

**OCCUPATIONAL HAZARDS AND ASSOCIATED FACTORS AMONG  
NURSES WORKING IN JIMMA ZONE PUBLIC HOSPITALS,  
SOUTH WEST ETHIOPIA**

**BY**

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**A RESEARCH THESIS SUBMITTED TO DEPARTMENT OF  
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**JIMMA UNIVERSITY**

**COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES**

**DEPARTMENT OF NURSING**

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## **ASSURANCE OF PRINCIPAL INVESTIGATOR**

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the Faculty of Public Health in effect at the time of grant is forwarded as the result of this application. I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or any other university.

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## **ABSTRACT**

**Background:** *Every nurse around the world is at risk of developing occupational hazard as a result of exposure to blood or body fluid and needle or sharp injuries resulting in blood born infection. However, to what extent this hazard occur among nurses in Jimma zone public hospitals is not known.*

**Objective:** *To assess occupational hazards and associated factors among nurses working in Jimma Zone public hospitals, South-West Ethiopia, 2014.*

**Methods:** *Institution based Census was conducted on 318 nurses working in Jimma zone public hospitals from March 1-14, 2014. Data was collected by structured self administered questionnaire and edited, entered into Epi-Data version 3.1 and exported to IBM SPSS Statistics Version 16 for analysis. Percentage, frequency and mean were calculated. Logistic regression was done to see the association between the independent and the dependent variables and variables with P-value less than 0.25 in the bivariate analysis were included in the multivariate model. The result was summarized and presented in texts, tables, charts and graphs.*

**Result:** *The mean age of respondents were  $27.91 \pm 6.84$  years. Out of a total of 318 nurses participated on study, about 161 (50.6 %) of them were males, 174(54.7 %) single and 173(60.7 %) were diploma holders. Majority, 249(78.3%) of nurses had occupational hazards. Needle stick/sharp injury and blood/body fluid exposure occurs in 58.8% and 62.6% of respondent respectively. The highest frequency of needle stick/sharp injury and blood/body fluid exposure was occurred twice a year. The majority of occupational hazards were occurred during morning shift. Sex, marital status, working unit, and training on infection prevention were significantly associated with occupational hazards at  $p \text{ value} < 0.05$ .*

**Conclusion and recommendation:** *There is high prevalence of occupational hazard among nurses working in Jimma zone public hospitals. Working unit and training are work related factors significantly associated with occupational hazards. Working unit specific safety precaution and basic infection prevention in-service training is recommended.*

**Key Words:** *Occupational hazards, Nurses, Public hospitals.*

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## **Abbreviations/ Acronyms**

AOR	Adjusted odd ratio
BBF	Blood and Body Fluid
CDC	Center for Disease control
COR	Crude odd ratio
DUHS	Duke University Health System
FMOH	Federal Ministry Of Health
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HCWs	Health Care Workers
HIV	Human Immunodeficiency virus
ILO	International Labor Organization
JU	Jimma University
JUSH	Jimma University Specialized Hospital
NSIs	Needle Stick Injuries
OPD	Outpatient Department
USA	United State of America
WHO	World Health Organization

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Back Ground**

According to ILO/WHO definition, occupational health is the promotion and maintenance of the highest degree of physical, mental and social well being of workers in all occupation(1). Occupational hazard is any condition of a job that can result in illness or injury. Hazard is a future source of danger that has the potential to cause injury, disease, stress and death of the people but risk is the chance, high or low that somebody could be harmed by chemicals, electricity and other hazards, together with an indication of how serious the harm could be(2). Almost everything may be a hazard, but it may or may not become a risk (3). A health hazard is something that can produce a negative effect on people's health, either immediately or over time. The World Health Organization has identified the major steps in an assessment of health hazards: hazard identification, risk characterization, exposure assessment, and risk estimation (4).

Blood and body fluid exposures and needle stick injuries place healthcare workers at risk for numerous blood-borne infections, most importantly human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV) (5). Occupational exposure to blood borne pathogens from needle sticks and other sharps injuries is a serious problem, but it is often preventable(6) . Needle stick and sharps injuries have been recognized as one of the occupational hazards among health care workers(7). Nurses are the major health care provider in the hospital and more potential to exposure with blood and body fluid (8) .

According to the Centre for Disease Control and Prevention the two main types of occupational exposures to patients' body fluids are percutaneous or non-percutaneous exposures. Percutaneous injury is an exposure event occurring when a needle or other sharp object penetrates the skin and it is interchangeable with sharps injury. A non-percutaneous or mucous membrane exposure is contact of mucous membrane (e.g. eyes, nose, or mouth) with the fluids, tissues, or specimens(10). Therefore the purpose of this study is to assess the prevalence of occupational hazards and associated factors.

## **1.2 Statement of the Problem**

Despite advances in our understanding and control of the infections, occupational blood and body fluid exposure continues to be the major worldwide public health problem (8) and serious concern for health care workers among 35 million HCW globally(11). Over 20 million dedicated health care providers expose themselves to biological, chemical, and mechanical hazards daily. The World Health Organization estimates that approximately three million health care providers are exposed to blood and body fluid due to needle stick or sharps injuries annually and more than three fourth needle stick injuries are preventable with the use of safe needle devices(12). Over 90% occurring in resource constrained countries (11).

Needle stick injuries may expose HCWs to more than 20 different blood-borne pathogens, including hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) (13). It is the most important problems for HCWs as they increase the risk of spread of infection/diseases and common occupational health hazard in nurses with alarmingly high rates(14). Hospital nurses are at particularly high risk for contracting blood-borne infections, as most of their NSI incidents involve devices that are very efficient at transmitting pathogens, such as hollow-bore needles (15). It is estimated in USA that the reported incidence of needle stick injury in nurses is currently 16.3% (16). Research also revealed that around two thirds of disease sero- conversions following NSI will occur among nursing staff(17). Needle stick injuries occur most often while using disposable syringes with hollow-bore needles.

The Centers for Disease Control estimates that 236,000 NIs involving hollow-bore needles occur each year in the United States(18). The problem is more devastating in developing countries like Ethiopia with poor infrastructure and health setup(19). So nurse managers considered gains for staff and patients were made with the implementation of a team based approach to nursing care. This team based approach to care was regarded by managers to enable nursing staff of varying experience and skill to provide care more safely as direct supervision by more experienced staff was possible (20).

For all newly hired nurses job orientation shall be provided and a continuing in-service training program on appropriate use of sharps safety mechanism is conducted (21).The needle stick injuries were the most prevalent of occupational exposures to patients' body fluids among nurses that led to blood borne infections (22). Information about the prevalence of occupational hazards and its determinants is crucial for health planner in occupational health but As far as the researcher 's knowledge is concerned, little is known about the prevalence of occupational hazards and its determinants in Jimma zone public hospitals. so the current study will help to fill this gap.

## **CHAPTER TWO : LITERATURE REVIEW**

### **1. Prevalence of Occupational hazards**

Occupational body fluid exposure is the exposure to potentially harmful chemical, physical, or biological agents that occurs as a result of one's occupation . A cross-sectional survey conducted in hospitals of Fars Province, Southern Iran showed that approximately three-fourths of participants reported experiencing a blood and body fluid contamination at least once during the prior year, with most being exposed to blood 87% (23). Other cross-sectional survey done in 2013 among Cypriot Nurses revealed that almost half of the participants (48.9%) reported a previous exposure to pathogens(41). A descriptive epidemiological study done in tertiary teaching hospital in Adelaide, Australia revealed that from a total of 640 incidents of work related sharps injury and body fluid exposures, 42% were exposed to body fluids(25). Out of 131 exposures occurred in Tikur Anbesa University Hospital, around one third exposures were due to splashes of patient's body fluids (22). Similar study conducted in Australian teaching hospital revealed that, 57% exposures were from splashes of blood, around 20 % were from saliva/sputum, nearly 9 % were from urine and 3% were from vomit (26). Also the study done in six General Hospital in Attica working at emergency departments showed that the majority (98 %) were exposed to blood , above 50% to urine and nearly 50 % to vomit and other finding from this study revealed that more than half participants(52.8%) reported blood/body fluid exposure during evening shift, about 31% of them during morning shift and around 17% during night (27).

