

ADDIS ABABA UNIVERSITY  
COLLEGE OF MEDICE AND HEALTH SCIENCE  
DEPARTMENT OF EMERGENCY MEDICINE



PREVALENCE AND ASSOCIATED FACTORS OF NEEDLE STICK  
AND SHARP INJURIES AMONG NURSES WORKING IN TIKUR  
ANBESA SPECIALIZED HOSPITAL, ADDIS ABABA, ETHIOPIA, 2018.

BY: BIKIS LIYEW (BSC)

A RESEARCH THESIS SUBMITTED TO GRADUATE STUDIES OF  
ADDIS ABABA UNIVERSITY, COLLEGE OF MEDICINE AND  
HEALTH SCIENCE, DEPARTMENT OF EMERGENCY MEDICINE  
AND CRITICAL CARE IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCE IN  
EMERGENCY MEDICINE AND CRITICAL CARE NURSING.

JUNE, 2018  
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JUNE, 2018

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Examiner

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## **ABBREVIATIONS**

AAU	Addis Ababa University
AIDS	Acquired Immune Deficiency
AOR	Adjusted Odd Ratio
BSC	Bachelor of science
CHS	College of health science
CI	Confidence Interval
COR	Crude Odd Ratio
GC	Gregorian calendar
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HCW	Health Care Workers
HIV	Human Immune Virus
MSC	Master of Science
NSI	Needle Stick Injury
NSSI	Needle Stick and sharp Injury
SPSS	Soft Ware Program for Social Science
TASH	Tikur Anibesa Specialized Hospital
USA	United States of America
WHO	World Health Organization

## ABSTRACT

**Background:** Needle stick and sharp injuries are a significant risk to the health of nurses. Every day Nurses face the possibility that they may injure themselves. Although many injuries will have no adverse effect, the possibility of acquiring infections like hepatitis C, hepatitis B and HIV can cause untold psychological harm. About twenty blood borne pathogens can be transmitted through accidental needle stick and sharp injury, the potential life threatening are Human Immunodeficiency Virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV). Nurses are at risk of injuries caused by needle stick and sharp instruments in hospitals.

**Objective:** The objective of this study was to assess the prevalence and associated factors of needle stick and sharp injuries among nurses working in Tikur Anibesa Specialized hospital, Addis Ababa, 2018.

**Methods:** Institutional based cross sectional study was conducted among 268 nurses working in Tikur Anibesa Specialized Hospital from February 19 to march 31, 2018. Stratified random sampling technique was used to select the study participants. Data was collected by using a self-administered questioner. Bivariate and multivariate logistic regression model was fitted to identify factors associated with needle stick and sharp injury. An adjusted odds ratio with 95% confidence interval was computed to determine the level of significance.

**Result:** The prevalence of needle stick and sharp injuries among nurses was 97(36.2%) with 95% CI of 30.2% to 42.3%. Presence of contaminated needles and/or sharps materials in the working area AOR=2.052(1.110, 3.791) and needle recapping after use AOR=1.780(95% CI, 1.025, 3.091) were positively associated with needle stick/sharp injury; while working in pediatrics ward AOR = 0.323(0.112, 0.930) and Being female (AOR = 0.461(95% CI, 0.252, 0.845) showed negative association at  $p$  value of ( $p \leq 0.05$ ).

**Conclusion and recommendation:** The proportion of needle stick/sharp injury was high among nurses. The safety of nurses depends directly on the degree to which nurses can identify and control the varied occupational hazards specific to jobs. Thus, working unit specific safety precautions, safe working environment and appropriate needle and sharp disposal improve nurses' safety practice and thereby decrease the on job.

**Key words:** Needle sticks injury, Safe practice, Sharp injury, unsafe practice.

# CHAPTER ONE

## 1. INTRODUCTION

### 1.1. Background

Needle stick and sharp injuries are wounds that are caused by sharps accidentally puncture the skin. Sharps include needles, as well as items such as scalpels, razor blade, lancets, retractors, scissors, pins, clamps, cutters, staples and glass item (1). About twenty blood borne pathogens can be transmitted through accidental needle stick and sharp injury, the potential life threatening are Human Immunodeficiency Virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV). Moreover, HBV is highly contagious and infects one out of three people (2). Risk factors that causes NSI are numerous as, manipulating needles in patient line related work, recapping activity, passing devices, handling specimens, clean-up or failure to dispose the needle in the puncture proof containers. Every day while caring for patients, nurses are at risk to exposure to blood borne pathogens potentially resulting in infections such as HIV or hepatitis B and C. These exposures, while preventable, are often accepted as being a part of the job (3). Needle stick and sharp injuries are a serious concern to all health care personnel and pose a significant risk of transmission of occupational blood borne pathogens (4).

The Centers for Disease Control and Prevention (CDC) estimates that about 236,000 to 384,000 hospital workers sustain needle-sticks and sharp injuries, and nurses share 40% of it (5). These injuries occur in a variety of procedures like during needle recapping, operative procedures, blood collection, intravenous line administration, suturing, checking blood sugar and poor sharp disposal system (6). Almost 90% of all the needle-stick injuries which occurred in nurses of third world countries are due to lack of knowledge, resources and training (7).

Among all health care personnel, nurses have the highest rate of needle stick and sharp injury .In USA, It was estimated that the reported incidence of NSI among nurses is currently 16.3 % (8). In United Kingdom, about (48%) of the nurses have reported an

incident at some point in their careers and (10%) had been stuck by a needle or sharp in the last 12 months (9).

According to the World Health Organization (WHO) NSIs cause about (40%) of hepatitis C and B infections and (2.5%) of HIV infections among healthcare providers worldwide (10). In addition, direct costs for laboratory tests, including tests for hepatitis B serology, HIV antibodies, and the test for anti-hepatitis C, also treatment for any condition. There are also the burden associated with post-exposure prophylaxis and their work absences (11).

According to US International Healthcare Worker Safety Center, injections and drawing blood accounted for (23.6%) and (11.5%) of NSIs, respectively (12). So safety engineered needle devices are recommended for these tasks (13).

Needle-stick injury among nurses varies according to work place, country, professional level and procedures. For instance 39% of registered nurses in USA (14), 39.4% of nurses in Iran (15), 62% nurses in Nigeria (16) and 32% of them in Ethiopia had sustained needle-stick injury in 12 months period (17). Moreover, health care workers practicing in poor countries such as Ethiopia are more exposed to human immunodeficiency virus (HIV) and hepatitis B virus (HBV) following occupational exposure, and are less likely to use post-exposure prophylaxis (PEP) than those working in developed countries (18, 19).

## **1.2. Statements of the problem**

Needle stick and sharp injury represent a major occupational hazard in the health care industry, with professional nurses incurring a large proportion of the total burden particularly with items that have been previously used on patients (20-22). In Turkey, about four million people are estimated to be carriers of chronic HBV between 0% and 2% of the blood donor population were found to be HCV antibody positive. The numbers of patients with HIV reported is relatively low rates have been increasing steadily in recent years, whereas this number reached a total of 1325 in 2001. WHO reports that the number of sharp and needle stick injuries per person among health care staff are 4 per year in Africa, Western Mediterranean and Asia (23).

The risk of occupational infection is rises by a factor including the following: hospital overcrowding lower ratio of HCWs to patients, limited awareness of the risks associated with exposure, to blood, failure to implement standard precautions, inadequate supplies of basic safety equipment, handles contaminated needles and other sharp instruments are reuse. Developed countries recognized the importance of safety practice among HCWs (24).

In the Health care sector, although nurses 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 (22). Nurses are highly exposed to needle-stick and sharp injuries. Such injuries transfer some pathogens such as (human immunodeficiency virus) HIV, Hepatitis B virus (HBV), and Hepatitis C virus (HCV) (25). Approximately, 66000 cases of HBV, 1600 cases of HCV, and 1000 cases of HIV might occur worldwide among healthcare workers through their exposure to needle-sticks. The spread of blood borne viral diseases through sexual and vertical means is decreasing, while their transmission by needle stick and sharp injuries are assumed to be increasing. They are day to day medical hazards in health institution among nurses (26).

The burden of the problem is not only on individual health but also human resources, economic and social destruction (27). Blood borne pathogens are generally considered endemic in sub-Saharan Africa (26).

National data are unavailable for these blood borne infections in Ethiopia. However, surveys in different parts of the country indicate the prevalence of HCV to be 0.9–5.8% and estimates for HBV range from 4.7% to 14.4 % (28-31). Hence, the objective of the present study was determining the prevalence of needle stick and sharp injuries and its associated factors among nurses at Tikur Anibesa Specialized hospitals.

### **1.3. Significance of the study**

There is a paucity of information in Ethiopia particularly in Tikur Anbesa Specialized hospital describing occupational injuries by needle sticks and sharp injuries and consequently exposures to blood and body Fluids and associated factors. In Ethiopia, where primary health care services are covered by nurses, it is important to develop their knowledge and practice on universal prequention since the risk of contracting infections following needle stick and sharp injuries are high in their day to day activities. Since I have seen different literatures there is no single study on nurses rather than overall health professionals in the study area and clinical attachment I observe needle stick and sharp object injuries on nurses which is very dangerous and devastating in economical, psychological and health of nurses and their families.

Credible evidence is paramount in designing strategies and in taking action-based interventions. Such information would also be useful in identifying any gaps that might need further attention in this implementation of infection-control practices for different organizations and in providing feedback to these groups about improving safe practices.

Yet, there is no documented data identified in the area of prevalence and predictors of needle stick and sharp injury among nurses working in Tikur Anbesa Specialized Hospital. This research was intended to generate base line information on the possible determinants of needle stick and sharp injuries and its prevalence. The reason why Tikur Anbesa Specialized Hospital selected was that, this hospital is the largest referral hospital in the country. It is also an institution where specialized clinical services that are not available in other public or private institutions are rendered to the whole nation. Since large number of Ethiopian population is served adequate staff number should be available. Nurses are major part of health care delivery system by providing holistic care for clients.



## **CHAPTER TWO**

### **2. LITERATURE REVIEW**

#### **2.1. Prevalence of needle stick and sharp injury**

Study conducted in South Korea 70.4% of the hospital nurses had experienced needle stick or sharp injuries in the previous year (32).

