience needle stick injuries or cuts from “sharps” when handing trash that contains needles or scalpels. Most investigators find it difficult to understand why this situation occurs. Some attribute the problem to forgetfulness or lack of motivation or training on the part of people who work with and dispose of needles. Others feel that inconvenient disposal systems contribute to these incidents.[48]

Chanda DO found 13 out of 33 porters & maids sustained injuries with needles and blades.[53]

Bennett G, Man sell I, while surveying found majority of community nurses reported compliance with universal precautions, although small number of nurses stated that they re-sheathed needles, inappropriately stored sharps containers, inadequately wore gloves and experienced difficulty in hand washing. Maintenance staff has also experienced needle stick injuries when they have been cleaning ducts or other areas with their hands and have found hidden needles and syringes. These injuries have usually happened when they are reaching into areas where they cannot see and were not wearing leather gloves.[20]

#### PREVENTION OF NEEDLE STICK INJURY AND KNOWLEDGE, PRACTICES AND ATTITUDE OF HEALTH CARE WORKERS ABOUT IT.

Preventing needle stick injuries is the most effective way to protect workers from the infectious diseases that needle stick accidents transmit.[57]

NOISH CDC Alert: Comprehensive needles stick injury prevention program would include:

1. Employee training
2. Recommended guidelines.
3. Safe recapping procedures.
4. Effective disposal systems.
5. Surveillance programs.
6. Improved equipment design.

#### Employee Training

To reduce needle stick injuries, an effective program must include employee training. Workers need to know how to properly use, assemble, and disassemble and dispose of needles. Workers need to understand the risks associated

with needle stick injuries and know the proper means to prevent them.

Specifically, the training programs should address:

- Risk of injury.
- Potential hazards.
- Recommend precautions for use and disposal of needles.
- Procedures for reporting injuries.

The importance of hepatitis B vaccination where appropriate.

#### Recommended guidelines.[49]

Aziz AM, Aston H: An audit of sharps management was undertaken to observe equipment, practice and awareness. Infection control team as a result of audit implemented an action plan and set a plan for training and awareness. It further recommends to have routinely audit of sharp management.[19]

The Laboratory Center for Disease Control's Bureau of Communicable Disease Epidemiology reviews, publishes, and updates guidelines to protect staff from exposure to all blood-borne disease-causing agents.

The following guidelines deal specifically with needle safety:

Needles, scalpel blades and other sharp instruments--workers should consider these as potentially infectious and handle them with care to prevent accidental injuries.

Disposable needles and syringes, scalpel blades, and other sharp items--workers should place these in puncture-resistant containers located near the area of use.

They should avoid overfilling the containers because accidental needle stick injuries may occur.

Recapping--Workers should not recap needles by hand or purposely bend, break, or remove them from disposable syringes or otherwise manipulate them by hand.

#### Safe Recapping Procedures

In situations where recapping is considered necessary, develop safe approaches which workers can follow.

Workers should never move an exposed needle tip towards an unprotected hand.

- Single-Handed Scooping.  
Recapping can be safe when people lay the cap on a flat surface and scoop it onto the tip of a syringe held in one hand. They must keep the free hand away from the sheath and behind the exposed needle.
- Recapping Devices.  
Several devices are available for recapping needles safely. Some devices permit single-handed recapping by parking a needle cap on a flat surface.
- Other devices are designed to protect the hand that holds the cap during two-handed recapping procedures. As yet, most products have not received independent testing and the two-handed recapping process remains a cause for concern. Recapping devices require further investigation. They may provide a practical solution for situations where recapping is considered necessary.

### Disposal

An effective system for disposing of used needles is crucial to preventing needle stick injuries. Having disposal containers readily available can greatly reduce the concern for recapping needles. Workers should place needles in wide-mouth, puncture-proof containers. Locate disposal containers specifically where needles are used to make safe disposal possible without recapping. Replace the containers before they are completely filled. Make sure they are sealed, collected, and disposed of in accordance with local regulations for biomedical waste. All staff should report every incident in which they find needles left at the bedside or thrown into the regular garbage.[56] Ernest SK in his enquiry at Nigeria, found only 50% of respondents had facilities for disposal of needles and syringes in their health centers.[25]

### Surveillance

There is still a serious lack of information about the various factors that cause accidents with needles. Surveillance programs that provide in-depth analysis of needle stick accidents are an important tool for obtaining this information.