Sharps injuries are one of the most serious occupational accidents among health workers due to the possible severe consequences, such as the transmission of infectious diseases. A qualitative research conducted in the Ethekewini district health facilities showed that the incidence of nurses sustaining needle stick injuries is higher than other categories in the medical profession, for example 78% of the participants believe that professional nurses are more at risk of sustaining needle stick injuries than other categories (28). Different study report shows that the incidence of sharp injury vary from country to country or place to place. For instance around 0.02 in British (29), 0.58 in Australia (25) and 0.11 in Saudi Arabia [(30). Also study conducted in different area revealed that the prevalence of needle

stick injury was around 55 % in Thailand regional hospital (31) , 69 % in Ghurki Trust Teaching Hospital, Lahore and Pakistan(32), more than half (56.7 %) in Turkey (33) and around half (48.1 %) in Tikur Anbesa Unversity Hospitals (22). A cross sectional survey conducted in Pakistan showed that majority of nurses (39%) sustained needle stick injuries more than once, while only 11% once in their life(34). Similar cross-sectional study done in Sub-Saharan Africa revealed that more than half (57%) of nurses reported at least one needle stick injury in one year duration (35).

Different study report showed that the prevalence of different needle type related to needle stick / sharp injury among nurses vary from place to place. For instance around 65 % in Turkey (36) and 63% in Saudi Arabia (30) was by syringe needle; almost 19 % in Turkey (36) , one fourth (25.7%) in West Bengal (37) and around 15 % in Saudi Arabia (30) was by suture needle. A hospital-based retrospective study done in two medical college hospitals of west Bengal revealed that out of 140 most recent injuries 53.6% were associated with disposable needle (37). While similar study done in Korea suggests that 14.5% of needle stick injury was by blood glucose lancets (15). A cross sectional study conducted in Serdang Hospital Malaysia using a self administered validated questionnaire revealed that around 9% reported butterfly needle and 5% reported lancet (38). Of all nurses 5.5% by insulin syringe and 3.2% by i.v needle, as a proportion of all needle stick injury events, insulin syringe needles accounted for 30 % followed by i.v needles 16.3% (39).

Nurses sustained a needle stick injury while recapping ,disposing and injecting medicine, or drawing blood(30). The most common procedure that leads to needle stick injuries among nurses were injection (47%) , ampoule breaking (27%), and recapping (26 %) (34). A self reporting survey conducted in a German university hospital also showed that needle stick injuries occurred 23% in suturing and 13% in vein puncture (40). From occupational exposure incidents 12.2% was occurred from taking of a blood specimen (22). A retrospective study conducted in Australian teaching hospital revealed that, sharps injury occurred 11 % during disposal process and 5 % during recapping(37). A cross sectional survey done in Korea showed that working mixed shifts (day shifts followed by night

shifts, or vice versa) increased the risk of any needle stick injury when compared to nurses who worked exclusively on day shifts or night shifts(15). For example a cross sectional survey done in three Public Sector tertiary care hospitals of Pakistan showed that one third of nurses experienced needle stick injury in morning shift where as 15% sustained needle stick injury in evening and 6% at night (34).Also study done in China suggest that nurses working mixed shifts were 3.5 times more likely to have sustained a NSI than those who did not(42).

## **2. Factors associated with Occupational hazards**

### **2.1. Socio Demographic Factors**

A cross sectional survey done in Korea suggests, having an age younger than 27 years was associated with a 4.5 fold increased risk of any needle stick injury and a 3.1fold risk of syringe needle injuries (15). Other cross-sectional study carried out in Turkey revealed that the incidence rate of sharp or needle stick injury was highest in the  $\leq 24$  years age group at 92.9% and the risk of having sharp or needle stick injury in this group was 13 times higher than for those aged  $\geq 40$  and also 83.3% experiencing sharp or needle stick injury during the whole professional life occurred most often in the  $\geq 40$  years age group. (41).

The study report from the Duke Health and Safety Surveillance System showed that blood and body fluid exposure rates stratified by age found rates to be highest among employees 25–34 years of age, with rates decreasing thereafter with age and exposure rates for employees older than 35 years were found to be significantly lower than the rate for all ages combined and overall annual exposure rates were significantly higher for males than females with the same trend holding for percutaneous exposures(5).

### **2.2 Work related factors**

The study conducted in Australian Tertiary Hospital revealed that risks of sharps injuries varied between different units within hospital (25). For instance the study result in tropical Australian hospital revealed that, the prevalence of needle stick injuries in surgical ward was 23.9% , in the medical wards 21.0% and in the maternity/neonatal wards 7.4% (17).



Similar study conducted in British Columbia showed that needle stick incidents occurred predominantly in operating rooms (15.0 %), around 11% in treatment rooms and 3.0 % in Intensive care unit(29) .Other retrospective survey in sudi Arabia related to needle stick injuries revealed that around 16 % in the operation theatre, 13.7% in the intensive care unit and 2.7% incidents were reported from the outpatient department (30). A cross sectional study carried out with nurses working at a university hospital in Ankara, the capital of Turkey showed that the occurrence of sharp or needle stick injury was higher in nurses who had worked in the intensive care unit for the last year (82.1%), and their risk being 2.66 times higher than for those working in outpatients (41). And also the study done Chinese Hospital revealed that nurses working in the gynecology department were only 0.3 times as likely to report an NSI as nurses in other areas (42).

A cross sectional study carried out in Turkey showed that the incidence of sharp or needle stick injury and number of years in the profession was 82.0% in the group with  $\leq 4$  years of service and 38.8% in nurses with  $\geq 15$  years of service (41). A cross sectional survey done in three Public Sector tertiary care hospitals of Pakistan showed that more than half of nurses (55%) were attending 11-30 patients per day whereas one fifth (20%) of the nurses were attending more than 50 patients(34).

The study conducted in sub Saharan Africa showed that the strongest risk factor for needle stick injury was not having attended any training session; those nurses who had not attended any training on infection prevention and management of needle stick injuries in their workplace were 5.72 times significantly greater risk of sustaining injury compared with those who had attended training(35) .

The study conducted in Australian Tertiary Hospital revealed that risks of body fluid exposures varied between different units within hospital(25). For instance a descriptive cross-sectional study conducted in Tikur Anbesa University Hospital showed that the highest number of body fluid exposures occurred in inpatient wards (34.4%), followed by the emergency department (19.8%), then the operating theatre (13.7%) and lastly the labor ward (13.0%) (22). Also the study done at Sydney teaching hospitals of Australia showed that occupational exposure to patients' blood and body fluid in medical ward (9%), in surgical ward (25%), in outpatients (7%) and in operating theatres (9%)(43). Other study

result in British Columbia, Canada reported that splash incidents occurred predominantly in operating rooms (12 %) and around 5 % in intensive care unit(29). Additionally a cross-sectional survey conducted in hospitals of Fars Province, Southern Iran revealed that 41% of blood and body fluid exposure occurred most frequently in surgical wards (23).

The study done in Duke Health and Safety Surveillance System revealed that a decrease in the rate of exposure was observed as years of employment at DUHS increased, with a greater rate being observed among workers with less than 5 years experience (5). Similar study conducted in Attica General Hospital showed that 39.5% of the participants worked up to 3 years, around 15 % 4-5 and 6-10 years, nearly 9 % 11-15 years, almost 10 % 16-20 years and 9.7% >20 years (27).

### **2.3 Professional Factors**

The study conducted among health care workers in a German university hospital showed that about 70 % of needle stick injuries occurred when gloves were used and around 30 % of the HCWs who reported needle stick injury were not wearing gloves(40). Also other cross-sectional study performed in Turkey showed that 31.7% had not used gloves when injured, the reason given for not wearing gloves was lack of time (46.6%)(33).

A descriptive design that used a self- administered questionnaire conducted in Turkey showed that 67.4 % wore gloves sometimes when they were carrying out a patient- related procedure, 61.7% always washed their hands before wearing gloves, and 92.2% always washed their hands after removing gloves(44). Other study conducted in six General Hospital in Attica revealed that 47.6% wore gloves, 21.0 % wore double gloves and 0.8% wore mask (27). A cross sectional study done on prevalence and associated factors for percutaneous injuries and splashes among a random sample of health care workers in a provincial hospital, Kenya showed that 98% of HCWs wore protective equipments, 9% were worn double gloves, only 18% were worn masks but no eye shield or face shield was worn during execution of procedures at the time splash exposures occurred (11). Also similar cross-sectional survey conducted in hospitals of Fars Province, Southern Iran revealed that 38% employees were not using any protective equipment (e.g. gloves and goggles) (23).

## 2.1. Conceptual Framework of the Study

This conceptual framework was developed by principal investigators after reviewing relevant literatures.