Study conducted in Pakistan 67% of nurses got needle stick injury during job. Almost all 99% nurses said that they didn't report their injury because of no reporting system in their hospital. Injection and needles (72%) are the most injury causing instrument and majority of nurses (39%) sustained needle stick injuries more than once, while only twenty five (11%) nurses sustained NSI once in their life. Two third (81%) of nurses experienced NSI in ward or bedside whereas only few got NSI in Emergency Room (9%) and Operation Theatre (6%). Needle is the most injury causing instrument (48%) followed by ampoule (18%) and blade (1%). Almost all the nurses (99.3%) didn't report their injury to hospital administration (33).

A cross-sectional study was conducted among nurses in Thailand Regional Hospital shows that the prevalence of SIs for the previous 12 months was 55.5%. 91.1% were with blood. Needles (52.8%) were the main cause of SIs. The reporting rate of SIs to the hospital was 23.8%. SIs had a significant association with each of marital status, work duration, work department and preventive management (34).

In other study conducted in India shows that overall, every third nurse (33.3%) had sustained needle stick injury at least once in the past. More than half (56%) of the NSI incidents occurred while the nurses were recapping the needle, 10% of the incidences occurred while passing needle and 10% while disposing the needle and or breaking. The most common cause of NSI as perceived by nurses was lack of proper equipment for disposal (50%) followed by increased workload (24%), carelessness (18%) and fatigue (8%). More than half (58%) of the NSI involved a hollow bore needle, followed by I.V. cannula (24%), suture needle (10%) and butterfly (8%). Fingers/thumb/index finger

together were the most common (65.3%) site of injury with almost third thirds of the total incidents involving any of these areas followed by involvement of palm (18.4%) and hand (10.2). In regard to the area where NSI occurred, nearly half (48%) of the total incidents have occurred either in patient room (24%) or in emergency department (24%), 16% of the NSI have occurred in intensive/critical care units and only one NSI incident (2%) has occurred in operating room/recovery room (35).

Study carried out in Nepal the prevalence of needle stick and sharp injuries among nurses was 74% during the whole work duration and a study carried out in Saudi Arabia and Iran were 74% and 39.4% respectively (36).

Study conducted in Tehran (Iran) shows that the prevalence of occupational exposure to sharp tools of hospital waste was 41%. Most impressed by the syringe needle was 46.3%. Working load and needle recapping were the main causes of the damage due to exposure to the sharp objects, 26.8 and % 31.7 respectively (37).

Other study conducted in Iran Imam Hossein Hospital the case incidence of NSIs was 63.3%. 12.8% of nurses had not been vaccinated against hepatitis B virus (HBV). 92.1% were hollow-borne needles and the main causes of percutaneous injuries with hollow-bore needles were recapping (32.4%) and manipulating needles in patients (18.1%). The majority 51.8% of injuries occurred after use and before disposal of the objects (38).

Study conducted In Jordanian showed that within the last 3 months, 67.6% of the nurses reported having at least one NSI. Most of these injuries were caused by recapping procedure, while working with syringe needles (39).

Study conducted in Sri Lanka, Colombo showed that the prevalence of NSIs was 43%. IV cannulation was the most risky procedure (51%). Re-capping was seen in 24% of the exposed group. Medical wards accounted for 78% of the NSIs (40).

Study carried out hospital of central India showed that the case incidence of NSIs was 31.78%. 63.64% were hypodermic needles and the main causes of percutaneous injuries

with hypodermic needles were during injecting drugs (38.4%) and handling sharp wastes (32.9%) (41).

Study conducted in Imam Reza Hospital, Kermanshah, Iran showed that 73.3% of nurses were exposed to sharp injuries at workplace. About 41.8% of cases occurred during the first year of nursing. Major injuries were caused by needle-sticks (73.3%) and then IV catheter (42.4%). About 43.5% of the observed injuries occurred while trying to recap the needle-sticks. Also, 38.52% of injured nurses performed the tests after injury screening, while 48.7% did nothing after being injured. This study showed that sharp injuries were higher among female nurses regarding the relationship between demographic factors and injuries, there was only a significant association between the sharp injuries and gender ( $P=0.025$ ) and the number of injuries was higher among female nurses (42).

In other study conducted among Nurses in a University Hospital, Shiraz, Iran the prevalence of NSIs in the total of work experience and the last year was 76% and 54%, respectively. Hollow-bore needles were the most common devices involved in the injuries (85.5%).) and the most common activity leading to NSIs was recapping needles (41.4%). A statistically significant relationship was found between the occurrence of NSIs and sex, hours worked/week, and frequency of shifts/month (43).

study done by National surveillance for health care workers (NASH) of USA show that 59% of all sharp injuries were caused needles and according to a study done in Malaysia hospitals nurses 27.2% NSSIs causes were recapping of syringes after use (35, 44).

A cross-sectional study conducted in South Africa 18.8% indicated that they had needle stick injuries in the previous 12 months. Seventy eight point three percent (78.3%) needle stick injuries occurred in wards with syringe needles being the most common causative device, while 28.9% occurred during recapping of needles. The majority of respondents (90.1%) were aware of the hospital policy on needle stick injury. Although needle stick injuries were prevalent at a low rate, only 50% were reported. It remains an important

workplace hazard that needs on-going attention such as training, as it could be the cause for diseases, for example HIV and hepatitis B, among nurses (45).

Study conducted in Egypt, at Zagazig University Hospitals the prevalence of needle stick and sharp injuries among nurses was (74.57%) during the whole work duration, (72.8%) of nurses exposed to needle stick while (39.4%) exposed to sharp injury and (36.86%) exposed more than once. About the type of exposure, (47.78%) had needle stick and (30.93%) had sharp injury while (22.88%) had more than one exposure. The most frequent causative tools were hollow –bore needle (78.03%) followed by blade (27.27%) then suture needle (23.48%). The most frequent procedures at which exposure happen were needle recapping, injection and sample drawing (62.87%, 56.06% and 43.18%) respectively. It was noticed that the frequency of exposure were high among nurses working in emergency, surgery and internal medicine departments (78.04%, 71.05% and 63.26% respectively) (1).

A cross-sectional descriptive survey studied among Nigeria nurses showed that 40.2% exposed NSSI in 12 month(16). 20% of sharp injury occurred while they were administering injectable medicines and 35.3% of them identified needle recapping. 21.2% and 11% of the participants, breakage of medication ampoule and packing used syringes and needles for disposal were identified respectively. Also, 87.6% of the respondents experienced sharp injury at work while 12.4% did not. The causes of sharp injury result from failure to follow recommended procedures through personal behavioral risks such as safe handling and disposal of needle and syringes (46).

Study conducted in Southwest Ethiopia showed that prevalence of sharp injury among nurses was found to be 58.8%. Of this syringe needle 58.8% and broken ampoule 43.3% were the dominants. From the reported sharp injuries, 46.0% occurred when the needle was used for an injection and 78 (41.7%) occurred during ampoule breaking. Out of those nurses exposed to sharp injuries, 38.5% had experienced it twice (47).

Other cross-sectional Study conducted in Ethiopia, Jimma University Hospital shows that the prevalence of needle tick injury was 39.3%. 37.3% reported due to needles recapping and 37.7% were during sharp collection (48). In other studies done in Jimma zone public hospitals prevalence of needle stick injuries was 39.3% (49).

Other studies done in Ethiopia, Bahir Dar, 66.6%(50).south west Ethiopia 58.8%(48) and East Gojjam Zone Health Institutions, Sidama Zone and North western Ethiopia had showed 23.5%, 22%, 32%and 31% respectively(51).in other studies done in Jimma zone public hospitals prevalence of needle stick injuries was 39.3%.

## **2.2. Associated factors of needle stick and sharp injuries.**

Study conducted in South Korea non-use of safety containers for disposal of sharps and needles, less working experience as a registered nurse, poor work environments in regards to staffing and resource adequacy and high emotional exhaustion significantly increased risk for needle stick or sharp injuries. Working in perioperative units also significantly increased the risk for such injuries but working in intensive care units, psychiatry, and obstetrics wards showed a significantly lower risk than medical–surgical wards. The occurrence of needle stick or sharp injuries of registered nurses was associated with organizational characteristics as well as protective equipment and nurse characteristics (32).

Study conducted in Tehran (Iran) shows that the relationship between occupational exposure to hospital sharp tools and age, experience, education and place of work was significant with  $P= 0.006, 0.017, 0.027$  and  $0.008$  respectively. According to the complications of sharp tools, reduction of sharp components requires regular training courses for staff, proportion of the number of work shifts, strict implementation of treatment protocols, modification of the current inaccuracy procedures, access to adequate equipment's and safe and an effective mechanism for reporting of occupational accidents in all of the sectors (37)

Study conducted In Jordanian showed that the prevalence of NSI was found to be significantly associated with age group ( $P<0.001$ ), working experience ( $P<0.001$ ), and marital status ( $P<0.004$ ) (39).

A cross-sectional study was conducted among Nurses in a Thailand Regional Hospital shows that SIs had a significant association with each of marital status, work duration, work department. A significant association between SIs and working duration ( $p=0.031$ ) was detected. The nurses who had been working from 1 to 20 years were about two times more likely to have SIs than those working from 21 to 40 years. Less experienced nurses were more likely to have SIs compared to more experienced nurses (34).

Study conducted in Sri Lanka, Colombo showed that there was a significant difference in NSIs seen in maturity in age ( $p=0.015$ ) and increase working experience ( $p=0.044$ ) but no difference was found with increased work load ( $p=0.765$ , increase number of working hours per week,  $p=0.204$ ) and participation in in-service training programs ( $p=0.592$ ). A significant 49% did not report the injury and the main reason were assumed less risk (46%) (40).

Study conducted in Imam Reza Hospital, Kermanshah, Iran showed that sharp injuries were higher among female nurses, there was only a significant association between the sharp injuries and gender ( $P=0.025$ ) and the number of injuries was higher among female nurses (36).

In other study conducted among Nurses in a University Hospital, Shiraz, Iran showed that a statistically significant relationship was found between the occurrence of NSIs and sex, hours worked/week, and frequency of shifts/month (42).