The goals of these programs should include:

- Determining the rate of needle stick injuries.
- Investigating the factors that cause the injuries.
- Ensuring the injured workers receive proper treatment.
- Identifying areas in which the prevention program needs improvement.
- Eventually, providing practical strategies for dealing with the problem.

The Division of HIV Epidemiology Research, Bureau of HIV/AIDS and STD, LCDC maintains a program to monitor occupational exposure to HIV infected blood and body fluids among health care workers.[56]

Ernest SK, Nigeria found 11.8% respondents reported lack of surveillance and health supervision for workers is one of the cause responsible for needle stick injuries.[25]

### Equipment Design

Safer innovative devices using protected needle devices or needle-free systems with self-sealing ports would alleviate many of these injuries. There is accumulating evidence suggesting that syringes with safety features reduce needle stick injuries.[56]

Ernest SK(Nigeria) found 16.8 % suggested planning budgeting and purchasing of auto-destruct syringes.[25]

M. Rele, M. Mathur . in their research abstract discuss that, newer devices should be designed so that the HCWs hand remains behind the needle during procedure and needle remains covered before disassembly of the device and remains covered after disposal.[33]

News and Event: The BD Venflon pro safety catheter has an advanced needle shield , once activated the needle tip is encapsulated inside the smooth- edged plastic shield, thereby reducing the risk of HCWs injuring themselves with the sharp needle tip. [55]

### Continued Innovation

There is a need for further investigation and innovation to develop means for preventing needle stick injuries. These investigations should aim:

- To identify the types and designs of needle instruments that are potentially capable of causing needle stick injuries.
- To understand better how needle devices are normally handled in the workplace and how they cause injuries.
- To find methods that eliminates the need to move hands towards the tips of contaminated needles, or to manually disassemble contaminated needle equipment.[56]

Mullar N, Steele M, Balaji KA, Krishna M : Thirty-one Balcan Mini-Destructor needle removers were introduced into seven health facilities in two cities in India- Delhi and Jaipur. 199 HCWs including ANMs, nurses, and laboratory staff were studied over a 23 weeks period for uses, malfunctioning, and acceptability of device found devices were seen as easy to use and durable. Also found preventing needle reuse and isolating infectious sharps waste in clinical setting. [32]

Ernest SK, Nigeria, found less than 9% of respondents knew auto-destruct syringes exist while 38.9% were aware of the joint WHO and UNICEF statement on „bundling approach. in vaccine packaging.[25]

Bio-medical waste fact sheet 2004: In country like India, there is no proper sharp disposal facility, and all the sharps are buried off or many hospitals throw these sharps in ordinary garbage and our health ministry as well as public should be aware of these needle stick injuries while walking along garbage disposal near hospital area.[46]

POST EXPOSURE PROPHYLAXIS OF NEEDLE STICK INJURY AND KNOWLEDGE, PRACTICES AND ATTITUDE OF HEALTH CARE WORKERS ABOUT IT.

Willam Dionne [MCOH-EH] CDC: PROTOCOL FOR POST EXPOSURE PROPHYLAXIS:-

#### 1. FIRST AID

\* Contaminated Wound - Encourage bleeding from the skin wound & wash the injured area with soapy water, disinfectant, scrub solution or plain water.

\* Contaminated intact skin - Wash the area with soap and water.

\* Contaminated eyes - Gently rinse the eyes while open with normal saline or water.

\* Contaminated mouth - Spit out any fluid. Rinse the mouth with water and spit out again.

#### 2. REPORT ACCIDENT

#### 3. BLOOD TESTING (Consent required)

health worker and source both are investigated for - Hepatitis B status  
Hepatitis C status and HIV

#### 4. IMMEDIATE ACTION

If the patient is known HIV positive, then the post exposure prophylaxis and counseling given.

PEP drugs should be given within 72 hours following exposure.

#### 5. FURTHER ACTION

1. If immune status of patient and health care worker is unknown and immune status cannot be obtained within 48 hours then give:-

- a) Hepatitis B Immune Globulin
- b) Hepatitis B Vaccine (first dose)

2. If the health worker is HBV immune then no further HBV is required. Check Hepatitis B antibody titer of health care worker and if low give HBV booster.