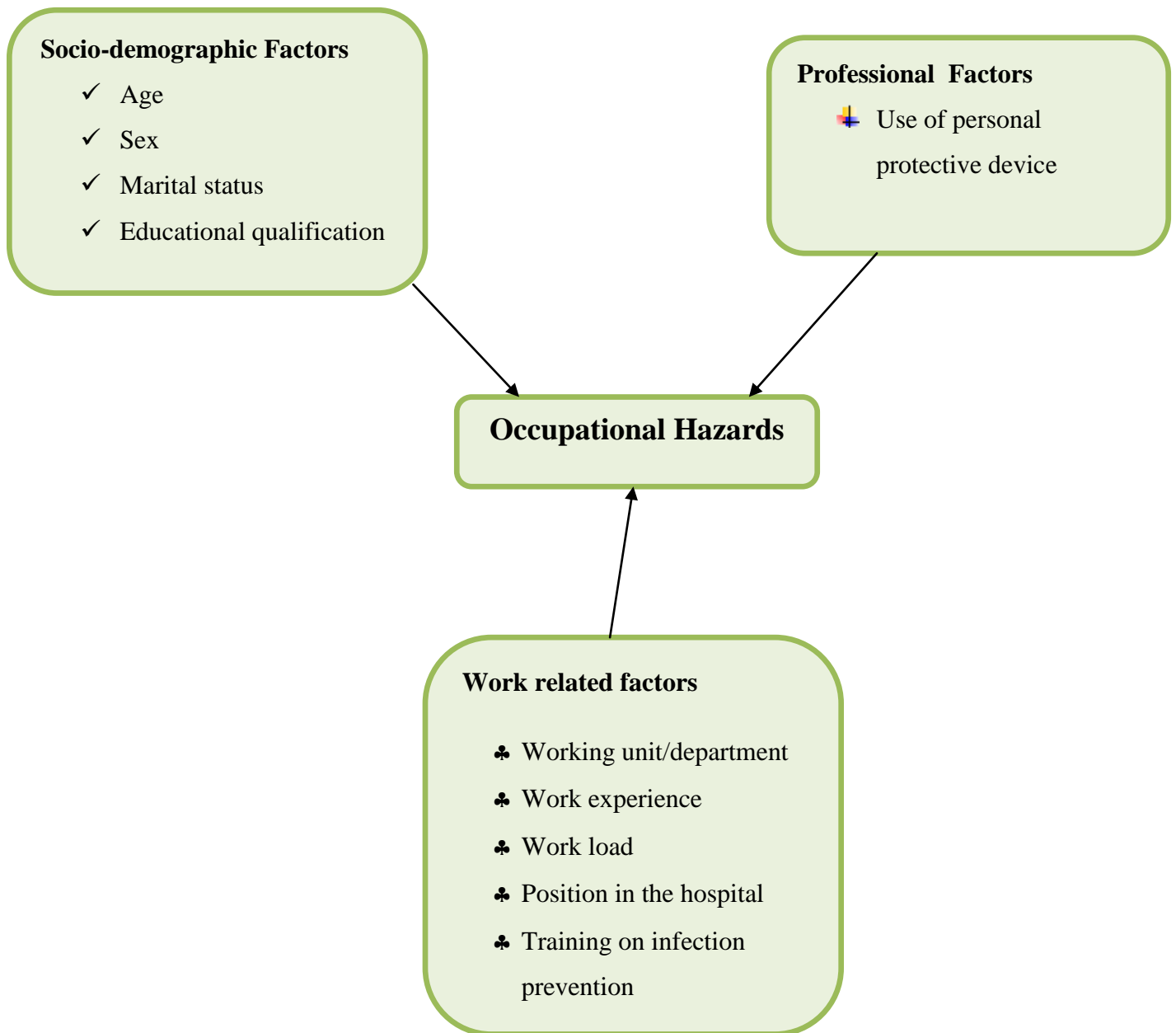


Figure 1: Conceptual Framework Developed For Occupational Hazards and Associated Factors Among Jimma Zone Public Hospitals, South West Ethiopia, 2014.

## **2.2 Significance of the Study**

Occupational health is an important aspect which concerns itself with the interaction between the workplace and the health of the worker. However in Jimma zone public hospitals little is known and information about the prevalence of occupational hazards and its associated factors needs investigation which will contribute for health planner and decision maker. so this research gives a baseline data for the prevalence of occupational hazards and its associated factors in Jimma zone public hospitals. The research also gives such information for health care planner and researcher for further investigation.

## **CHAPTER THREE: OBJECTIVES**

### **3.1 General Objective**

To assess occupational hazards and associated factors among nurses working in Jimma Zone public hospitals, South-West Ethiopia, 2014.

### **3.2 Specific Objectives**

1. To determine the prevalence of occupational hazards among nurses working in Jimma Zone public hospitals, 2014.
2. To identify the factors associated with occupational hazards among nurses working in Jimma Zone public hospitals, 2014.

## **CHAPTER FOUR: METHODS AND MATERIALS**

### **4.1. Study area and period**

The study was conducted in three public hospitals found in Jimma Zone, Oromia Regional state from March 10-April, 2014. Jimma is zone town of 18 zone of the Oromia Regional State found at 352 kilometers from Addis Ababa, the capital city of Ethiopia, in the South western part of the country. Based on the 2007 Census conducted by the CSA, this Zone has a total population of 2,486,155, an increase of 26.76% over the 1994 census, of whom 1,250,527 are men and 1,235,628 women; with an area of 15,568.58 square kilometers (45).

In this zone there are three public hospitals namely, Jimma University specialized hospital (JUSH), Shenan Gibe and Limu hospital. The first two are situated at Jimma town where as the later one is in Limu town which is 72 kilometers far from Jimma town. Except JUSH both are district level. JUSH plays a pivotal role in this zone and it is the only teaching and referral hospital in the southwestern part of the country, and provides specialized clinical services to about 15 million people (46). It provides generalized service to in-patients and out-patients on a referral system in south-west part of the country.

### **4.2 Study Design**

Institution based cross sectional quantitative study was conducted

### **4.3 Population**

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

The source population for this study includes all nurses who are working in Jimma Zone Public Hospitals.

#### **4.3.2. Study population**

All nurses who were available at work at Jimma Zone public hospitals during data collection period.

#### 4.3.3. Inclusion criteria

- All nurses having work experience of greater or equal to 6 months.
- All nurses who were available at work during data collection period.

#### 4.4 Sampling

##### 4.4.1. Sample size determination

The total population of nurse in the three public hospitals were 433 from these 73 were under six months of experience and the remaining 360 were greater than six months of experience. Hence, the investigator conducted census.

#### 4.5. Study Variables

##### 4.5.1 Dependent Variables

- ❖ Occupational Hazards

##### 4.5.2 Independent Variables

- ❖ Socio-demographic variables

Age, sex, marital status, educational qualification

- ❖ Work related factors

Working unit/department, work experience, position in the hospitals ,  
training on infection prevention and work load

- ❖ Professional factor

Use of personal protective device

#### 4.6 Operational Definitions

✚ **Occupational hazards:** A nurse who is exposed to at least one needle stick / sharp injury or blood / body fluid is considered as having occupational hazards .

✚ **Body fluid:** Includes vomits, urine , sputum, saliva, amniotic fluid, exudative fluids from burns/lesions and cerebrospinal fluid considered as body fluids.

#### **4.7 Data Collection Instrument**

Data collection instrument was adapted after review of relevant literature and the data was collected from nurses working in Jimma zone public hospitals using pre tested structured self-administered questionnaires. Questions were developed for this study to assess socio demography factors, work related factors, professional factors, types of procedures, types of needle and sharp devices and types of blood and body fluids. Questionnaire contains three sections that has a total of 23 major items and 47 sub items which told the purpose of the study.

The socio- demographic part contains 8 items which gives information about age, sex, marital status, educational qualification, working experience, position in the hospitals, working hospitals and working unit of the respondents.

Questions on Needle stick/ Sharp injuries and professional factors were assessed by using 8 major items and 31 sub items that was also adapted by the investigator from relevant literatures.

Questions on blood/ body fluid exposures and work related factors was addressed by using 7 major items and 16 sub items that is developed by the researcher from different published study.

Questionnaire was pretested with five percent of study population on nurses working at Woliso hospital before the actual data collection. Out of 18 pretested questionnaires, 90% of the respondents agree with tools and 10% of them comments for some modifications.

#### **4.8 Data Collection Personnel**

A total of five diploma nurses: three for JUSH, one for Shenen Gibe and one for Limu Genet were recruited to distribute, and to collect/facilitate the data. They were trained and oriented for one day on the questionnaire and the way of data collection.



#### **4.9 Data Quality Control**

The collected data was reviewed and checked for completeness by the facilitator/data collectors and principal investigator. For each shift the questionnaire were distributed after the purpose of the study explained and told to return when they finish

#### **4.10 Data Entry and Analysis**

The data was edited, entered into Epi-Data version 3.1 and exported to IBM SPSS Statistics Version 16 for analysis. Percentage, frequency and mean was calculated. The results was summarized and presented by text, tables, charts and graphs. Logistic regression analysis was performed to assess statistical association between dependent and independent variable and variables with P-value less than 0.25 in the bivariate analysis was included in the multivariate model. P-value of less than 0.05 was considered as statistical significance.