Study conducted in Egypt, Zagazig University showed that there was no significant association between gender with needle stick and sharp injury. However, the risk of exposure decreases with increasing the duration of experience. And the risk of exposure increased with the nurses with lower education, working in the emergency and surgery departments; less experience and low education level were the most significant Predictors of needle stick and sharp injuries among nurses. In another study conducted in Malaysia showed that there was no significant association between gender with needle stick and sharp injury (1).

Study conducted in Southwest Ethiopia showed that being male [AOR: 2.20, 95% confidence interval (CI): 1.09, 4.4], being single (AOR: 2.26, 95% CI: 1.09, 4.69), and having no training on infection prevention (AOR: 5.99, 95% CI: 3.14, 11.41) were positively associated with needle stick/sharp injury; while working in chronic illness

follow-up clinic (AOR: 0.19, 95% CI: 0.05, 0.71) showed negative association at  $p$  value of 0.05 (47).



### 2.3. Conceptual framework

The factors associated with needle stick and sharp injuries are classified as socio-demographic factors like, sex, age, service year or experiences, marital status etc. work related environmental factors like; injection practice, disposal of used sharps, department, client flow, favorability of work place and etc. and behavioral factors are like; education and training. The three factors are interrelated to affect one another. The following figure shows the interrelation between sharp and needle stick injury (the independent) variables in detail and it is adapted from Ethiopian nurse association.

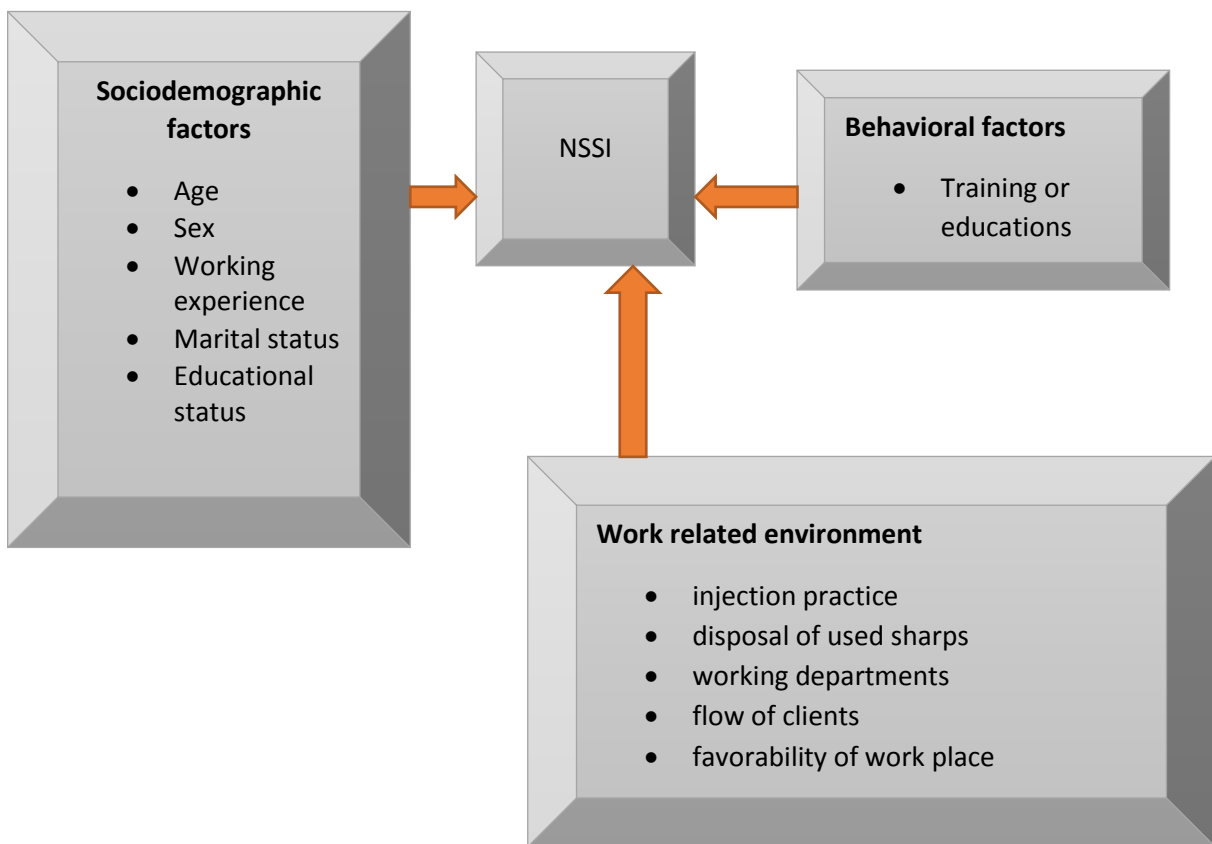


Figure 1: Conceptual frame work literature review (18, 19, 48), Addis Ababa, Ethiopia, June, 2018.

## **CHAPTER THREE**

### **3. OBJECTIVES**

#### **3.1. General objective**

The objective of this study was to assess the prevalence and associated factors of needle stick and sharp injuries among nurses working in Tikur Anibesa Specialized Hospital, Addis Ababa, 2018.

#### **3.2. Specific objectives**

- To determine the prevalence of needle stick and sharp injuries among nurses working in Tikur Anibesa Specialized Hospital, Addis Ababa, 2018.
- To identify associated factors of needle stick and sharp injuries among nurses working in Tikur Anibesa Specialized Hospital, Addis Ababa, 2018.

## **CHAPTER FOUR**

### **4. METHODS AND MATERIALS**

#### **4.1. Study area**

The study was conducted in Tikur Anbessa Specialized Hospital which is found in Addis Ababa (capital city of Ethiopia) in Lideta sub-city. According to Central Statistical Agency of Ethiopia (CSA), as of 2013 the town of Addis Ababa has a total population of 3,130,673, of which 1,478,890 are men and 1,624,783 women. It is the nation's largest and highest referral hospital. This hospital sees approximately 370,000 – 400,000 patients a year but the exact number is not known. It has 700 beds. This is the largest teaching hospital in Ethiopia. There are a total of 789 nurses in different qualification. The hospital is planned and accommodated and facilitated with the outpatient department (OPD), has seven x-ray, nine surgical and two diagnostic laboratory rooms. The hospital provides medical services in the internal medicine, gynecological and obstetrics, surgical, pediatrics and emergency departments. The hospital also has special units (Referral clinics), those are Chest, Renal, Neurology, Cardiology, Dermatology And Sexually Transmitted Diseases, Gastrointestinal, Infectious Diseases, Orthopedics, General Surgical, Gynecologic and Obstetrics, Diabetic, Hematology And Medical Intensive Care units (52).

#### **4.2. Study design and period**

An institutional based cross sectional study was conducted to assess prevalence and associated factors needle stick and sharp injuries (NSI) from February 19 to March 31, 2018 G.C.

#### **4.3. Population**

##### **4.3.1 Source population**

All nurses who were working in Tikur Anibesa Specialized Hospital, Addis Ababa, Ethiopia.

### **4.3. 2.Study population**

All nurses who were working in Tikur Anibesa Specialized Hospital, Addis Ababa, Ethiopia, 2017/2018.

### **4.3.3. Sample population**

All selected Nurses working in Tikur Anibesa Specialized Hospital at the time of data collection Addis Ababa, Ethiopia, 2018.

## **4.4. Inclusion criteria and exclusion criteria**

### **4.4.1. Inclusion criteria**

- Nurses either males or females who were working at the same department or unit for at least one year.
- All those registered nurses who were working in Tikur Anibesa Hospital of Addis Ababa during study period involved in clinical work were included in the study.

### **4.4.2. Exclusion criteria**

- The nursing personnel not involved in the direct management of the patients (e.g. nursing managers, tutorial staff) were excluded.
- Those nurses who were students, retired, on sick or maternity leave was excluded from the study.

## **4.5. Variable of the study**

### **4.5.1. Dependent variable**

- Needle sticks and sharp injury (NSSI)

### **4.5.2. Independent variables**

- Unsafe injections (recapping, bending needle etc.)
- Unsafe clinical practices (inconsistence use of protective materials)
- not using the right equipment's, not using the right sharp disposals)
- Background variables (socio-demographic characteristics of nurses.)
- Others like unsafe handling, using safety box, using incinerate or burring included here.
- Behavioral factors (training).

#### 4.6. Sample size determination

The actual sample size for the study was determined using the formula for single population proportion. To determine the initial sample size the following assumption was made: Where  $n_i$  = initial sample size from finite population,

$n_f$  = final sample size from finite population

$Z$  = the standard score (critical value) corresponding to 95% confidence level,

$P$  = the proportion of nurses experiencing needle stick and sharp injuries in which taken, from study done in Jimma university specialized hospital Taking the prevalence of NSTI among nurses was 39.3%. So sample size can be calculated as follows

$n_i = (Z\alpha/2)^2 P(1-P)/d^2 = (1.96)^2 \times 0.393(1-0.393)/(0.05)^2 = 367$  because of the total population size of the study area are less than 10,000 we shall to apply the population correction formula:

$n_f = n_i/1+n_i/N = 367/1+367/789 = 250$  samples + 10% non-response rate.

Totally =275 Samples.

Since I had taken prevalence of NSSI proportion in other studies I had considered factors that are significantly associated with NSSI in different studies. The following four factors identified and calculated by using double or two population proportions formula by using epi info statcalc calculation. Where  $\alpha$  = type I error (level of significant) , $B$  = Type two error ( $1-B$  = power of the study), Power = the probability of getting a significant result,  $f(B, \alpha) = (Z\alpha/2 + ZB)^2$ . When the Power = 80% and the level of significance is 5%.

Table 1: Sample size determination, TASH, Addis Ababa, Ethiopia, and June, 2018.

Factors	Proportion	AOR	Sample size
Needle recapping after use	P1=37.3% P2=72.7%	0.26	128
Training on NSSI	P1=48.7% P2=16.4%	0.2	140
Working department	P1=23.5% P2=1.21%	0.58	95
Working experience	P1=15.5% P2=9.4%	0.947	985

So finally the sample size calculated in these factors the first three sample size (128,140 and 95) less than 275, then we didn't take these, the last sample size (985) greater than source population (789), so this also didn't take. Finally 275 were taken as sample size.