3. Give T.T. Booster if indicated.

#### 6. FOLLOW UP

- i) Complete the course of Hepatitis Vaccine.
- ii) Follow up HIV serology 1,3 and 6 months

#### 7. FURTHER INFORMATION

PEP TELEPHONE INFORMATION LINE: 1800 889 887.[50]

Chaudhary R, Agrawal P: The study carried out at a tertiary care hospital in north India found that 53% out of 79 HCWs ( 53 males and 26 females ) had experienced NSI at least once during their tenure of service. Although, free hepatitis B vaccination is provided to all the staff, only 49% of them had been vaccinated. None of the HCWs who had received NSI got post exposure prophylaxis.[21]

Chogle NL, Chogle MN, Divatia JV, Dasgupta D found that Out of seventy (39 anaesthetists and 31 surgical residents), Fourteen respondents (20%) were aware of true risk of transmission. About 1/3rd identified all high risk fluids correctly. Fifty-five respondents (78%) correctly stated that washing the site with soap and water was the initial measure, but less than a one third knew whom to contact immediately after needle stick injury. Though 45 respondents (64%) correctly stated that prophylaxis should be initiated within 1 hour of injury, none knew exactly which drugs were to be used. Thirty respondents (42%) were aware of the use of Zidovudine but none were aware of second or third drugs used for post-exposure prophylaxis. Only 4 respondents (6%) knew the correct duration of post-exposure prophylaxis. Five respondents (7%) knew that the drug is available in medical stores and 7 knew the approximate cost of therapy.[23]

Chen MY and group: Found, in two major teaching hospitals in London, Most junior doctors had heard of PEP (93%) but fewer were aware that it reduces the rate of HIV transmission (76%). Only a minority doctors (8%) could name the drugs recommended in recent national guideline and a significant proportion (43%) could not name any. Almost one third (29%) Didn't know within what period PEP should be administered. This was despite of the fact that the majority of respondents(76%) had experienced high risk exposure to potentially infective material at some stages in their careers.[22]

Leliopoulou C, Waterman H, Chakrabarty S: Out of 133 respondent nurses ( 85 working in high risk areas- Group A ; and 48 in low risk areas- Group B) 49% of Gr A and 60%

of Gr B believed that a needle stick injury with a needle contaminated with infected blood was an unlikely source of infection.67% of Gr A and 71% of Gr B disagreed with the statement that nurses are at high risk of exposure to HIV/HBV than the other health care workers.[30]

INTERVENTIONS TO IMPROVE KNOWLEDGE, PRACTICES AND ATTITUDE OF HEALTH CARE WORKERS ABOUT PREVENTION AND POST EXPOSURE PROPHYLAXIS OF NEEDLE STICK INJURY.

Yang YN, Liou SH, Chen CJ, Yang CY, Wang CL, Chen CY, Wu TN found that lecture followed by self study brochure, the incidence of NSIs decreased significantly from 50.5% pre test to 25.2 % post test, and the report rate increased from 37% to 55.6 % respectively.[44]

Zafer A, Habib F, Hadwani R, Ejaz M, Khowaja K, Khowaja R, Irfan S. reported impact of surveillance and educational program on rate of NSIs among HCWs at tertiary care hospital in Pakistan. They found that there was an increasing trend in per interventional years( 2002-04 ). However notifiable fall was noted in post interventional years ( 2006-07 ). Major decline noted among nurses ( from 13 to 5 NSIs / 100 FYE/ year). [45]

INTERNATIONAL EFFORTS FOR NEEDLE STICK PREVENTION: ACT AND SUPPORT GROUPS

Tatelbaum MF: The needle stick safety and prevention act to revise the Occupational Safety and Health Administration.s (OSHA ) standard regulating occupational exposure to blood borne pathogens, including the human immuno-deficiency virus, the hepatitis B virus, and the hepatitis C virus ,was signed into law on November 6, 2000. OSHA published in the federal register its regulations reflecting the Act and its requirements. The effective date of the regulations is April 18, 2001. The Needle stick safety and prevention Act seeks to further reduce health care worker.s exposure to blood borne pathogens by imposing additional requirements upon employers, such as hospital, concerning their sharps procedures. Consistent with the act, OSHA.s regulations:

- 1) Modify the definition of "engineering controls" and adds definitions for the terms "sharps with engineered sharps injury protection" and "needle-less systems".
- 2) Requires employers to consider and implement new technologies when they update their "exposure control plan".
- 3) Requires employers to solicit employee input with respect to appropriate engineering controls. And
- 4) Requires employers to maintain a sharps injury log. Practical questions about implementing the new requirements are a source of major concern.