#### **4.11 Ethical Consideration**

Ethical clearance and approval letter to conduct the research was obtained from Jimma University College of public health and Medical sciences, institutional review board. Then a letter was secured from the university to respective hospital management to gain support for the study. Prior to administering the questionnaires, the aims of the study were explained to the participants, also told that participation is voluntarily, confidential and anonymity ensured throughout the execution of the study as participants were not required to disclose personal information on the questionnaire. Besides verbal consent were obtained from study participants.

#### **4.12 Dissemination of the Results**

The final report will be disseminated to the department of nursing, College of public health and medical sciences, Jimma University. Also the study findings will be disseminated to the Jimma University Specialized Hospital, Limu Genet hospital, Shenen Gibe hospital, Jimma zone health office, and other relevant bodies. Attempts will be made to publish the findings in scientific journal.

## CHAPTER FIVE : RESULT

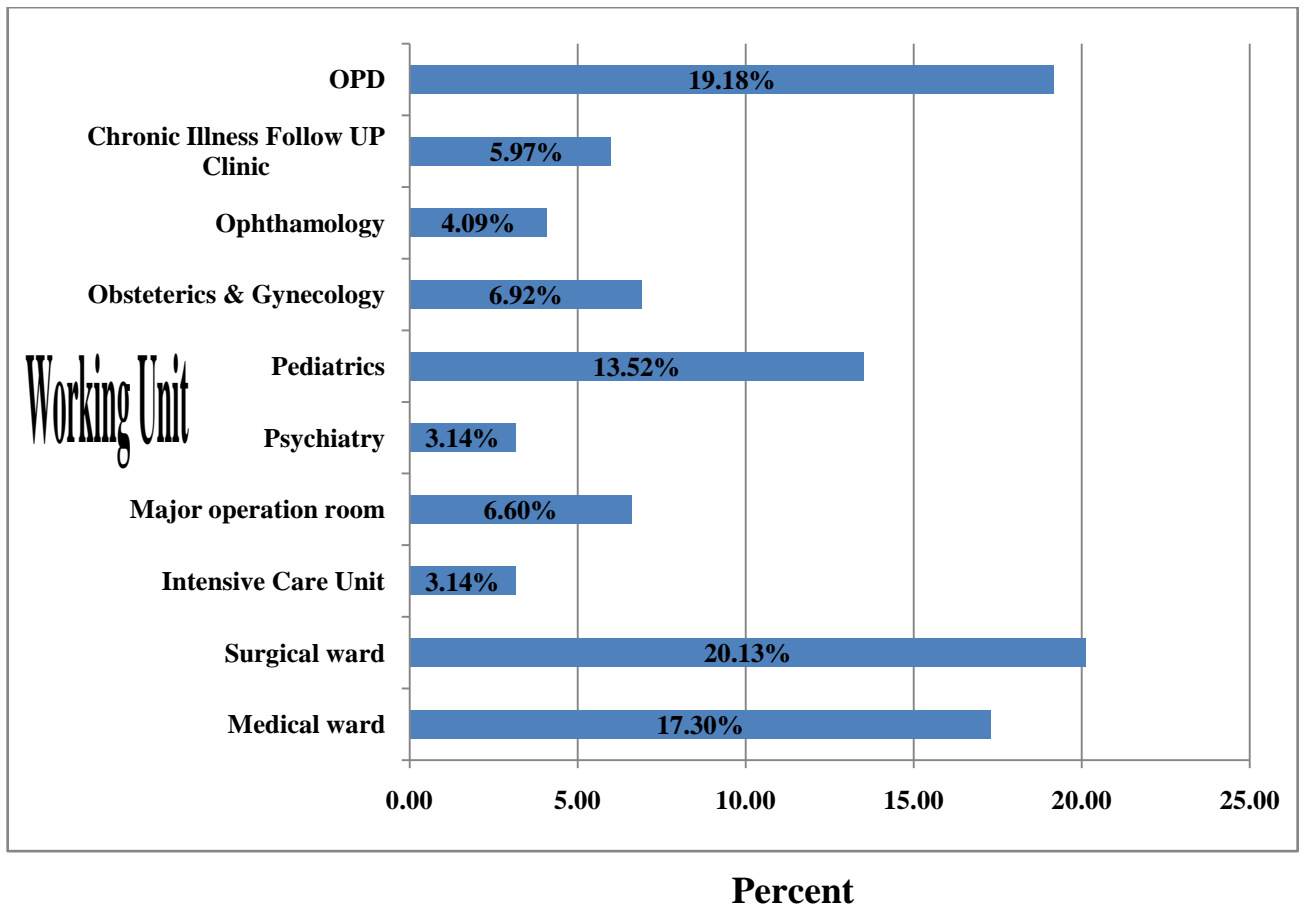
### 1. Socio-demographic characteristics of study participants

Among 341 questionnaires distributed to nurses at different units in Jimma zone public hospitals 318 were returned and used for the analysis which gives an overall response rate of 93.3%. The mean age and standard deviation of respondents  $27.91 \pm 6.84$  respectively. Of the 318 respondents about 161 (50.6 %) of them were males, 174(54.7 %) single, 173(60.7 %) respondents were diploma holders and 239 (75.2%) of the study participants had less than five year work experiences (**Table 1**).

**Table 1 Distribution of nurses working in Jimma zone public hospital, south west Ethiopia, 2014.**

Characteristics	N=318	n	%
<b>Working Hospital</b>	Jimma University Specialized Hospital	273	85.8
	Shenen Gibe Hospital	20	6.3
	Limu Genet Hospital	25	7.9
<b>Sex</b>	Male	161	50.6
	Female	157	49.4
<b>Age group</b>	≤ 24 years	106	33.3
	25-29 years	150	47.2
	≥ 30 years	62	19.5
<b>Marital status</b>	Married	136	42.8
	Single	174	54.7
	Divorced	7	2.2
	Widowed	1	0.3
<b>Educational Qualification</b>	Diploma	193	60.7
	BSc	125	39.3
<b>Work experiences in years</b>	< 5 years	239	75.2
	≥ 5 years	79	24.8
<b>Position / title in the hospital</b>	Staff nurse	283	89
	Head nurse	28	8.8
	Supervisor nurse	4	1.3
	Matron nurse	3	0.9

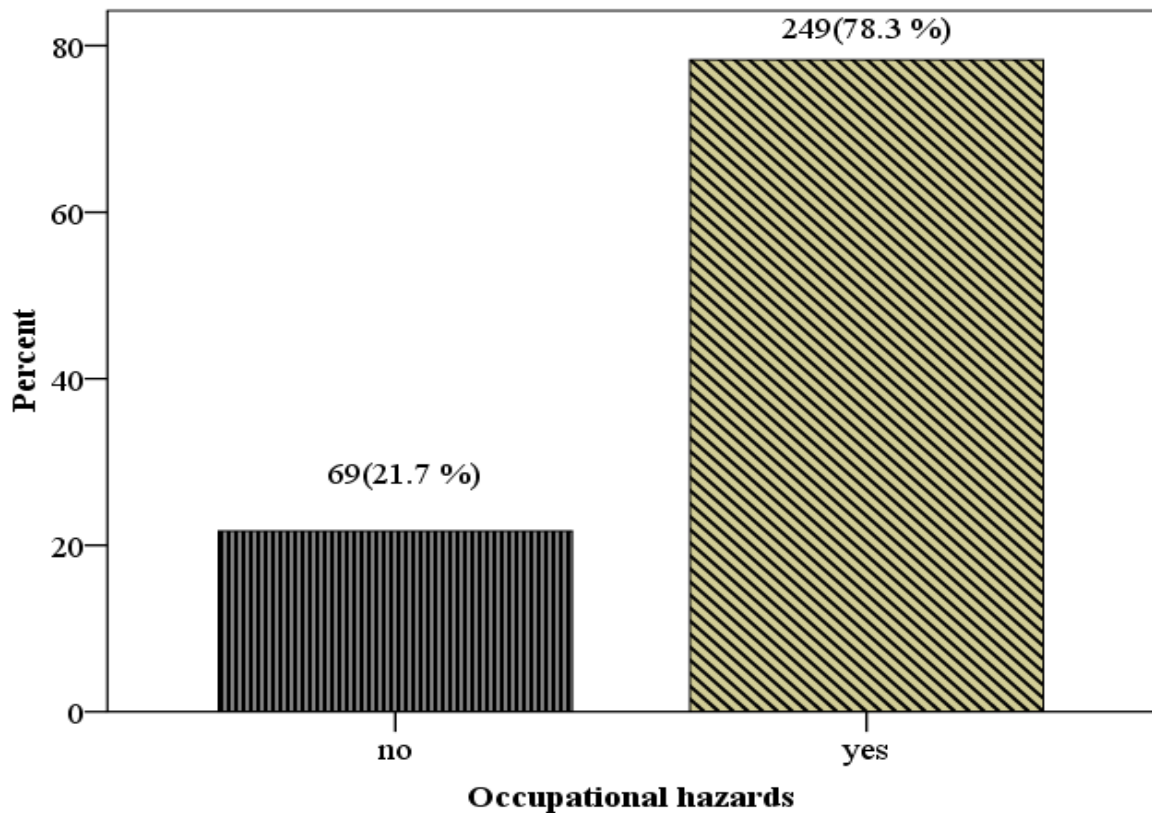
From all respondents, the distribution of nurses were high in surgical ward (20.1%), in outpatient department (19.2%), in medical ward(17.3%) and in Pediatrics Ward (13.5%) relatively to other working units(**fig 2**).