#### 4.7. Sampling procedures and techniques

Stratified random sampling technique was used to select the nurses. Hospitals departments are classified into 5 main strata had nearly the same working conditions; 1) Internal Medicine, 2) Pediatrics, 3) Surgical, 4) Outpatient Clinics, and 5) Emergency and Intensive Care Departments. Proportional allocation will be taken from each stratum.

##### 4.7.1. Sampling proportion of each ward in TASH

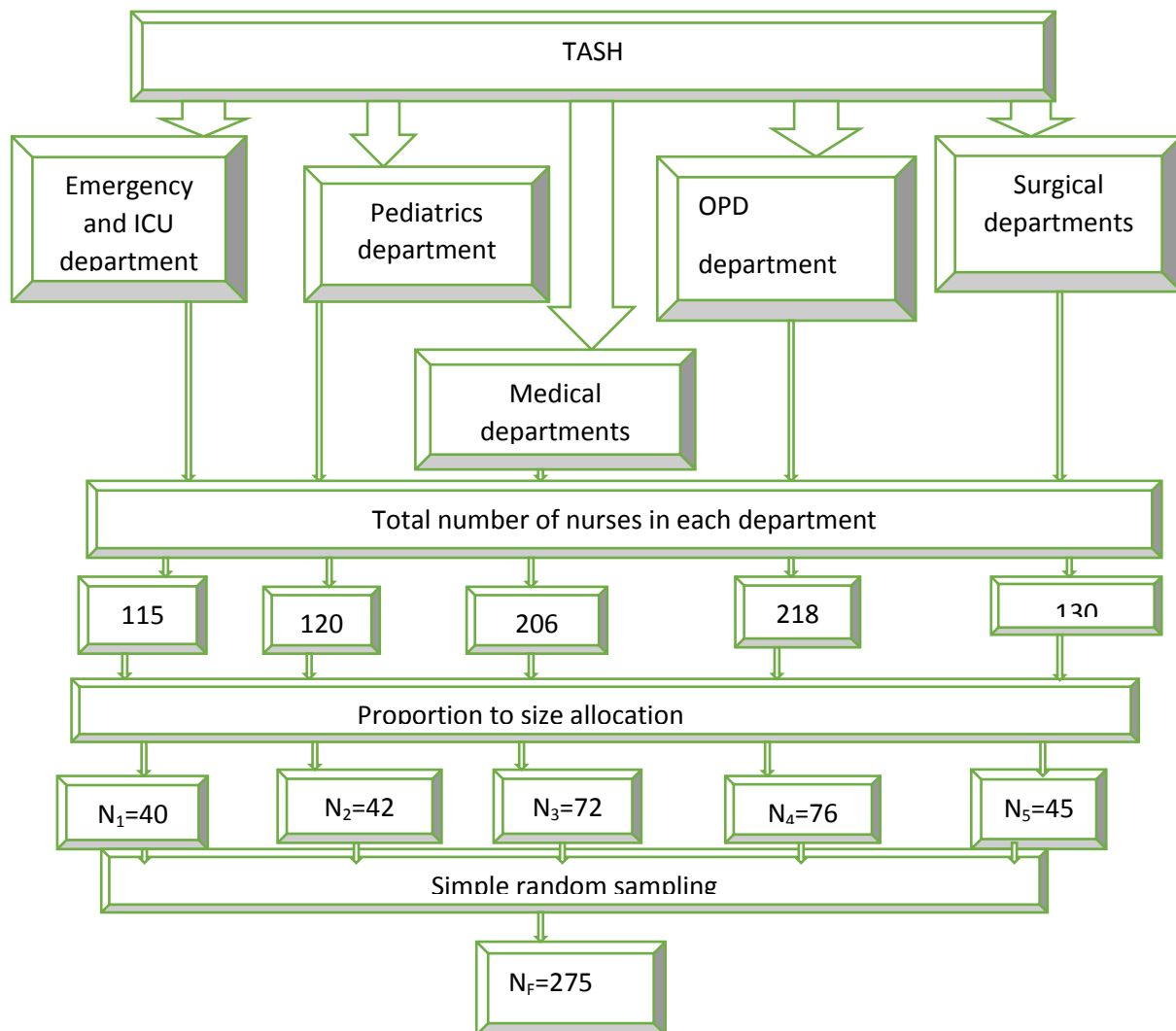


Figure 2: Schematic presentation of the sampling procedure to select the study participants, Addis Ababa, Ethiopia, 2017/2018.

#### **4.8. Operational definition and definition of terms**

**Needle Stick Injury:** - Is a percutaneous piercing wound typically set by a needle point, but possibly also by other sharp instrument or objects.

**Sharp:** Any object that can penetrate the skin including, but not limited to needles, scalpels, broken glass.

**Sharp injury:** An exposure event occurring when any sharp object penetrates the skin. This term is interchangeable with “percutaneous injury.”

**Safe injection:**-An injection that does not harm the recipient, does not expose the health care worker to any avoidable risk and does not result in waste that is dangerous for the community.

**Unsafe practice:** An injection that expose health care worker at risk of HBV,HCV, and HIV infection through percutaneous injury or contact of mucus membrane or non-intact skin with blood, tissue, or other body fluids that are potential infectious

**Safe:** Clean and no potential contamination of any sharps, syringe and needle with blood or other body fluids.

**Risky:** Dirty and potential contamination of any sharps, syringe and needle with blood or other body fluids.

**Hallow-bore needle:** Needle (e.g.’ hypodermic needle, phlebotomy needle) with a lumen though which material (e.g., medication and blood) can flow.

#### **4.9. Data collection tool and technique**

Quantitative data collection tool were a questionnaire informed by literature review and adapted from the WHO / ICN tool kit injection safety and the experience of the research done by Ethiopian Nurse Association. The data was collected using self-administered questionnaire. Data was collected by three BSc Nurses and supervised by two MSc nurses and one EMCCN principal investigator. Training was given by principal investigator for two days for data collectors and supervisors. Data were collected in Tikur Anibesa Specialized Hospital by introducing themselves, explaining the aim of the study and by agreed up on consent.

#### **4.10. Data quality management**

Data assurance were applied from the very beginning by review prior study and adopted from WHO/ICN, CDC tool kit, and pretest was by taking 5% of the study sample in Minilick hospitals and close monitoring of the activity of data collectors and supervisors by principal supervisor. The collected was checked for completeness, accuracy and clarity. Codes were given to the questionnaire and participant during data collection so that any identified errors could get traced back using the codes. Each filled questionnaire were checked and re-viewed for completeness by supervisor and principal investigator; the necessary feedback was given to the data collectors in the next morning.

#### **4.11. Data processing and analysis**

Data clean up and cross-checking were done before analysis. Data was checked, coded, completed questionnaires were given identification numbers and entered to epi info version 7.2.2 then it was exported to SPSS version 23 for analysis. Both descriptive and analytical statistical procedures were utilized. Descriptive statistics like percentage, mean, median and standard deviation were used for the presentation of socio-demographic data and prevalence of needle stick and sharp injury. Tables were also used for data presentation. Cross tabulation and chi square test were used. A binary outcome variable indicating “have you had any sharp and needle stick injury since last year?” The response was coded as “yes” and “no” and it was used as the dependent variable .Binary logistic regression was used to identify associated factors of needle stick and sharp injury among nurses working in Tikur Anbesa Hospital. All explanatory variables with p-value of  $\leq 0.2$  from bivariate logistic regression model was fitted in to the multivariate logistic regression model to control the possible effect of confounders and finally the variables which had been independent association with needle stick and sharp injury was identified on the basis of OR, with 95%CI and p-value less than 0.05. The variables were entered in the multivariate model using the Backward Stepwise regression method. Model fitness was checked by using Hosmer and Lemeshow goodness of a fit test.

#### **4.12. Ethical consideration**

Ethical clearance was applied from Ethical Review Board of Addis Ababa University, collage of medicine and health science, departments of emergency medicine and critical



care. Approval for the study area was obtained from Addis Ababa University, college of medicine and health science. An informed consent was obtained from participants who were signed or gave verbal consent to fill the questionnaires are allowed to do so. Nurses whom refused to participate in the survey were not force to participate in the study. Each study subject was informed about the objective of the study and confidentiality of the information which they were given. In addition, they were told that they have full right to withdraw from the study at any time if they feel that uncomfortable. A letter of cooperation was written by TASH to conduct this research in the hospital.

#### **4.13. Dissemination of results**

The findings of this study will be presented and submitted to Department of emergency medicine and critical care nursing, College of Medicine and Health Sciences, Addis Ababa University. In addition, it will be used as a reference for other researchers interested in these topics. It will be presented in different seminars and attempts will also be made for presentation in National / International Science of conference and for public in peer reviewed journal. Furthermore, the finding will be presented on appropriate seminars, conferences and workshops and will be published with scientific journals.

## CHAPTER FIVE

### 5. RESULT

#### 5.1. Socio demographic Characteristics of participants

A total of 268 hospital nurses responded fully to the self-administered questionnaire providing a response rate of 97.5%. From the total respondents 191 (71.3%) were female nurses. 115 (42.9%) were between age of 25-30 with the mean age of 29.97 years ( $SD\pm 5.68$  years). One hundred eighty seven (69.8%) were Orthodox Christians. In the marital status condition of nurse, more than half 158 (58.9%) were single followed by married which accounts 89 (33.2%). one hundred ninety eight (73.9%) nurses have work experience of less than five years with the mean work experience of 5.08 year ( $SD\pm 5.883$  years). Majority to the study participants 202 (75.4%) were BSC nurses by educational status (table 2)

Table 2: Distribution of socio-Demographic characteristics of nurses, TASH, Addis Ababa, Ethiopia, June, 2018.

Variables	Characteristics	Frequency(N=268)	Percentage (%)
Age	<25	59	22.0
	25-30	115	42.9
	>30	94	35.1
	Total	268	100
Sex	Male	77	28.7
	Female	191	71.3
	Total	268	100
Religion	Orthodox	187	69.8
	protestant	40	14.9
	Muslim	35	13.1
	catholic	6	2.2
	total	268	100

Marital status	Single	158	59.0
	Married	89	33.2
	Divorced	9	3.4
	widowed	12	4.5
	total	268	100
Educational status	Diploma	31	11.6
	BSC	202	75.4
	MSC	35	13.1
	Total	268	100
Work experiences	<5	198	73.9
	5-10	41	15.3
	>10	29	10.8
	Total	268	100
working departments	Emergency &	38	14.2
	ICU		
	Medical	72	26.9
	Surgical	45	16.8
	OPD	73	27.2
	Pediatrics	40	14.9
	Total	268	100

## 5.2. Prevalence and circumstances of needle sticks and sharp injuries

The prevalence (occurrence) of needle stick and sharp injury to nurses in TASH was 97(36.2 %) with 95% CI of 30.2% to 42.3%.