The House Committee on Education and the workforce stated in legislative history to the Act that the statute was not meant to disturb the underlying flexible, performance-oriented nature of the initial standard.[ 40]

Business Wire Nov 22, 2005: International needle stick prevention group (ISIPS) South Jordan, Utah- the first international needle-stick prevention group, celebrates the international sharp injury prevention awareness month, in

month of December. During December 2005 ISIPS announced that 6 recipients are being honored for reducing sharp injuries, as a part of awareness month activities.[51]

### 3. Problem Statement

“Effect of self-instructional booklet versus planned teaching on knowledge and practices about prevention of needle stick injury and its post exposure prophylaxis among nurses of selected urban health centers.”

#### Objectives

- 1) To prepare self-instructional booklet and plan teaching program.
- 2) To assess the knowledge and practice about Prevention of needle-stick injury and its post exposure prophylaxis in group I (Planned teaching) & group II (Self-instructional booklet).
- 3) To assess the effect of planned teaching on knowledge and practices about prevention of needle stick injury and its post exposure prophylaxis in group I.
- 4) To assess the effect of self-instructional booklet on knowledge and practices about prevention of needle stick injury and its post exposure prophylaxis in group II.
- 5) To compare the effect of planned teaching to that of self-instructional booklet.

### 4. Methodology

#### Research Design

A experimental research design with pre and post test approach was used to evaluate effect of planned teaching versus self instructional booklet for the present study. The design to be used is depicted as follows...

Group	Pretest	Treatment	Post test
Group I	O1	X1	O2
Group II	O3	X2	O4

#### Study settings

The study was conducted in randomly selected ---- Municipal Corporation in thane district, 42 km. away from Thane. Total 13 urban health centers are situated within this area.

#### Population

The population of the study was the nurses working in urban health centers, ---- Municipal Corporation.

#### Samples

In this study the samples are the nurses working in urban health centers of ---- Municipal Corporation.

#### A) Sampling techniques

The samples were selected by non probability method of sampling technique (purposive / judgmental sampling method ) involves the conscious selection by the researcher of certain subjects of elements to include in a study.

#### B) Sample size

In this study the sample size consists of 40 nurses working in urban health centers of ---- Municipal Corporation.

#### Criteria for sample selection

##### A) Inclusion criteria:

1. Nurses with minimum one year experience.
2. The nurses with G.N.M. / A.N.M. training.
3. Who can speak, read and write English and / or Marathi.
- 4 Who are working in selected urban health centers.

##### B) Exclusion criteria:

1. Nursing personnel with less than one year experience.
2. The personnel other than nurses.
- 3 Who are not willing or permitted by authority to participate.

#### Variables

##### A) Independent variable

The independent variables in this study are planned teaching and self Instructional booklet.

##### B) Dependent variable

In this study the dependent variable is knowledge and practice of nurses regarding prevention and post exposure prophylaxis of needle stick injury.

#### Tool preparation

In this study the tools were self administered questionnaire for assessment of knowledge and practices, planned teaching and self instructional booklet.

##### TOOL I - Questionnaire-

In this study the researcher developed tool on the basis of literature review, observations made during clinical experience and opinion of experts.

Section I: Dealt with demographic data of the sample.

Section II: Consisted of questions regarding past experience of needle stick injury. Total 9 items were selected.

Section III: Consisted of multiple choice questions to assess the knowledge of nurses regarding prevention and post exposure prophylaxis of needle stick injury. Total 16 items were selected.

Section IV: Consisted of questions regarding practices. Total 14 items were selected.

##### Tool II- Self instructional booklet-

In this study self instructional booklet developed on the basis of CDC: NIOSH, Literature review, available printed material / workshop's booklets and WHO.s guideline for infection control.

##### Tool III - Planned teaching-

In this study researcher developed planned teaching program for nurses in urban health centers. Same content and pictures, that of self instructional booklet, were used in planned teaching.

#### SCORING

Score “1” was given for each correct answer and “0” for each wrong or partially correct answer. Maximum score was 30.

#### Feasibility of the study

Urban health centers in ---- Municipal Corporation were selected as these were feasible in terms of ...

- \* Geographical proximity and ethical clearance.
- \* Economy of time.