**Figure 2 Distribution of nurses working in each unit in Jimma zone public hospital, south west Ethiopia, 2014.**

## 2. Prevalence of Occupational hazards

The overall prevalence of occupational hazard is 249(78.3%) [fig 3].



**Figure 3 Prevalence of occupational hazards among nurses working in Jimma zone public hospital, south west Ethiopia, 2014.**

Among the study participants 187 (58.8%) reported needle stick/sharp injuries. From those who exposed to needle stick/sharp injuries 110(58.8%) were by syringe needle, 81(43.3%) by broken ampoule 47(25.1%) by Iv needle, 41(21.9%) by suturing needle, 34(18.2%) by surgical blade and 22(11.8%) by butterfly needle. Also from the reported needle stick/sharp injuries 86 (46.0 %) occurred when the needle was used for an injection while 78(41.7 %), 56(29.9 %), 45(24.1 %) and 33(17.6 %) were occurred during ampoule breaking, securing IV line (Vein puncture), suturing /sewing and blood drawing or disposing respectively(**Table 2**).

**Table 2 Prevalence of needle/sharp injuries in Jimma zone public hospital, south west Ethiopia, 2014.**

<b>Variables</b>		<b>N</b>	<b>%</b>	
<b>Needle stick/sharp injury</b>	Yes	187	58.8	
	No	131	41.2	
<b>Types of needle and sharp materials</b>	Syringe needle	Yes	110	58.8
		No	77	41.2
	Suturing needle	Yes	41	21.9
		No	146	78.1
	Butterfly needle	Yes	22	11.8
		No	165	88.2
	Iv needle	Yes	47	25.1
		No	140	74.9
	Insulin syringe	Yes	7	3.7
		No	180	96.3
	Lancet	Yes	18	9.6
		No	169	90.4
	Surgical blade	Yes	34	18.2
		No	153	81.8
	Brocken ampoule	Yes	81	43.3
		No	106	56.7
<b>Types of procedures related to needle stick and sharp injuries</b>	Injection	Yes	86	46.0
		No	101	54.0
	Breaking ampoule	Yes	78	41.7
		No	109	58.3
	Suturing /Sewing	Yes	45	24.1
		No	142	75.9
	Blood Drawing	Yes	33	17.6
		No	154	82.4
	Recapping of needle after use	Yes	14	7.5
		No	173	92.5
	Securing IV line (Vein puncture)	Yes	56	29.9
		No	131	70.1
	Misplaced needle	Yes	19	10.2
		No	168	89.8
	Disposing	Yes	33	17.6
		No	154	82.4

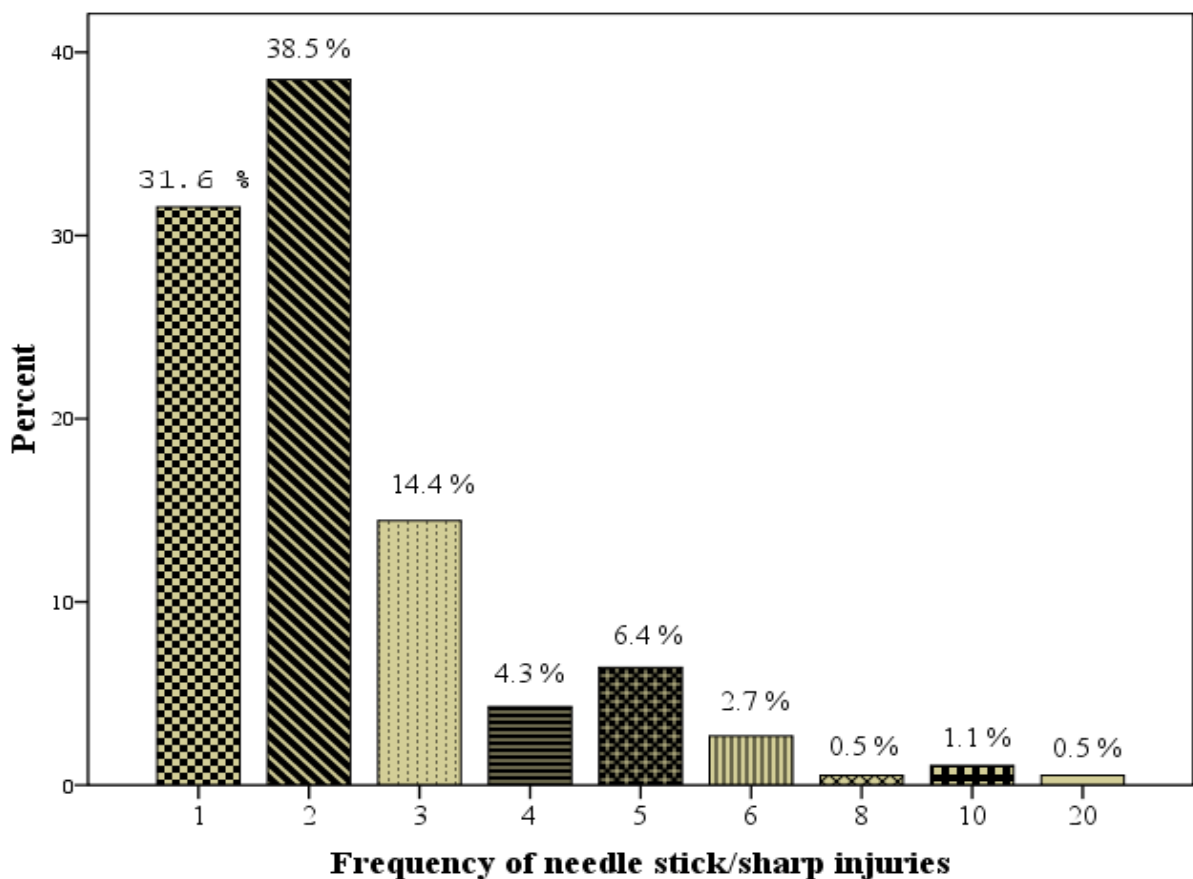
Of the study participants who exposed to blood/body fluids the majority [177(88.9%)] involved splashes of blood, 81(40.7%) were urine, 66(33.2%) were vomit, 54(27.1%) were saliva and 30(15.1%) were exudative fluids from burns/lesions. Also from the reported blood / body fluid exposures 102(51.3%) were occurred during blood drawing ,94(47.2%) during vein puncture and 60(30.2%) during injection(**Table 3**).