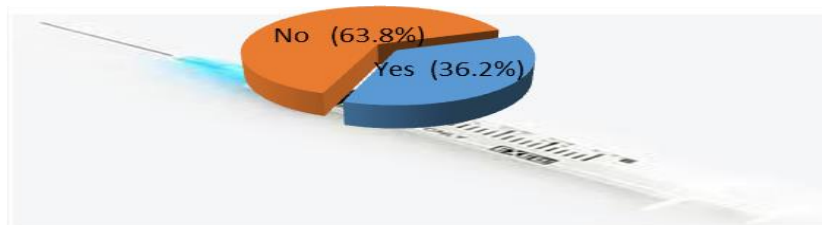


Figure 3: The prevalence of NSSI among nurses TASH, Addis Ababa, Ethiopia, June, 2018.

From the total of respondents who had experienced NSSI in the last 12 months prior to the study, (49.5%) were exposed once, while 27.8%, 14.4% and 8.2 were exposed two, three, four and above times per year respectively. But out of total respondents who had experienced NSSI in the last year 58.8% of nurses exposed in the last one month prior to the study, while 6.2% exposed two times and none of the respondents exposed three, four and above per month. Nearly one half of (46.2%) the injuries occurred in ICU unit. Other injuries occurred in surgical ward (44.4%), medical (39.9%), emergency (36%), OPD (35.6%) and pediatrics (20%).

Regarding parts of the body injured accounted by finger was 72.2% followed by hand 15.5% and 7.2%,7.2%, 6.2% were arm, thigh and palm respectively. The degree or severity of injury accounted by slight skin penetration was 53.6% and followed by superficial and deep were 33% and 18.6% respectively among injuries. On the other hand 77.3% of nurses inflicted self after injury happen and the other 14.4% and 12.4% of nurses inflicted by another staff and non-compliant patient respectively.

Regarding the practice of nurses on job, 44% of the respondents had recapped needles after use at least once during their work time. From those (69.5%) of the needles were recapped using one hand recapping, where us nearly one third (30.5%) of needles were recapped using two hand recapping. Among those nurses exposed NSSI ,workload (61.9%), fatigue(7.2%) and lack of proper equipment disposal(35.1%) were perceived causes of NSSI.64.5% of nurse know in which department or room they report and 71.3% nurses were responded that safety box available at right working places.

The study result Revealed that most frequent causative tools of needle stick and sharp injuries among exposed nurses was needle (87.6%) followed by blade (9.3%) then lancet (5.2%) (figure 4).

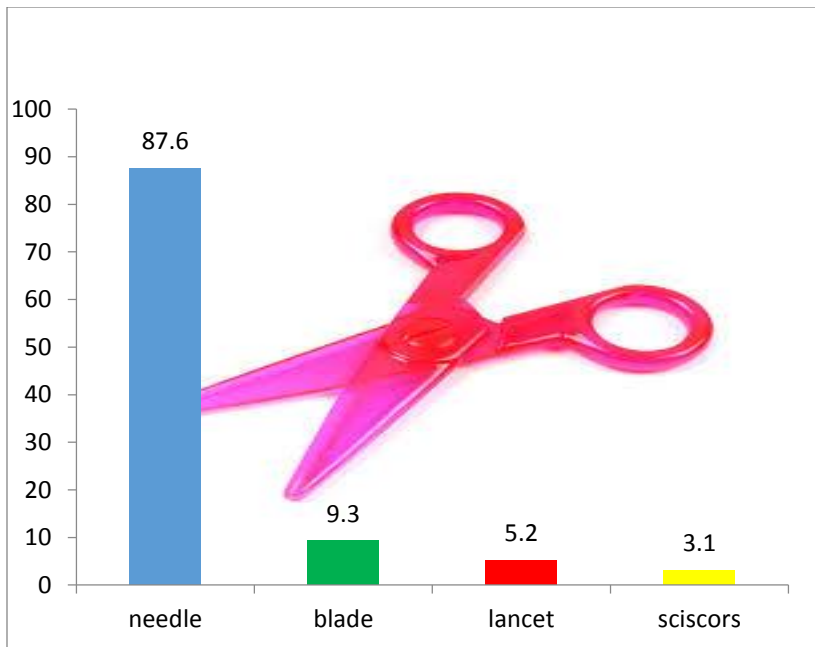


Figure 4 : Frequency distribution of causative tools of needle stick and sharp injuries among exposed nurses during the last year working at TASH, Addis Ababa, Ethiopia, June, 2018.

This study result represented that the most frequent procedures at which exposure happen were injection, Sample drawing, operation (38.1%, 24.7% and 16.5%) respectively.

Table 3: Frequency distribution of procedures at which exposure happened among the exposed nurses during the last year working at TASH, Addis Ababa, Ethiopia, June,2018.

Procedures	N=97	Percent (%)*
Injection	37	38.1
Suturing wound	12	12.4
Sample drawing	24	24.7
Operation	16	16.5
Needle recapping	10	10.3
Sharp disposal	6	6.2
Cleaning and sterilization of instruments	12	12.4
Failing of tools	2	2.1

The frequency distribution of procedure taken after exposure showed that 51.5% used antiseptic after exposure while 45.4% let blood to flow. Regarding vaccination, only (2.1%) took the vaccine while no one reporting the incident after exposure.

Table 4: Frequency distribution of procedure taken after exposure happened among the exposed nurses during the last year working at TASH, Addis Ababa, Ethiopia, June, 2018

Action taken	n=97	%*
Let blood to flow	11	11.3
Wash with water	50	51.5
Use with antiseptic	44	45.4
Lab investigation	2	2.1
Vaccination	2	2.1
Seroprophylaxis	9	9.3

\* Each of the percentages does not add up to 100% because respondents could choose several responses which could be more than one reason

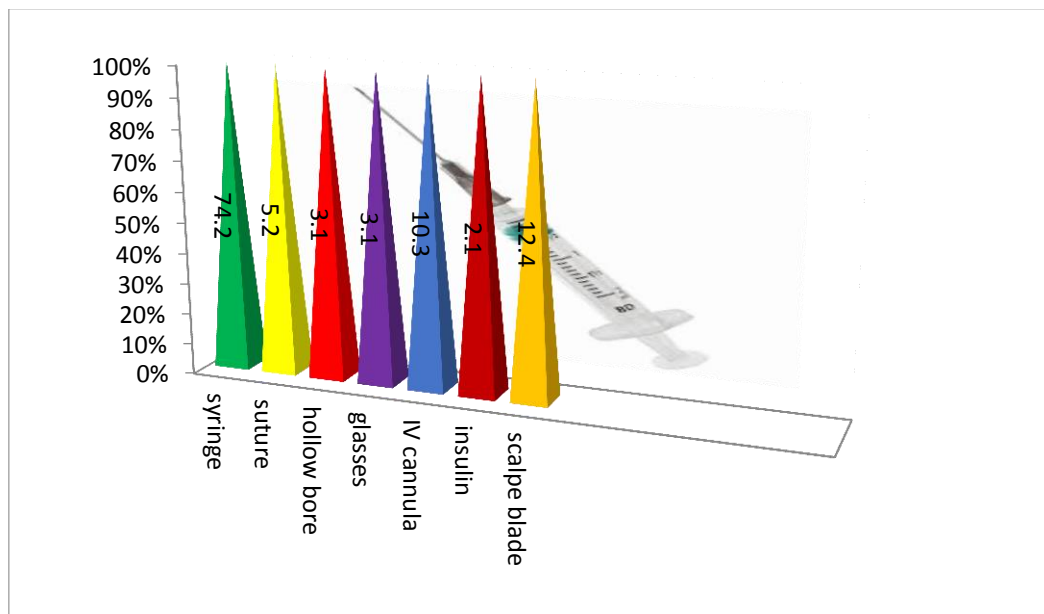


Figure 5: Frequency distribution of type of item causes NSSI among exposed nurses during the last year working at TASH, Addis Ababa, Ethiopia, June, 2018.

In this study result those factors contributed to NSSI were excess client 35.7% followed by shortage of glove 29.6% and the rest suturing 17.35%, shortage of sharp collection box 13.3%, during emergency situation 5.1%), recapping of used needle 8.2% and removing of used needle 12.2%. In another way from the total respondents 193(72%) of nurses observe needle stick and sharp injury on nurses. From this 101(52.3%) NSSI occur by abrupt movement of patients during clinical practice, followed by unsafe sharp collection 51(26.4%) and the rest two handed recapping and carelessness (negligence) of nurses, 37(19.2%), 18(9.3)] respectively.

In this study from 268 participants 180(67.2%) of nurses says that there was sharp collection box in the clinical area.

