

# Assessment of Factors Affecting Needle Stick and Sharp Injuries Among Health Professionals and Cleaners in Arba Minch General Hospital, Gamo Gofa Zone, Southern Ethiopia, 2015 G. C

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**Abstract:** Sharp piercing injuries to medical personnel are a piercing body trauma caused by sharp medical equipment used to screen, diagnose, treat or follow up patients' conditions. More than 50 pathogens can be transmitted by sharp injury. Thus, this study was aimed at assessing Prevalence and factors that affect needle stick and sharp injuries among health Professionals and Cleaners in Arbaminch General Hospital. Facility based cross sectional study was used and the required sample was 187. Study participants were selected using systemic sampling method Detailed explanation and interpretation was made by presenting the data in the form of frequency, percentage using tables, graphs and Bivariate analysis with a P-value <0.25 was employed to select candidate variables for the multivariable logistic regression to identify independent predictors for needle stick and sharp injury exposure. A total of 181 health professionals and cleaners were interviewed making a response rate of (181) 96.8% and 75 (42.1%) had experienced needle stick and/or sharp injury at least once in the 12 months. Majority of the respondents 172 (95.0%) were concerned about the needle stick and sharp injury, of whom the risk was perceived high in 139 (76.8%) of the respondents. Monthly income, job satisfaction, and working in waste handling unit were the predictors for needle stick and sharp injury and. On job training to health professionals and cleaners and discussion with the hospital administrators on how to alleviate the problem is recommended.

**Keywords:** Injuries, Needle Stick, Sharp, Health Professionals, Cleaners

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## 1. Introduction

Health care workers are at risk for infection from blood borne pathogens as a result of percutaneous injuries from sharps and also from mucous membrane and skin exposures to contaminated blood or body fluids. Occupational exposure to blood borne pathogens, particularly hepatitis B, HCV, or HIV, can result in debilitating or fatal disease, and even when post exposure prophylaxis is timely and effective, treatments

have serious health and economic consequences. [15, 16].

Accidental occupational injuries to health care workers (HCWs) continue to have a significant problem in healthcare system owing to the associated health risk of acquiring infections [17-20]. Worldwide incidence of percutaneous injury with a sharp object among the HCWs is estimated to be 3 million every year where a chance of four injuries per healthcare worker could occur annually [21, 22].

HCWs in developing countries are at serious risk of

infection from blood-borne pathogens particularly hepatitis B virus (HBV), hepatitis C virus (HCV) and Human Immunodeficiency Virus (HIV) because of the high prevalence of such pathogens in many poorer regions of the world, especially they are endemic in sub-Saharan Africa [3, 18].

The public health magnitude of sharps injuries and other blood and body fluid exposures in health care remains poorly defined because surveillance has been limited. Although workplaces in which there is the potential for blood borne pathogen exposures are required to have reporting systems under the Occupational Safety and Health Administration (OSHA) blood borne pathogen standard, workplaces may not implement them effectively or workers may not report to them [23].

Studies reported the high prevalence of needle stick injury among health care workers in Ethiopia [24, 25]. Such occupational injury leading to workers dissatisfaction and psychological trauma may reduce workers motivation and in turn may affect the quality of health care [24, 26]. Since there is no study conducted in GamoGofa Zone this study will enable as to find out the prevalence as well as factors affecting needle stick and sharp injuries among HCWs.

## 2. Method and Material

### 2.1. Study Area

This study was conducted in Arbaminch General Hospital which is found in Arbaminch town. Arbaminch town is one of the 22 reform town in Ethiopia which is found in SNNPR, GamoGofa zone. The town is located 505km from the capital city Addis Abeba. The current statistical data indicate that there are around 295 health professionals and 52 Cleaners from all category of qualification including those of New and Old Medical Doctor Intern Students, The study was conducted from March 29-April 14, 2015.

### 2.2. Source and Study Population

All health professionals and cleaners in Arbaminch general hospital are source population and Sampled health professionals and cleaners from source population are study population.

### 2.3. Sample Size Determination and Procedure

Sample size was determined using single population proportion formula for cross-sectional study. Prevalence of sharp injuries 31.0% [ ] based on 2012 study among health care workers in FelegeHiwotReferral Hospital, Bahir Dar, Northwest Ethiopia. Margin of error 5%, none response rate is 10%. The following formula was used to calculate the sample size:

$$n = \frac{(Z\alpha/2)^2 \cdot P \cdot (1 - P)}{d^2}$$

Where; n=the desired sample size

p= Prevalence of Sharp object injuries among Health professionals (31. %)

$Z\alpha/2$ = critical value at 95% confidence level of certainty (1.96)

d= the margin of error between the sample and the population = 5%

Using the above formula, sample size for the single population proportion is 329. After 5% of none response rate, the final sample size will be 362.