**Table 3 Prevalence of blood/body fluids in Jimma zone public hospital, south west Ethiopia, 2014.**

Variables			N	%	
<b>Blood and body fluid exposures</b>		Yes	199	62.6	
		No	119	37.4	
<b>Types of blood and body fluids</b>		Yes	177	88.9	
		Blood	No	22	11.1
		Vomit	Yes	66	33.2
			No	133	66.8
		Saliva	Yes	54	27.1
			No	145	72.9
		Urine	Yes	81	40.7
			No	118	59.3
		Amniotic fluid	Yes	7	3.5
			No	192	96.5
		Exudative fluids from burns/lesions	Yes	30	15.1
			No	169	84.9
		Cerebrospinal fluid	Yes	4	2.0
			No	195	98.0
<b>Types of procedure related to blood and body fluid exposures</b>		Injection	Yes	60	30.2
			No	139	69.8
		Blood Drawing	Yes	102	51.3
			No	97	48.7
		Vein puncture	Yes	94	47.2
			No	105	52.8
		Recapping of needle after use	Yes	12	6.0
			No	187	94.0
		Misplaced needle	Yes	12	6.0
			No	187	94.0
		Disposing	Yes	51	25.6
			No	148	74.4

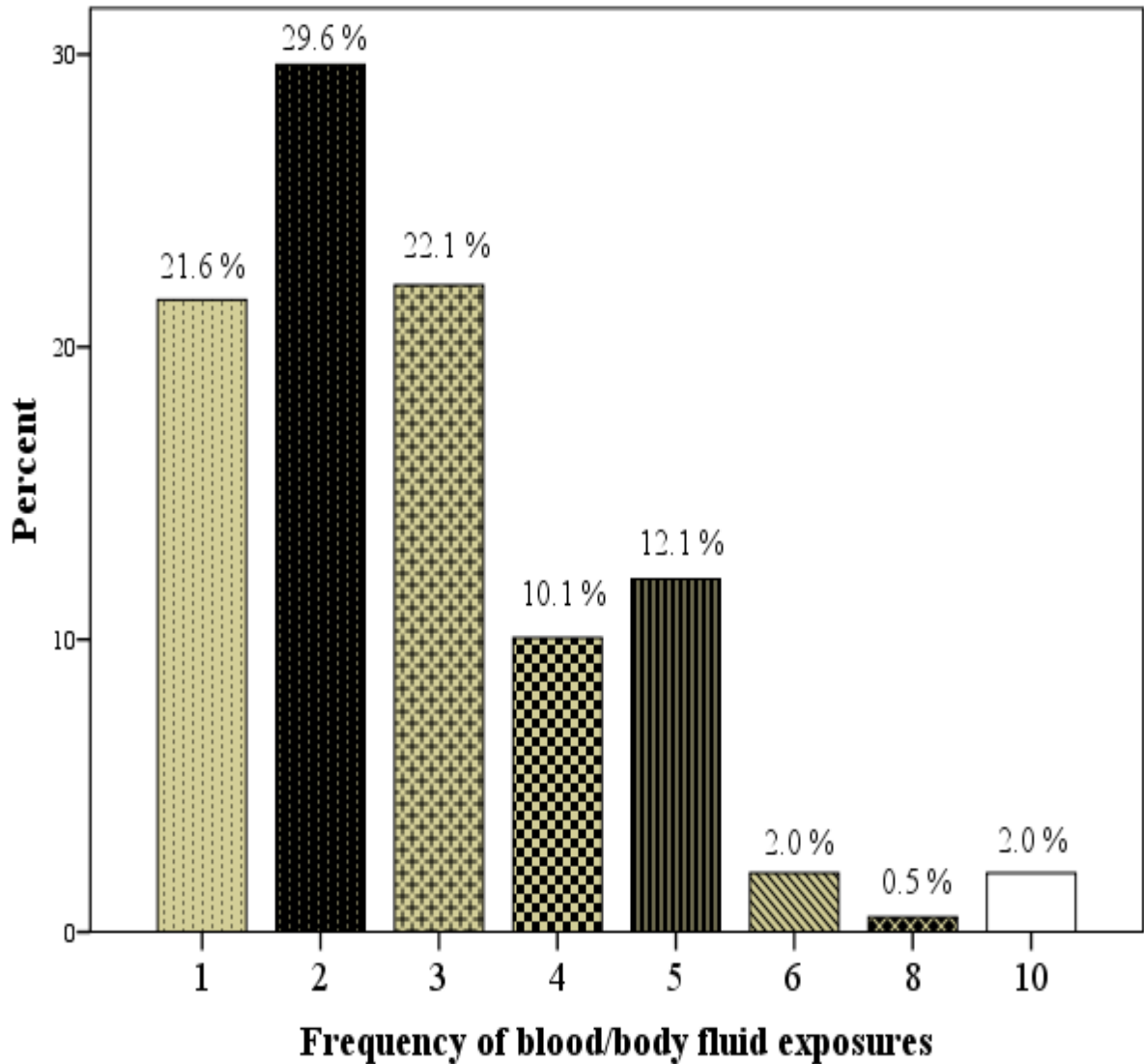
Concerning personal protective devices utilization almost all of the study participants (99.1%) were used personal protective devices when they gave care for the patients. The work load of the nurse to patient was ranged from 1 to 50 patients per day with the mean and standard deviation of  $13.81 \pm 8.252$  respectively. Out of 318 respondents 75(23.6%) of nurses were attending 10 patients per day, 44(13.8%) were attending 15 patients per day and 34(10.7%) of them were attending 12 patients per day.

Out of 187 nurses who exposed to needle stick / sharp injuries 72(38.5%) of nurses were experienced needle stick / sharp injuries twice a year,59(31.6%) of them were experienced once a year,27(14.4%) of nurses reported three times a year, 12(6.4%) were five times a year and 1(0.5) were twenty times a year(**fig 4**).



**Figure 4 Frequency of needle stick/sharp injuries among nurses working in Jimma zone public hospital, south west Ethiopia, 2014 .**

From 199 nurses exposed to blood /body fluids 59(29.6%) of nurses were experienced twice a year, 44(22.1%) of nurses were three times a year, 43(21.6%) of nurses were once a year, 24(12.1%) of nurses were five times a year, 20(10.1%) of nurses were four times a year and 4(2.0%) were ten times a year (**fig 5**).



**Figure 5** Frequency of blood/body fluid exposure among nurses working in Jimma zone public hospital, south west Ethiopia, 2014 .

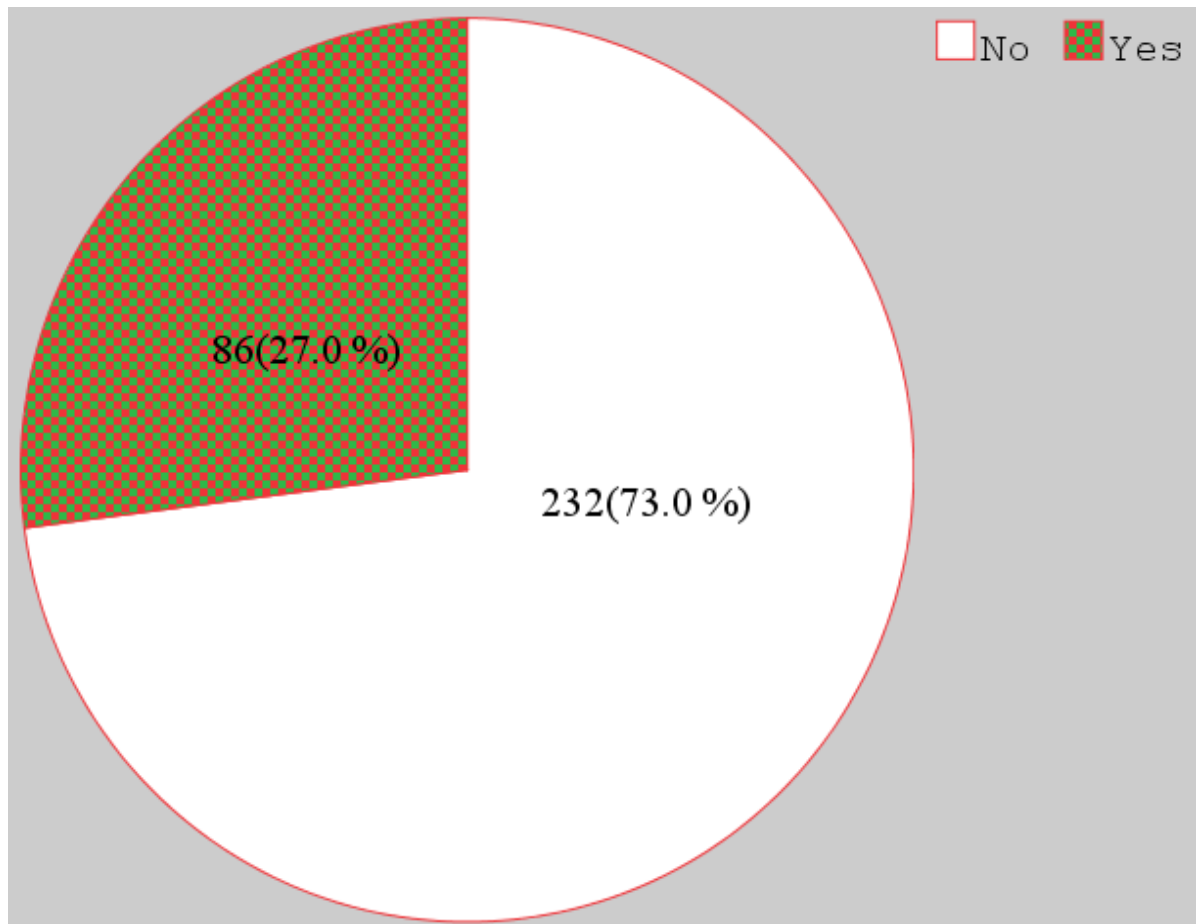


From this study 111(59.4%) of participants reported sharp/needle stick injury during morning shift, 64(34.2%) during evening and 101(54.0%) during night shift. Also 130(65.3%) of nurses exposed to blood/body fluid during morning shift,79(39.7%) during evening and 103(51.85) during night shift(**Table 4**).