- \* Transport facility.
- \* Administration approval.
- \* Co-operation and availability of subjects.

### Validity

The content validity was determined by consulting 11 experts in the field of nursing and medicine. Also opinion of one expert in statistics was taken. The experts were required to judge items for relevance, organize approach, measurability and clarity of the questionnaire. The suggestions of the experts were incorporated in the tool and tool was modified as required.

### Reliability

The reliability of tool was obtained by split - half method. Twenty sample scores were analyzed by using Pearson's Product Moment Method ( r ) formula.

The calculated value of Pearson (r) was "0.96".

## 5. Results & Discussion

### SECTION A: DISTRIBUTION OF SAMPLE CHARACTERISTICS ACCORDING TO DEMOGRAPHIC DATA.

Distribution of samples according to their age depicts that, highest percentage (57.5 %) of samples were in age group of 31 to 40 years and (7.5%) of samples were in age group of 51 and above years. However (22.5 %) of samples were of age group 41 to 50 years & (12.5 %) were between age group 21 to 30 yrs.

Distribution of samples according to basic qualification shows that, highest percentage of samples (70%) had done HSC and (27.5%) had done SSC. However (2.5%) had F.Y.B.Com. as their basic qualification.

Distribution of samples according to their professional qualification shows that, highest percentage of samples (60%) were GNMs and (30%) of samples were ANMs. However (10%) of samples were GNM + PHN diploma holders.

Distribution of samples according to post held depicts that,, the highest percentage (50%) of samples were Staff Nurses, (32.5%) were ANMs and only (12.5%) were PHNs.

Distribution of samples according to their years of experience shows that highest percentage (40%) of samples had 11 to 20 years of experience and (2.5%) had more than 31 years of experience. However (35%) of samples had 1 to 10 years of experience and (22.5%) had 21 to 30 years of experience.

Distribution of samples according to gender shows that all (100%) of samples belong to female gender and no one (0%) samples were of male gender.

Distribution of samples according to their past needle stick injury experience shows that, highest percentage of samples (62.5%) had the incidence of needle stick injury at least once in their career and only (37.5%) had no such experience till the date.

### SECTION B: DISTRIBUTION OF SAMPLES ACCORDING TO THEIR PAST NEEDLE STICK INJURY EXPERIENCE.

Distribution of samples, which had needle stick injury experience in past, shows that, highest percentage (72%) had experience 12 month back and only (4%) reported experience recently. However (16%) had incidence within period of 6 months to 1 year, whereas (8%) had incidence within a period of 1 month to 6 months.

Distribution of samples, which had past experience of needle stick injury, according to procedures performing at the time of needle stick injury shows that, highest percentage ( 52%) of incidences were while giving injection and (12%) of incidences were while discarding needle. However (24%) of incidences were while recapping and (16%) while preparing for injections.

Distribution of samples, which had past experience of needle stick injury, according to reasons of needle stick injury shows that, highest percentage (52%) of incidences were due to patient moved during procedure and (4%) had because of other staff. However (32%) had it because of distraction and (20%) had because needle was mixed with other trash.

Distribution of samples, , which had past experience of needle stick injury, according to their reaction shows that, highest percentage (52%) of samples felt fear and (4%) had pain as reaction. However (24%) of samples felt shame, anger and guilt (i.e. 8% each) and (20%) felt nothing.

Distribution of samples, , which had past experience of needle stick injury, according to first action taken after needle stick injuries shows that highest percentage (52%) of samples washed it with soap and water and (4%) of samples simply removed needle. However (48%) of samples squeezed out finger to bleed, (8%) washed with spirit whereas (4%) washed with sterilium.

Distribution of samples, , which had past experience of needle stick injury, according to reporting shows that highest percentage (76%) had not reported the incidence to anyone whereas (24%) of samples reported the incidence.

Distribution of samples, which had reported the past experience of needle stick injury, according to person to whom reported the incidence shows that (50%) reported to colleagues,(33.32%) reported to sister in charge and (16.66%) to medical officer in charge.

Distribution of samples, which had reported the past experience of needle stick injury, according to post exposure prophylaxis received shows that (16.6%) of samples blood was tested, (16.7%) of samples received ART and (16.7%) of samples received hepatitis B vaccination.

### SECTION D: ASSESSMENT OF EFFECT OF PLANNED TEACHING.

H0: there is no significant difference between pre and post intervention scores of Group I, who received planned teaching.