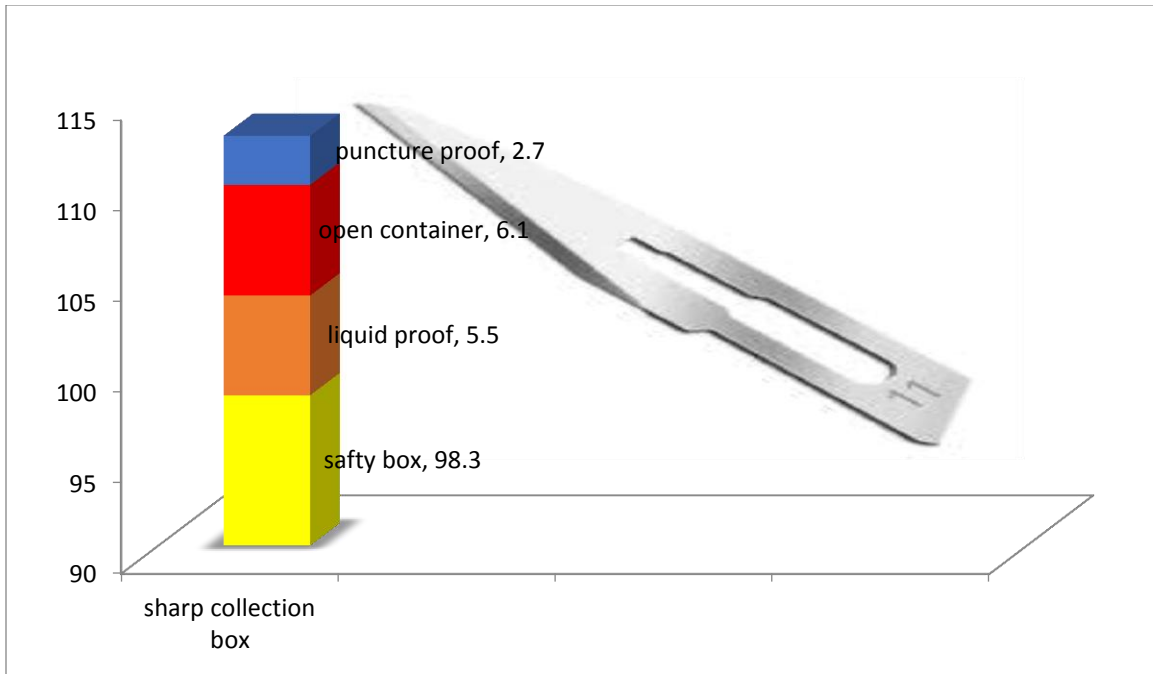


Figure 6: Distribution of sharp collection box in clinical area of TASH, Addis, Ababa, Ethiopia, June, 2018.

In this study from 268 study participants 188(70.1%) of nurses had seen over filled sharp collection containers in the clinical area were us 50(18.7%) and 30(11.2%) had seen torn, needle seen the hole and dirty syringe inside it respectively.

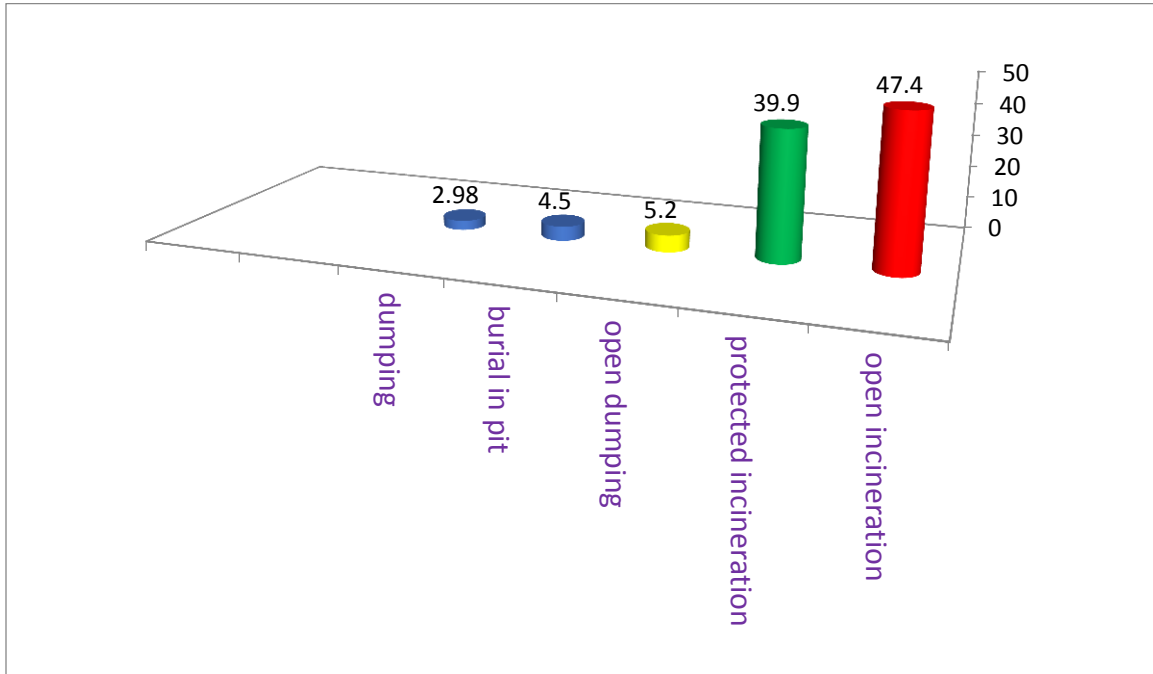


Figure 7: Percentage distribution of needle, syringe and sharp disposal system in TASH, Addis Ababa, Ethiopia, and June 2018.



Regarding the injection environment, 187(69.8%) staffs responded that their injection environments were unsafe. From the total respondents, one hundred forty six (54.5%) had got of site and onsite training on infection prevention prior to the study (table 5).

Table 5: Showing working environment and Behavioral Characteristics of nurses working in TASH, Addis Ababa, Ethiopia, June, 2018.

Variable	Response	Frequency (N=268)	Percentage
Training	Yes	146	54.5
	No	122	45.5
	Total	268	100
IP committee	Yes	197	73.5
	No	71	26.5
	Total	268	100
PEP	Yes	150	56
	No	118	44
	Total	268	100
HBV vaccination	Yes	174	64.9
	No	94	35.1
	Total	268	100
Department report when NSSI occur	Yes	173	64.6
	No	95	35.4
	Total	268	100
recapping of needle after use	Yes	118	44.0
	No	150	56.0
	Total	268	100
Observe any NSSI on nurses	Yes	193	72
	No	75	28
	Total	268	100
Sharp collection box	Yes	180	67.2
	No	88	32.8
	Total	268	100
Injection equipment	Sterilized and reused	21	7.8

	Single use	233	86.9
	auto disposable	14	5.2
	Total	268	100
Recommended practice to prevent NSSI	Yes	192	71.6
	No	76	28.4
	Total	268	100
Dirty sharps in working places	Yes	184	68.7
	No	84	31.3
	Total	268	100
Injection environment	Safe	81	30.2
	Unsafe	187	69.8
	Total	268	100

### 5.3. Cross tabulation of Needle stick and sharp injury within the past 12 month.

Generally, male respondents reported high prevalence of NSSI than female counterparts; for 50.6% male-compared to 30.4% female-respondents from those who had NSSI 1 year prior to the study ( $\chi^2=8.917$ ,  $p= 0.003$ ). Respondents who recapping needle after use were higher occurrence of NSSI (44.8%) compared with not recapping needle after use (29.3)  $\chi^2 = 6.285$ ,  $p = 0.012$ ).The occurrence of NSSI was higher in males (50.3%) compared with female (30.4%). This difference was statistically significant. The highest prevalence of NSSI was observed among nurses who practiced needle recap after use (44.9%) compared to those who do not have history of recap (29.3%). This difference was statistically significant. There is also statistically significant difference of NSSI among those who had seen dirty sharps in working places and those who did not seen. Neither the age nor marital status or the training, work experience and working departments had a significant effect on the prevalence of NSSI of the respondents.

Table 6: Cross-tabulation of prevalence of NSSI within the past one year among nurses in TASH, Addis Ababa, Ethiopia, June, 2018 (n = 268).

Variables	Characteristics	Frequency of NSSI in past one year			
		YES (%)	No (%)	$\chi^2$	p-value
Age	<25	21(35.6)	38(64.4)	0.068	0.967
	25-30	41(35.7%)	74(64.3)		
	>30	35(37.2)	59(62.8)		
Sex	Male	39(50.6)	38(49.4)	8.917	0.003*
	Female	58(30.4)	133(69.6)		
Marital status	Single	53(33.5)	105(66.5)	1.270	0.736
	Married	35(39.3)	54(60.7)		
	Divorced	4(44.4)	5(55.6)		
	Widowed	5(41.7)	7(58.3)		
Educational status	Diploma	6(19.4)	25(80.6)	7.324	0.026*
	BSC	73(36.1)	129(63.9)		
	MSC	18(51.4)	17(48.6)		
	Total				

Work experiences	<5	71(35.9)	127(64.1)	2.694	0.260
	5-10	12(29.3)	29(70.7)		
	>10	14(48.3)	15(51.7)		
working departments	Emergency	9(36.0)	16(64.0)	6.664	0.247
	ICU	6(46.2)	7(53.8)		
	Medical	28(38.9)	44(61.1)		
	Surgical	20(44.4)	25(55.6)		
	OPD	26(35.6)	47(64.4)		
	Pediatrics	8(20.0)	32(80)		
Training	Yes	60(41.1)	86(58.90)	2.887	0.089
	No	37(30.3)	85(69.7)		
IP committee	Yes	76(38.6)	121(61.4)	1.462	0.227
	No	21(29.6)	50(70.4)		
HBV vaccination	Yes	69(39.7)	171(63.8)	2.164	0.141
	No	28(29.8)	66(70.2)		
recapping of needle after use	Yes	53(44.9)	65(55.1)	6.285	0.012*
	No	44(29.3)	106(70.7)		
Dirty sharps in working places	Yes	75(40.8)	109(59.2)	4.689	0.030*
	No	22(26.20)	62(73.8)		
Injection environment	Safe	32(39.5)	49(60.5)	0.365	0.546
	Unsafe	65(34.8)	122(65.2)		

\*significant at  $p \leq 0.05$

## 5.4. Factor associated with NSSI within the past 12 month

### 5.4.1. Bi-variate and Multi-variate analysis

#### 5.4.1.1. Bi-variate Analysis

As described in table below the regression analysis of socio-demographic, NSSI circumstances on bivariate logistic regression showed that sex, COR =0.425(95% CI,0.247,0.731), educational status, COR = 0.227 (0.075, 0.688), current working department, COR = 0.313 (95% CL, 0.118, 0.8270) , dirty sharps in working places, COR =1.939( 95% CI, 1.098,3.423), and needle recapping COR=1.964(95% CI,1.185,3.255) have association with NSSI (Table 7).