Since the source population is less than ten thousand population correction formula was used

$nf = n / (1 + n/N)$  Where

ni = calculated sample size

nf = exact sample size

N= sample population

$362 / (1 + 362/347) = 187$

### 2.4. Sampling Procedure

The study participant were categorized under different strata based on their profession and proportional allocation of the sample to each category was done. Finally, to select study participant from each professional category, simple random sampling technique (lottery method) was used.

### 2.5. Data Collection Tools, Procedure and Quality

The questionnaire was developed after extensive review of literatures and similar study tools used previously by adapting to the purpose of the study. format include the following check list

- Socio-demographic characteristics (sex, age, residence, marital status, religion, job category, work experience, occupational status, educational status)
- Behavioral factors (needle recapping, awareness on diseases transmission by shapes injury, job satisfaction, use of personal protective equipment)
- working environment (health safety training, length of working hours/week, working department)

Training and orientation on how to collect the data was given for the data collectors pre-test was conducted and possible modification was done based on the finding and after on the actual data collection was carried out. The data was collected using Semi Structured interview administered questionnaire. Only those variable which have showed association on Bivariate analysis were entertained multivariable analysis.

### 2.6. Data Quality Management, Processing and Analysis

To ensure the quality of data, data collectors were trained nurses. On the days of data collection the principal investigators and supervisor supervised the data collection. The data collector and supervisor were trained on the objective of study. The questioners were checked for completeness and consistency by principal investigator before data entry. Completed questioner were coded by number and entered in to a computer software EPI info version 3.5.1 statistical package and exported to SPSS

version 20. Cross checking and data cleaning was done for accuracy and consistency by running frequency of each variable by principal investigator. Bivariate analysis with a P-value <0.25 was employed to select candidate variables for the multivariable logistic regression to identify independent predictors for needle stick and sharp injury exposure. All statistical tests were considered significant if P-value <0.05. Detailed explanation and interpretation was made by presenting the data in the form of frequency, percentage using tables and graphs.

## 2.7. Study Variables

### 2.7.1. Dependent Variable

Occurrence of needle stick and sharp injury in the previous 12 months

### 2.7.2. Independent Variables"

- Socio-demographic characteristics (sex, age, residence, job category, work experience, educational status)
- Behavioral factors (needle recapping, awareness on diseases transmission by sharp injury, job satisfaction, use of personal protective equipment)
- working environment (health safety training, length of working hours/week, working department)

## 2.8. Operational Definitions and Definition of Terms

Needle stick injuries; a piercing body trauma caused by different types of needles

Sharp injuries; a penetrating body trauma caused by sharp medical equipment that were used to screen, diagnose, treat or follow the patient disease conditions

Satisfaction: Satisfaction is assessed using likert scale. Health professionals and cleaners who had satisfied and above from the alternative lists which was measuring their satisfaction are categorized under satisfied and those who are out of this are considered as dissatisfied

## 2.9. Ethical Consideration

Ethical clearance was obtained from ethical review committee of Arba Minch University, College of medicine

and Health Science, department of nursing. An official letter from the college was sent to Arba Minch general hospital in order to get permission for data collection. Verbal consent was obtained from each respondent before data collection. Subjects were told the confidentiality of the information that they are going to give. Ethical way of approaching was followed by the interviewers in a manner of respect of the culture, religion, language and other dignity of the community, their right to refuse.

## 3. Result

In this facility based correctional study A total of 181 health professionals and cleaners were interviewed making a response rate of 96.8% and the prevalence of needle stick and/or sharp injury at least once in the 12 months is 75 (42.1%).

### 3.1. Socio Demographic Characteristics of Study Participants

Of all participants 99 (54.7%) were females. The majority 101 (55.5) were Orthodox Christian by religion, and more than one third 75 (41.4%) were degree and above holders by qualification, 72 (39.8%) were clinical Nurses by profession, and 90 (49.7%) were married. About 110 (60.8%) staff had five years or less work experience, majority of staff 56 (30.9%) were working in surgical ward and about 94 (51.9%) staffs salary were in the range between 1,000.00 to 2,500.00 ETB.