**Table 4 Distribution of Occupational hazards against working shift among nurses working in Jimma zone public hospital, south west Ethiopia, 2014.**

Variables	Types of occupational Hazards			
	Needle stick/sharp injuries		Blood / body fluid exposures	
Working shift	Frequency (n)	%	Frequency (n)	%
Morning	111	59.4	130	65.3
Evening	64	34.2	79	39.7
Night	101	54.0	103	51.8

Among study participants 232(73%) of nurses were not participated in any training program on infection prevention but the rest 86(27%) participated in any training program on infection prevention (**fig 6**).



**Figure 6 Distribution of study participants training on infection prevention among nurses working in Jimma zone public hospital, south west Ethiopia, 2014**

### **3. Factors affecting Occupational hazards**

Different variables that are assumed to be associated with occupational hazards were assessed first using bivariate then multivariate logistic regression analysis methods. There are nine variables entered into bivariate logistic regression models. These are age, sex, marital status, educational qualification, position in the hospital, working unit, work experience, training on infection prevention and work load (**Table 5**). But personal protective device utilization variable was not entered into the above model because from this study report almost all (99.1%) of nurses used personal protective device when they gave care for the patient.

Bivariate logistic regression analysis shows that male nurses were 2.29 times more likely to have occupational hazards than female nurses [COR = 2.294]; Single nurses were 2.84 times more likely to have occupational hazards than ever married nurses [COR = 2.841]; respondents not participated in any training program about infection prevention were 6.09 times more likely have occupational hazards than those trained [COR= 6.087]; occupational hazard was significantly associated with working unit in which those nurses working in chronic illness follow up clinic were 79 % less likely to have occupational hazard as compared to nurses working in surgical ward [COR= .208] and clinical staff nurses were 3.18 times more likely to have occupational hazard than staff manager [COR = 3.181]. However; multivariate logistic regression showed male nurse are 2.20 times more likely to have occupational hazard than female[AOR= 2.198]; Single nurses are 2.26 times more likely to have occupational hazards than ever married nurses [AOR = 2.261]; respondents not participated in any training program about infection prevention are 5.99 times more likely exposed to occupational hazards than those who had training [AOR = 5.992] and occupational hazard was significantly associated with working department in which those nurses working in chronic illness follow up clinic were 81 % less likely exposed to occupational hazard as compared to nurses working in surgical ward [AOR = .190] (**Table 5**).

**Table 5 Bivariate and multivariate logistic regression model among nurses working in Jimma zone public hospital, south west Ethiopia, 2014.**

Variables		OH		COR(95.0% CI)/P	AOR (95.0% CI)/P	P value
		YES (N=249)	NO (N=69)			
Sex	Female	112	45	1		
	Male	137	24	2.29 ( 1.32 , 3.99)/ .003*	2.20 (1.096, 4.409)/ .027*	<b>.027*</b>
Marital status	Ever married	99	45	1		
	Single	150	24	2.84 ( 1.63 , 4.96)/ .000*	2.26 (1.09, 4.69)/ .028	<b>.028*</b>
Age category	≥ 30 years	43	19	1		
	≤ 24 years	86	20	1.90(.92 , 3.93)/ .083		
	25-29 years	120	30	1.77(.90 , 3.46)/ .097		
Training on infection prevention	Yes	46	40	1		
	No	203	29	6.09 ( 3.42 , 10.82)/ .000*	5.99 (3.146, 11.413)/ .000	<b>.000*</b>
Position in the hospital	Clinical staff manager	20	15	1		
	Clinical staff nurse	229	54	3.18 ( 1.53 , 6.61)/ .002*	2.201 (.894 , 5.421)/ .086	
	Surgical ward	52	12	1		
Working Unit	Medical ward	47	8	1.36( .51 , 3.60)/ .542		
	Intensive Care Unit	7	3	.54 ( .12 , 2.39)/ .416		
	Major operation room	17	4	.99 ( .28 , 3.45)/ .976		
	Psychiatry	7	3	.54( .12 , 2.39)/ .416		

Pediatrics ward	39	4	2.25 ( .67 , 7.51)/ .187		
Obstetrics & Gynecology ward	18	4	1.04 ( .29 , 3.63)/ .953		
Ophthalmology unit	9	4	.52 ( .14 , 1.97)/ .336		
Chronic Illness Follow UP Clinic	9	10	.208 ( .07 , .62)/ <b>.005*</b>	.190 ( .051 , .710)/ .013	<b>.013*</b>
OPD	44	17	.60 ( .26 , 1.39)/ .230		

*OH= occupational hazards*

*\* = Statistically significant*

## CHAPTER SIX : DISCUSSION

Occupational hazard to health care workers continue to have a significant problem in healthcare system owing to the associated health risk of acquiring infections such as hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency (HIV) viruses. Occupational exposure to blood / body fluids and needle stick/sharp injuries among health care professionals consists a major occupational hazard, globally and nurses emerge as the staff group reporting the highest proportion of such hazards. The overall prevalence of occupational hazard in the study area was 78.3%.

Among nurses, the prevalence of blood/body fluid exposure during the last one year was 62.6 %, implying that, blood/body fluid exposures are common occupational health hazards to nurses in the study area. From current study the prevalence of needle stick/sharp injury during the last one year was 58.8 % , it implies that needle stick /sharp injury are other common occupational health hazards to nurses in the study area. This finding is almost in line with a study report in Turkey (57 %) [ 33]. Regarding to the frequency of needle stick/sharp injury, 31.6% of participants had experienced the injury once in a year but the study finding in sub-Saharan Africa revealed that 57% of nurses sustained needle stick/sharp injuries once in a year [35].This discrepancy might be because of almost 50% of the nursing staffs in sub-Saharan Africa were recapping and it was still a common practice significantly increased risk of needle stick injuries among those who were recapping needles most or all of the time compared with those who were not but in the current study only 7.5% of the participants were recapping. From this study the majority (58.8%) of needle stick/sharp injury among nurse were occurred by syringe needle because the most risky procedures in a clinical setting involve administering intravenous/intramuscular injections or the drawing of blood. This finding was almost comparable with the research conducted in Saudi Arabia(63 %) [30]. Current study revealed that the majority (88.9%) of nurse were exposed to splashes of blood. The proportion of nurses experiencing blood exposure in this study is comparable to that of Southern Iran in which blood was the most frequent contaminant (87%); most commonly associated with inserting or removing intravenous lines and the high prevalence may be due to insufficient number of nurses ,

lack of adherence to standard precautions and improper disposal of regulated medical wastes, especially needle disposal systems[23].

From the current study finding 65.3% of blood/body fluid exposure was occurred during morning shift . In contrast the study report in Attica General Hospital revealed that 30.6% of nurses exposed to blood/body fluid during the above shift. The discrepancy might be due to the difference in sample size (the study done in Attica included only 124 nurses from six General Hospital working at Emergency departments) and the other possible suggestion might be in terms to awareness of risk factors, almost 68 % already knew the risk factors of blood and body liquids exposure while 82% usually take all the appropriate measures and follow the instructions to protect themselves and their colleagues[27].

Risks of sharp injuries varied between different units in the study hospital. In this study, 21% of occupational hazard exposures occurred in the surgical ward. This result was almost consistent with the study finding in tropical Australian hospital (23.9%)[17] and other findings of the current study also revealed that the prevalence of sharp injuries in intensive care unit was 3.1%. This is comparable with the study conducted in British Columbia (3.0 % ) [29]

Sex of nurses was significantly associated with occupational hazard; being male was two times more likely exposed to occupational hazard than being female. This is consistent with the report from the Duke Health and Safety Surveillance System[5]. Possible explanations might be that men are assigned more risky tasks or are less likely to use universal precautions but further studies are warranted to identify exposure differences, especially in nursing staff who perform similar tasks . And also marital status of the nurse was significantly associated with occupational hazards in which single nurse was two times more likely exposed to occupational hazards than ever married nurses

Training on infection prevention was another strong predictor significantly associated with occupational hazards; nurses not participated in any training program on infection prevention were six times more likely exposed to occupational hazards than those nurses participated in any training program on infection prevention. This is in line with the study

finding in sub-Saharan Africa, those nurses who had not attended any training on infection prevention were almost six times(5.72) risk to occupational hazards than nurses who had attended some kind of training on infection prevention[18].This finding has great importance for planning preventive measures in developing country environments. Also the result of this study showed that working unit was the predictor for occupational hazards; nurses working in chronic illness follow up clinic were 81 % less likely to have occupational hazard than those nurses working in surgical ward. This finding was consistent with the finding in Chinese Hospital; for example those nurses working in the gynecology department were only 0.3 times as likely to report occupational hazards as nurses in other areas[21] and other study finding in tropical Australian hospital also showed that nurses working in maternity/neonatal units were 0.3 times as likely to have occupational hazards as nurses working in the medical or the surgical wards[17]. Even if this study included all nurses working in Jimma zone public hospitals, the finding cannot be generalized to all nurses working in Jimma zone public health center and private health clinic.