Table 7: Bi-variate Logistic Regression Model Analysis of Factors Associated with NSSI; TASH, Addis Ababa, June, 2018

Variables	Category	NSSI		COR(95% CI)	p-value
		YES	NO		
Age	<25	21	38	0.32(0.473,1.834)	0.838
	25-30	41	74	0.934(0.530,1.645)	0.813
	>30	35	59	1	
Sex	Male	39	38	1	0.002**
	Female	58	133	0.425(0.247,0.731)	
Marital status	Single	53	105	0.707(0.214,2.3330)	0.569
	Married	35	54	0.907(0.267,3.7086)	0.876
	Divorced	4	5	1.120(0.196,6.414)	0.899
	Widowed	5	7	1	
Educational status	BSC	73	129	0.5349(0.260,1.101)	0.089*
	Diploma	6	25	0.227(0.075,0.688)	0.009**
	MSC	18	17	1	
Working department	Emergency	9	16	0.703(0.257,1.923)	0.493
	ICU	6	7	1.071(0.310,3.6980)	0.913
	Medical	28	44	0.795(0.374,1.6930)	0.553
	Surgical	20	5	1	
	OPD	26	47	0.691(0.324,1.476)	0.340

	Pediatrics	8	32	0.313(0.118,0.8270)	0.019**
Training	Yes	60	86	1.603(0.965,2.6630)	0.069*
	No	37	85	1	
Working experiences	<5	71	127	0.599(0.273,1.312)	0.200*
	5-10	12	29	0.44390.164,1.195)	0.108*
	>10	14	15	1	
Dirty sharps in working places	Yes	75	109	1.939(1.098,3.423)	0.022**
	No	22	62	1	
IP committee	Yes	70	80	1.495(0.833,2.6840)	0.1778*
	No	27	91	1	
Safety box at right places	Yes	70	121	1.071(0.616,1.862)	0.808
	No	27	50	1	
Universal prequention	Yes	72	120	1.224(0.699,2.144)	0.480
	No	25	51	1	
Sharp collection box	Yes	66	114	1.065(0.625,1.812)	0.818
	No	31	57	1	
Needle recapping	Yes	53	65	1.964(1.185,3.255)	0.009**
	No	44	106	1	
Injection environments	Safe	32	49	1	
	Unsafe	65	122	0.816(0.477,1.397)	0.458

\* Significant at  $p \leq 0.2$ , \*\* significant at  $p \leq 0.05$

#### 5.4.1.2. Multi-variate analysis

In the logistic multi variate analysis sex, current working department, dirty sharps in working places and needle recapping are statistically significant with the occurrence of needle stick and sharp injury. But, working experiences and status of infection prevention committee had not showed any significant association. On bi-variate analysis respondents being diploma in educational status were 77% less likely risk of experiencing injury compared to their counterparts. But this was not significant after controlling other variables in multivariable analysis.

In multivariate analysis the odds of needle stick and sharp injury was 54% less likely in female nurses than male nurses (AOR = 0.461 (95% CI, 0.252, 0.845). Those who worked in the pediatric ward were 68 % less likely to get injured by needle stick and sharp objects than those who worked in surgical ward. AOR = 0.323 (0.112, 0.930). The risk of NSSI were 1.78 times higher in nurses who had recapping needle after use than those nurses had not recapping needle after use; AOR=1.780 (95% CI,1.025,3.091).The total model was significant ( $p < 0.001$ ). All the value of the standard error in the model (0.127) was below 5 which indicated no multi-collinearity among variables. The result of the Hosmer and Lemeshow test ( $p = 0.791$ ) indicated the goodness of fit of the model. The Nagelkerke R Square shows that about 50% of the variation in the outcome variable (NSSI) is unexplained by this logistic model (Table 8).

Table 8: Logistic Regression Model Analysis of Factors Associated with NSSI; TASH, Addis Ababa, June, 2018(n=268).

Variables	Category	NSSI		AOR(95%CI)	P-value
		Yes	NO		
Sex	Male	39	38	1	0.012*
	Female	58	133	0.461(0.252,0.845)	
Working departments	Emergency	9	16	0.670(0.226,1.984)	0.469
	ICU	6	7	0.8464(0.214,3.487)	0.838
	Medical	28	44	0.666(0.288,1.542)	0.343
	OPD	26	47	0.711(0.299,1.692)	0.441
	Pediatrics	8	32	0.323(0.112,0.930)	0.036*
	Surgical	20	25	1	
Dirty sharp in working places	Yes	75	109	2.052(1.110,3.791)	0.022*
	No	22	62	1	
Work experiences	<5	71	127	1.413(0.520,3.839)	0.498
	5-10	12	29	0.602(0.202,1.795)	0.363
	>10	14	15	1	
IP Committee	Yes	70	89	1.702(0.878,3.299)	0.116
	No	27	91	1	
Needle recapping	Yes	53	65	1.780(1.025,3.091)	0.041*
	No	44	106	1	
Training	Yes	60	86	0.753(0.429,1.323)	0.324
	No	37	85	1	



## CHAPTER SIX

### 6. DISCUSSION

In this study the prevalence of nurse who sustains NSSI in the last 12 months was found to be 36.2% with 95% CI of 30.2% to 42.3%. This is in line (comparable) with the studies done in Ethiopia; Jima University hospital which showed 39.3% (53), Sidama Zone (32%), North western Ethiopia (31%) (51), India (33.3%) (35), central India (31.8%) (41) and Tehran (41%) (37). But the prevalence in this study is lower than the figure from earlier studies in south west Ethiopia 58.8% (48), Sri Lanka (43%) (40), Thailand regional hospital (55.5%) (34) and Iran Shiraz university hospital (54%) (43). However, this result is much lower when compared with study done in Ethiopia, Bahir Dar, 66.6% (50), South Korea (74.4%) (32), Pakistan (67%) (33), Nepal (74%) (36), Iran Imam Hussein hospital (63.3%) (38), Jordan (67.6%) (39), Iran Imam Reza hospital (73.3%) (42). This difference might be related to the fact that the above studies were conducted by mixing all types of health professionals from hospitals, health centers and clinics, socio-demographic/economic status, and cultural characteristics of study participants, sampling method and sample size. The other possible reason might be related to work load and the availability of resources as well as the work environment and related to different time of recall periods.

In this study the prevalence of NSSI were higher as compared to other studies like East Gojam Zone Health Institutions (22%) (51) and South Africa (18.8%) (45). It could be due to the difference in the study health facility set ups, so that the number of screening, diagnostic, follow up and other intervention procedures that use needles and medical sharp materials were less in health centers and even the year of the study. But whatever is the difference in the proportion of needle stick and sharp injury, nurses are at much higher risk to acquire blood borne pathogens such as HIV and other infectious diseases through needle stick and sharp injuries.

In this study majority of injuries was slight skin penetration (53.1%) while (32.7%) was superficial. Regarding causative tools, the most frequent causative tools were needle

(86.3%). The present study revealed 51% exposed nurses used wash with water after exposure while 44.9% of them with antiseptic solution. This was lower than study conducted in Egypt, zigzag university who reported that severity of penetration of needle stick and sharp injuries during the last year among nurses were superficial (74.24%) and the most procedure exposed nurses were injection and withdrawal of blood (56.06% and 43.18%) respectively and procedure taken after exposure showed that, all exposed Nurses used antiseptic after exposure while half of them let blood to flow (1). But This result is higher than study done by JUH for nurses shows that needle 25.6%, surgical blade 23.2% (53). This result is also higher than study done by National surveillance for health care workers (NASH) of USA show that 59% of all sharp injuries were caused needles and study conducted in India showed that 71% the needles involved in the NSSIs injury were needles(35, 54). This variation might be due to different time of recall period.

The study revealed that syringe needle was a major cause of the injuries (74.2%). It is much higher as compared to the study done in Tehran (Iran) (46.3%) (37) and south west Ethiopia (58.8) (47). However, it is consistent with a study done in South Africa (78.3%) (45). This implies that nurses who had been injured by NSSI might be due to inappropriate needle handling practices. It might be also due to majority of the procedures done for the patients require syringe needles that may put nurses under risk of injuries.

Regarding the frequency of injury, 49.5 % of the respondents had experienced injuries at least once in a year. This is a little bit higher than as compared to the study done in India (33.3%) (35). But whatever the difference of the proportions of NSSI, nurses might practice needle recapping after use which may put them under risk of injury. For instance, the prevalence of needle recapping after use in this study was 44 % and of these nearly one third (30.5%) was recapping using two hands. The practice of recapping is higher to the studies in Nigeria(46) (35.3%) and Northern Ethiopia (34.7%) (51).

In this study Injection 37.7% and blood withdrawal 24.5% were the major clinical activities that lead to NSSIs in this study. Study conducted in Saud Arabia, showed that

most of the injuries occur during injections 31.8% and drawing of venous blood samples 17.2% (55) And study conducted in India showed that the commonest clinical activities to cause NSSIS in that study were, 55% blood withdrawal, 20.3% suturing, 11.7% vaccination and recapping needles after use was 66.3% and according to a study done in Malaysia hospitals nurses 27.2% NSSIs causes were recapping of syringes after use (44). In this study 64.9% nurses were vaccinated against Hepatitis B. This result is higher than a study done in Jimma hospitals showed that 1.76% of the study subjects were vaccinated for hepatitis B vaccine (53) And study conducted Egypt showed that only (6.81%) were vaccinated for hepatitis B (1). This variation may be due to the presence of the vaccine in TASH.

Regarding to factors found to be associated with high prevalence of NSSIs. From those factors being female was significantly associated with NSSI; the odds of needle stick and sharp injury was 54% less likely in female nurses than male nurses (AOR = 0.461(95% CI, 0.252, 0.845). This is consistent with the report from south western Ethiopia (47). The possible explanations might be men are less likely to use universal precautions but further studies are warranted to identify exposure differences. Those who worked in the pediatric ward were 68 % less likely to get injured by needle stick and sharp objects than those who worked in surgical ward: AOR = 0.323(0.112, 0.930). This is also may be due to more advanced procedures and manipulation of syringe and sharp materials were done in surgical ward. Respondents who practiced needle recapping were 1.78 times more likely to experience injury than who did not recap needles after use: AOR=1.780(95% CI, 1.025, and 3.091). Recapping needles after use was positively associated With NSSI in previous studies Jimma zone (49).

Taking training on infection prevention was not found to be statistically significant on multivariable analysis in this study. Similarly, this finding goes in line with previous findings study in Bahir Dar, in which training for workers seem to be not necessarily brought about protection from injury exposure. The reason for this may be: (i) Knowledge gained may not necessarily be transferred into practice of preventive measures or knowledge received may not be sufficient. (ii) Those who participated on the

infection prevention training may be other workers who are working as administrators rather as nurses working in clinical area (i.e. the training missed the personnel under risk of injury). (iii) The training might be given after the workers sustained the injury. (iv) The provided training may be more of theoretical than practical. Lastly, the sample size might not sufficient enough to detect the differences.