### 3.2. Working Environment, Injury Exposure and Related Characteristics

Majority of the respondents 172 (95.0%) were concerned about the needle stick and sharp injury, of whom the risk was perceived high in 139 (76.8%) of the respondents. Nearly two thirds (63.7%) had recapped the needle at least once, and one third (34.7%) had recapped the needle using two hands. Almost all respondents (98.5%) knew the diseases will be transmitted through needle stick and sharp injury.

**Table 1.** Working environment, injury exposure, and related characteristics of study participants (n=181) at Arbaminch General Hospital, GamoGofa, Ethiopia, 2015 G.C.

S.no	Variable	Frequency	Percent(%)
1	Needle stick is your concern	Yes=172	95
		No = 9	5
		Not risky= 1	0.6
2	Rating needle stick injury	Low risk=19	10.5
		Moderate risk=22	12.2
		High risk =139	76.8
		Strongly disagree=10	5.5
3	Needle stick is avoidable?	Disagree=26	14.4
		Agree=59	32.6
		Strongly disagree=86	47.5
	Do you use personal protective equipment	Yes = 152	84
		No =29	16

S.no	Variable	Frequency	Percent(%)
	Disease transmitted by sharp object	Strongly disagree=2	1.1
		Disagree=2	1.1
		Agree=48	26.5
		Strongly disagree= 129	71.3
	Are you use personal protectv equip?	Yes = 152	84
		No =29	16
		Never = 78	43.1
	Recap needle after use	Sometimes = 69	38.1
		Most of the time = 14	7.7
		All of the time = 20	11
	Exposed for needle stick injury?	Yes = 75	42.1
		No = 106	57.9
	If yes for which disease you exposed	Exposed for Hepatitis Virus=20	26.7
		Exposed for HIV/AIDS=13	17.3
		Exposed for other disease=42	56
	Do you receive medical care after injury	Yes= 43	57.3
		No = 32	42.7
	Is safety guide line available	Yes =153	84.5
		No = 28	15.5
	Is there occupational safety training	Yes =86	47.5
		No = 95	52.5
	Number of hours worked/week	Up to 40 hours= 85	47
		Up to 40 hours = 96	53
		Not satisfied =21	11.6
	How do you rate your satisfaction with your working environment	Poorly satisfied=53	29.3
		Satisfied = 72	39.8
		Well satisfied = 35	19.3

### 3.3. Needle Stick and Sharp Injury Exposure and Associated Factors

Of the total 181 respondents, 75 (42.1%) had experienced needle stick and/or sharp injury at least once in the 12 months. Of those who ever sustained the injury, 104 (53.1%) were exposed more than once. More than three fourths of the injuries were caused by needle stick and it was superficial in 87% of the participants.

On Bivariate analyses educational status [COR(95%CI): 2.0(0.8,5.0)], service year [COR(95%CI): 0.6(0.2,1.4)], job category [COR(95%CI): 2.6(0.9,7.5)], monthly income [COR(95%CI): 0.6(0.2,1.4)], needle recap practice [COR(95%CI): 4.2(1.4,12.0)], occupational training [COR(95%CI): 1.7(0.7,4.1)], not reporting a solution [COR(95%CI): 2.6(0.9,7.3)], Current working department [COR(95%CI): 1.1(0.4,2.8)], and satisfaction with working environment [COR(95%CI):2.1(0.7,6.7)] were statistically significantly associated with needle stick and sharp injury exposure in the study area.

On multivariable logistic regression analysis the variable remained in the model to predict needle stick injury was recapping of needle after use [AOR(95%CI): 4.2(1.5,12.0)]

### 3.4. Predictors of Needle Stick and Sharp Injury Exposure

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**Table 2.** Needle stick and sharp injury exposure risk and associated factors among study participants (n=181), in Arba Minch General Hospital, Southern Ethiopia, 2015.