The table value at degree of freedom 19 at 0.05 level is „2.09. and calculated value for „t. is 7.95 which is more than table value, therefore H0 is rejected.

#### SECTION E: ASSESSMENT OF EFFECT OF SELF INSTRUCTIONAL BOOKLET.

H0: there is no significant difference between pre and post intervention scores of Group II, who received self instructional booklet.

The table value at degree of freedom 19 at 0.05 level is „2.09. and calculated value for „t. is 6.56 which is more than table value, therefore H0 is rejected.

#### SECTION F: COMPARISON OF TWO GROUP.S PRE INTERVENTION SCORES.

H0: there is no significant difference between pre intervention scores of Group I, who received planned teaching and Group II, who received self instructional booklet.

The table value at degree of freedom 38 at 0.05 level is „2.02. and calculated value for „t. is 1.48 which is less than table value, therefore H0 is accepted.

#### SECTION G: COMPARISON OF TWO GROUP.S POST INTERVENTION SCORES.

H0: there is no significant difference between post intervention scores of Group I, who received planned teaching and Group II, who received self instructional booklet.

The table value at degree of freedom 38 at 0.05 level is „2.02. and calculated value for „t. is 2.23 which is more than table value, therefore H0 is rejected.

#### SECTION H: ASSESSMENT OF CORRELATION OF DEMO-GRAPHIC VARIABLES WITH POST INTERVENTION SCORES OF SAMPLES.

##### Assessment of correlation of age and post intervention scores of samples.

H0: There is no significant correlation between age and post intervention scores of the Group I and Group II.

The F- table value at degree of freedom 3,36 at 0.05 level is 2.86 and the calculated value falls in the 95% confidence limit, hence H0 accepted.

##### Assessment of correlation of professional qualification and post intervention scores of samples.

H0: There is no significant correlation between professional qualification and post intervention scores of the Group I and Group II.

The F- table value at degree of freedom 2, 37 at 0.05 level is 3.25 and the calculated value falls in the 95% confidence limit, hence H0 accepted.

##### Assessment of correlation of years of experience and post intervention scores of samples.

H0: There is no significant correlation between years of experience and post intervention scores of the Group I and Group II.

The F- table value at degree of freedom 2, 37 at 0.05 level is 3.25 and the calculated value falls in the 95% confidence limit, hence H0 accepted.

##### Assessment of correlation of past needle stick injury experience and post intervention scores of samples.

H0: There is no significant correlation between past needle stick injury experience and post intervention scores of the Group I and Group II.

The t- table value at degree of freedom 38 at 0.05 level is 2.02 and the calculated value falls in the 95% confidence limit, hence H0 accepted.

## 6. Conclusion

The various findings of the study show that, the knowledge and practices of nurses regarding prevention and post exposure prophylaxis of needle stick injury have improved through teaching. Analysis of data showed that there was significant difference between pre and post tests of both interventions and planned teaching is significantly effective to that of self instructional booklet on knowledge and practices of nurses.

## 7. Future Scope

### 1) Nursing Services

Occupational health of nurses is very important aspect of nursing services. To deal with high turnover of nursing staff and effect of it ( over burden and / or total paralysis) on existing nursing services can be prevented by following right strategies to prevent and post exposure prophylaxis of needle stick injuries. One of which is, making nurses aware of their right of knowledge and facilities to prevent and post exposure prophylaxis of needle stick injuries.

### 2) Nursing Education

The result of the study can be used by nursing teachers as an informative illustration for nursing services. For the student nurses, more stress can be given on prevention of needle stick injuries and equip them in case of accidental needle stick injury.

### 3) Nursing Administration

The findings of the study reveal the need to conduct an ongoing in-service education program for nurses who handles needles and sharp in clinical as well as community settings. This program should include both theoretical as well as practical inputs. The nurse administrator can prepare a procedure to report and post exposure prophylaxis for institute. This can bring about awareness among nurse administrator about the need of orientation of newly recruited nurses to preventive and post exposure strategies of the institution.

### 4) Nursing Research

The result of the study contributes to the body of knowledge and skills of nursing. Future investigator can use the findings and methodology as reference material. Investigator has highlighted the areas which require further exploration. The recommendations and suggestions can be utilizes by another investigators, conducting same kind of study. The tools and techniques used have added to body of knowledge and skill and can be used for further references.

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