Current Working Unit/department/, sex, presence of contaminated needle and sharps materials in the working area and needle recapping had significant association with the occurrence of sharp and needle stick injury in nurses; AOR = 0.323(0.112,0.930), (AOR = 0.461(95% CI,0.252, 0.845), AOR=2.052(1.110,3.791) and AOR=1.780(95% CI,1.025,3.091) respectively (p<0.05). This result is almost different with study conducted in East Gojjam Zone Health Institutions health care workers which showed the following results: sex of the worker, infection prevention and safety information access and getting training on infection prevention showed a significant association with the occurrence of needle stick and sharp injuries in health care workers (56).This difference may be related to difference of the setups they use (standard precaution guidelines) and mixing all types of health professionals from health centers.

## **CHAPTER SEVEN**

### **7. LIMITATION AND STRENGTH**

#### **7.1 Strength of the study**

Since the study was conducted among randomly selected nurses it might be generalized to all nurses who had direct contact with patients or equipment's used on patients working in the study hospital.

#### **7.1. Limitation of the study**

- Some staffs couldn't remember that they sustained needle stick and sharp injuries within the past 12 months, some respondents were not sure their information kept secrets and nurses was recruited during their lunch time and not comfortable to answer freely. Since participants have been asked a one year exposure experience, there might be recall bias.
- Since the study was based on self-reported data in estimating the prevalence of NSSI exposure; a common threat to the validity of the self-report that can lead to information bias such as social desirability and recall bias.
- In addition, a cross-sectional study by its nature cannot establish definitive cause and effect relationship to identify the risk factors.

## **CHAPTER EIGHT**

### **8. CONCLUSION AND RECOMMEDATION**

#### **8.1. Conclusion**

This study revealed that more than one third of study participants had needle stick and/or sharp injury at least once in the previous 12 months. The proportion of needle stick and sharp injury in the last one year was found to be high.

In general this study revealed that no single factor accounted for the occurrence of NSSIs.

Presence of contaminated needles and/or sharps materials in the working area and needle recapping after use were positively associated with needle stick/sharp injury; while working in pediatrics ward and being female showed negative association.

## 8.2. Recommendation

Based on the findings of this study the following recommendations forwarded to MOH Ethiopia, Addis Ababa City Administration Health Bureau, TASH Managers and TASH nursing professionals to reduce the occurrence of NSSIs and the consequences of NSSIs among nurses working in TASH:

- **TASH Hospital administrates and nursing service directors:** Strengthened regular provision of information on infection prevention and safety to nurses at all levels to creating safe working environment for nurses. Continuous monitoring of the work place safety and appropriate sharp disposal system.
- **TASH Nurse Professionals:** Practice proper use of safety box and personal protective equipment during handing needle and sharp. Nurses involved in safe segregation and disposal of all sharps items immediately in marked containers.
- **Health policy makers:** Formulate strategies to improve the working condition for nursing professionals and increase their adherence to universal precautions.
- **MOH:** continuous monitoring of the work place safety should be ensured by MOH.
- **Addis Ababa City Administration Health Bureau:** Regular reporting, follow up and evaluation of occupational injury exposure among nurses need to be introduced.
- **NGO:** Creating awareness to nursing professionals on safety practices of injection.

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## 10. ANNEXES

### Annex I: Participants Information and Consent Form

Information sheet:

This questionnaire was designed to investigate the prevalence and factors associated of needle stick and sharp injury sustained by nurses in Tikur Anibesa Specialized Hospital in Addis Ababa. It were look in to the following details back ground information, prevalence, associated factors and circumstances surround ding needle stick injuries. There was no risk to take part in the survey, all information were confidential. Their name was not kept in the form. Their participation in the survey was voluntary: They were not obliged to participate and may discontinue at any time. Moreover, this research thesis was approved by Ethical review board of AAU and college of health science, department of emergency medicine.

Consent Form

Hello! Good morning/afternoon? My name is ----- I am here today to collect data on the Assessment of prevalence and associated factors of needle stick and sharp injuries among nurses in Tikur Anibesa Specialized Hospital. The objective of this questionnaire was to assess prevalence and associated factors of needle stick and sharps injuries among nurses in Tikur Anibesa Specialized Hospital. Your correct and genuine response or answer to the questions can make the study achieve its goal. Therefore, you are kindly requested to respond very voluntary with patience. The questionnaire may take 10 to 15 minutes. We assure you that this study is surely confidential, thus writing your name is not needed. Are you willing to participate in answering the questionnaire?

Yes! Go to the next page.

No! Thank them and interrupt to take response.

Sign of the consenting interview .....

Supervisor's name .....

Sign .....

## Annex II: Questionnaire Check List

### I. Sociodemographic characteristics

No.	Questions	Choices	Skip
101	Age in years?		
102	Sex?	Male Female	
103	Level of education?	1) diploma nurse 2) BSC nurse 3) MSC nurse	
104	Marital status	Single married divorced/separated widowed	
105	Religion	Orthodox Muslim Protestant Other(specify)-----	
	Experience in years		
106	Current working Department	1) Emergency 2) OPD 3) Pediatrics 4) medical 5) surgical 6) ICU	
107	Is there any infection prevention committee?	1) Yes 2) No	
108	Have you ever been vaccinated for HBV?	1) Yes 2) No	

II. Information on needle stick injury and sharp injury (NSSI)			
201	Type of injection equipment (syringe and needle) used in the facilities	1) Sterilized and reused. 2) Single Use 3) Auto disposable 4) Other (specify) .....	
202	Have you had any sharp and needle stick injury since last year?	1) yes 2) No	
203	perceived causes of NSI by nurses	Workload Fatigue Lack of proper equipment for disposal Any other (carelessness)	
204	How much sharp (needle) injury have you sustained since last 12 months?	1) One time 2) Two times 3) Three times 4) Four and above	
205	How much sharp (needle) injury have you sustained since last 1 months?	1) One time 2) Two times 3) Three times 4) Four and above	
206	In your most recent needle stick injury, What type of item caused your injury?	1) Syringe needle 2) Suture needle 3) Butterfly needle 4) Hollow bore needle 4) Glasses item 5) IV cannula 6) Insulin needle	

		7) Scalpel blade 8) Other Sharp.....	
207	Type of injury you sustained?	1) Deep injury 2) Slight skin penetration 3) Superficial 4) Others (specify).....	
208	Causative tools of NSI and sharp injury during the last year?	Needle Blade Scissors Lancet Others	
209	What parts of the where injured	1) Hand 2) Thigh 3) Finger 4) Palm 5) Arm	
2010	How was the injury inflicted	1) Self 2) Another staff 3) Non-compliant patient 4) Other, specify.....	
2012	Which Procedure exposed for NSI and sharp injury	Injection Suturing wound Sample drawing Operation Needle recapping Sharp disposal Cleaning and sterilization of ins Failing of tools Others	
2013	What actions taken after exposure happened during NSI	Left blood to flow Wash with water	



	and sharp injury in the last year?	Use antiseptic Lab investigation Vaccination Seroprophylaxis Reporting	
2014	Do you know which unit / Department or room you may report if you exposed or sustained sharp or needle injury?	1) yes 2) No	
2015	In your last NSI, you sustained or observed which of the following factors contributed to NSI?	1) Excess clients, 2) Shortage of gloves 3) Shortage of sharp box 4) Emergency Situation 5) Recapping of used needle 6) Removing of used needle 7) Attempting to bend the needle 8) After drawing the blood 9) Lack of training 10) During injection 11) During suturing 12) During securing IV line 13) Other( specify)-----	
2016	Have you had on site or off site training on infection prevention?	1) Yes 2) No	
2017	Is there any active post sharp exposure management system in your facility	1) Yes 2) No	
2018	Did you recapping needle after	1) Yes	

	use?	2) No	
2019	How did recapping of the needle occurring?	1) Single handed 2) Two handed	
2020	Have you observed any needle stick injury on nurses?	1) Yes 2) No	
2021	How did the needle stick injury occur?	1) Abrupt movements of the patient/s 2) Two handed recapping 3) Unsafe sharp collection 4) Carelessness/ negligence 5) Other(specify)-----	
2022	How is the injection environment?	1) Clean and no potential contamination of syringes and needles with blood or other body fluids 2) Dirty and potential contamination of syringes and needles with blood or other body fluids. 3) Comments	
2023	Are there any needle, syringes, and sharp collection box in the room?	1) Yes 2) No	
2024	Type of needle, syringes and sharp collection box? ( you can select more than one)	1) Safety box 2) Liquid proof 3) Open container 4) Puncture proof 5) Others (specify) .....	
2025	Have you ever seen sharp container ( can select more than one)	1) Over filled 2) Torn and needle seen through the hole 3) Empty or few dirty syringes and needle	

		inside it 4) Others (specify)	
2026	Have ever seen any dirty needles and sharps in place where they expose nurses to needle stick injuries.	1) Yes 2) No	
2027	How are needles, syringes, and sharps disposed In your facility	1) Open incineration 2) Protected incineration 3) Open dumping 4) Burial in a pit 5) Dumping 6) Other (specify) .....	
2028	Is there a list of recommended practices to prevent NSI in your work place? Ex. Universal Precaution?	1) Yes 2) No	
2029	Are there safety box available at your work point as long as your hand stretch	1) Yes 2) No	
2030	What suggestion do you have for preventing needle stick injury (NSI) and Sharp injury	Change the attitude of nurses on safety injection Education and training for nurses Change perception of nurses on risk of NSI and sharp injury. Others specify	

### **Annex III. Assurance of Principal Investigator (declaration)**

The undersigned, declare that this thesis is my original work and has not been presented for degree in this or any other university, and all sources of materials used for this thesis have been fully acknowledged.

Name of the student: BIKIS LIYEW (BSc)

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Advisors: Dr. Menbeu sultan

Signature: \_\_\_\_\_ Date \_\_\_\_\_

Mr. Mebrat Micheal

Signature: \_\_\_\_\_ Date \_\_\_\_\_