## **CHAPTER SEVEN**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **7.1 CONCLUSIONS**

High prevalence of occupational hazard among nurses working in Jimma zone public hospital were observed as compared to literature and blood/body fluid exposure accounts greater number than needle stick/sharp injuries. Syringe needle and splashes of blood was the most dominant types of needle and blood/body fluid related to occupational hazards respectively; majority numbers of nurse exposed to occupational hazard was twice a year during morning shift. Sex, marital status, working unit and training is found to be the crucial factor in predicting the occurrence of occupational hazard among nursing.

#### **7.2. RECOMMENDATIONS**

Based on the finding of this study, the following recommendations are made.

1. The management of the hospitals better to arrange in-service training program on infection prevention; because in this study those nurses who don't attended training on infection prevention are around six times more likely to have occupational hazards than those who attended training
2. The researcher should conduct research on occupational hazards(association b/n occupational hazards and personal protective device) for further investigations

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## **Annexes**

### **Annex-01: Questionnaire**

#### **Consent form**

Dear nurse! this is a study conducted to assess occupational hazards and associated factors the among nurses working in Jimma Zone hospitals. It is evident that the findings of this study will help nurses to be more aware of the occupational hazards and how they could be better prevented. Your participation in this study will contribute a lot to meet the objectives of the study and your participation is totally with your voluntariness and you can stop your participation in the study at any time.

Be assured that the **information you provide** would be used for research purposes only and would be treated as **confidential**.

**Are you willing to participate?    A. Yes        B. No**

#### **Principal Investigator**

**Yeshitila Belay Belachew**

**Tel: 0912-08-62-65**

**Email: yeshitilabelay97@gmail.com**

***Thank You!***

**Part I: Demographic information for nurses (personal information)**

**Instruction:** Please circle the number in front of the option you choose & fill in the blank space that best describe you on the right side of the table.

No.	Questions	Coding categories		
101	Sex	0. Male 1. Female		
102	Your Age in years	____ years		
103	What is your current marital status?	1. Married 2. Single 3. Divorced 4. Widowed		
104	Length of service /Your working experience in nursing profession(in years)	____ Years		
105	Your educational qualification	1. Diploma 2. BSc.N 3. MSc 4. Other(Specify _____ )		
106	Your working unit	<table border="0"> <tr> <td style="vertical-align: top;">                     1. Medical ward 2. Surgical ward 3. Intensive care unit(ICU) 4. Emergency unit 5. Operation room 6. Psychiatry 7. Pediatrics unit 8. Obstetrics/gynecology un 9. Ophthalmology unit                 </td> <td style="vertical-align: top;">                     10. Chronic illness unit 10.1. ART 10.2. TB 10.3. DM/Cardiac/H TN 11. Dental unit 12. OPD 12.1.Emergency 12.2.Medical 12.3.Surgical 13. Minor OR 14. Other (Specify)_____                 </td> </tr> </table>	1. Medical ward 2. Surgical ward 3. Intensive care unit(ICU) 4. Emergency unit 5. Operation room 6. Psychiatry 7. Pediatrics unit 8. Obstetrics/gynecology un 9. Ophthalmology unit	10. Chronic illness unit 10.1. ART 10.2. TB 10.3. DM/Cardiac/H TN 11. Dental unit 12. OPD 12.1.Emergency 12.2.Medical 12.3.Surgical 13. Minor OR 14. Other (Specify)_____
1. Medical ward 2. Surgical ward 3. Intensive care unit(ICU) 4. Emergency unit 5. Operation room 6. Psychiatry 7. Pediatrics unit 8. Obstetrics/gynecology un 9. Ophthalmology unit	10. Chronic illness unit 10.1. ART 10.2. TB 10.3. DM/Cardiac/H TN 11. Dental unit 12. OPD 12.1.Emergency 12.2.Medical 12.3.Surgical 13. Minor OR 14. Other (Specify)_____			
107	What is your title/ Position that you presently hold within the hospital?	1. Staff nurse 2. Head nurse 3. Supervisor nurse 4. Matron nurse		
108	Specify the hospital that you are currently working.	1. Jimma University Specialized Hospital 2. Shenen Gibe Hospital 3. Limu Genet Hospital		

**Part -II Questions on Needle stick/ Sharp injuries and behavioral factors**

**Instruction: please read each item carefully and circle or write your answer in front of question**

No.	Questions	Choice/Response	
201.	Have you ever experienced any needle stick/sharp injury during the last one year ?	1. Yes 0 . No	
202.	If your answer is Yes to <b>Q 201</b> how many times _____ times		
203.	If your answer is Yes to <b>Q 201</b> Which type(s) of needle/sharp injured you ?		
203.1	Syringe needle	<b>Yes</b> 1	<b>No</b> 0
203.2	Suturing needle	1	0
203.3	Butterfly needle	1	0
203.4	Iv needle	1	0
203.5	Insulin syringe	1	0
203.6	Lancet	1	0
203.7	Surgical blood	1	0
203.8	Brocken ampoule	1	0
204	If your answer is Yes to <b>Q 201</b> during which shift did you experience the injury ?		
204.1	Morning	<b>Yes</b> 1	<b>No</b> 0
204.2	Evening	1	0
204.3	Night	1	0
205	If your answer is Yes to <b>Q 201</b> what was the procedure you were doing?		
205.1	Injection	<b>Yes</b> 1	<b>No</b> 0
205.2	Breaking ampoule	1	0
205.3	Suturing /Sewing	1	0
205.4	Blood Drawing	1	0
205.5	Recapping of needle after use	1	0
205.6	Securing IV line (Vein puncture)	1	0
205.7	Misplaced needle	1	0



205.8	Disposing	1	0
206	Do you wear personal protective device when you give care for patient ?	1. Yes	0. No
207	If your answer is yes for <b>Q 206</b> , Which one do you wear?		
		<b>Yes</b>	<b>No</b>
207.1	Apron	1	0
207.2	Glove	1	0
207.3	Boots/ shoe	1	0
207.4	Eye protectors / goggle	1	0
207.5	Mask	1	0
207.6	Gown	1	0
207.7	Other specify_____		
208	If your answer is No for <b>Q 206</b> , Why?		
		<b>Yes</b>	<b>No</b>
208.1	Difficult to work with	1	0
208.2	Not always necessary	1	0
208.3	Out of stock	1	0
208.4	Lack of time	1	0
208.5	Other specify.....		

**Part - III Questions On Blood/ Body fluid Exposures and work related factors**

S. No	Item	Choice/Response	
301.	Have you ever experienced any blood or body fluid exposure during the last one year?	1. Yes	0. No
302.	If your answer is Yes to <b>Q 301</b> how many times _____ times		
303.	If your answer is Yes to <b>Q 301</b> Which type(s) of body fluid or blood were you exposed?		
		<b>Yes</b>	<b>No</b>
304.1	Blood	1	0
304.2	Vomit	1	0
304.3	Saliva	1	0

304.4	Urine	1	0
304.5	Amniotic fluid	1	0
304.6	Exudative fluids from burns/lesions	1	0
304.7	Cerebrospinal fluid	1	0
305	If your answer is Yes to <b>Q 301</b> during which shift you exposed to blood and body fluid?		
		<b>Yes</b>	<b>No</b>
305.1	Morning	1	0
305.2	Evening	1	0
305.3	Night	1	0
306	If your answer is Yes to <b>Q 301</b> during what procedure were exposed to blood or body fluid ?		
		<b>Yes</b>	<b>No</b>
306.1	Injection	1	0
306.2	Blood Drawing	1	0
306.3	Vein puncture	1	0
306.4	Recapping of needle after use	1	0
306.5	Misplaced needle	1	0
306.6	Disposing	1	0
307	For how many patients do you have to give a care during peak working hours(Busy time)? _____ patient(s).		
308	Have you participated in any training program about infection prevention or universal precaution during the last one year?	1. Yes	0 . No