Variables	Variable category	frequency	%	COR(95%CI)	AOR(95%CI)
Educational status	Degree & above	75	41.4	2.0(0.8,4.9)	
	Diploma	73	40.3	2.0(0.8,5.0)	
Job Category	Below diploma	33	18.2	1	
	Medical Doctor	38	21.0	2.6(0.9,7.4)	
	Health officer	16	8.8	2.4(0.7,9.0)	
	Clinical Nurse	72	39.8	1.6(0.6,4.1)	
	Midwifery	13	7.2	2.4(0.6,9.6)	
	Laboratory personnel	10	5.5	0.6(0.1,3.4)	
	Anesthetist	3	1.7	4.7(0.4,60.1)	
	Cleaners	29	16.0	1	
Service year	<5 years	110	60.8	0.7(0.3,1.6)	
	6-10 years	39	21.5	0.5(0.2,1.4)	
	>10 years	32	17.7	1	
Currently working Dep't	Emergency unit	14	7.7	1.1(0.4,2.8)	
	OB/Gyn	24	13.2	0.9(0.3,2.2)	
	Pediatric ward	26	14.5	1.2(0.5,3.4)	
	Laboratory unit	13	7.4	0.4(0.1,1.9)	
	Medical ward	48	26.5	0.5(0.2,1.3)	
	Surgical ward	56	30.9	1	
Monthly Income	<1000 ETB	23	12.7	0.8(0.2,1.3)	
	1000-2,500 ETB	94	51.9	0.6(0.3,1.1)	
	> 2500 ETB	64	35.4	1	
Needle stick injury is your concern	Yes	172	95.0	0.7(0.5,1.0)	
	No	9	5.0	1	
	Never	79	43.1	1	1
Recap needle after use	Some times	68	38.1	0.5(0.2,1.5)	0.5(0.2,1.5)
	Most of time	14	7.7	0.8(0.2,3.7)	0.9(0.2,2.4)
	All the time	20	13.0	4.1(1.4,12.0)	4.2(1.5,12.0)*
Is safety guide line available	Yes	153	84.5	1.5(0.6,3.3)	
	No	28	15.5	1	
	Strongly disagree	19	10.5	2.6(0.9,7.3)	
Does reporting a solution	Disagree	10	5.5	1.1(0.3,4.1)	
	Agree	61	33.7	1.2(0.6,2.4)	
	Strongly agree	91	50.3	1	
Is there occupational safety training	Yes	95	52.5	1.1(0.6,2.0)	
	No	86	47.5	1	
Working hours/week	Up to 40 hours	85	47.0	0.6(0.3,1.1)	
	> 40 hours	96	53.0	1	
How do you rate your satisfaction	Strongly dissatisfied	21	11.6	2.1(0.7,6.7)	
	Dissatisfied	53	29.3	2.3(0.9,5.8)	
With your working environment	Satisfied	72	39.8	1.7(0.7,4.1)	
	Strongly satisfied	35	19.3	1	

\*significant at  $P < 0.05$ <sup>2</sup>Variables with a  $P$ -value<0.25 in the Bivariate analyses were considered for the adjusted model<sup>1</sup>Reference category

## 4. Discussion

Healthcare workers are at risk to occupational health hazards mainly due to accidental exposure to injuries such as needle stick and/or other sharp materials. Among HCWs and cleaners, the prevalence of needle stick and sharp injury in the previous twelve months prior to the survey was 42.1%, implying that, needle stick and sharp injuries are common occupational health hazards to HCWs in the study area. The finding is higher when compared to studies done in Switzerland, Malaysia, & South Africa where the proportion of injury in the last 12 months was 9.7%, 23.5%, and 23.5% respectively. But the proportion was lower than studies done in SSA, Egypt and India where the prevalence of needle stick and sharp injury reported were 57%, 67.9% and 80.1%

respectively. The possible difference in the proportion of injury could be the study design used, the socio-demographic/economic status, and cultural characteristics of study participants. Also it could be due to the difference in the study health facility set ups, even the year of the study and The work load in our study area was higher than others. This proportion of needle stick and sharp injury, shows that healthcare workers are at much higher risk to acquire blood borne pathogens such as HIV and other infectious diseases through needle stick and sharp injuries.

This study also showed that health professionals and cleaners those who practice needle recap after use had four times more likely to be exposed for needle stick and sharp injury when compared with those who never practice recap of needle after use. This finding is in agreement with a study

done in Eastern part of Ethiopia in 2010.

## 5. Strength and Limitation of the Study

Strength-Since we used trained data collector these decreased occurrence bias.

Limitation-Since the study is retrospective there might be possibility of recall bias and a cross sectional study by its nature cannot establish cause and effect relationship.

## 6. Conclusion

This study revealed that around one fourth of study participants had needle stick and sharp injury on the past 12 months. Nurses were more affected than other healthcare workers. Even though majority of respondents were concerned about risk of needle stick and sharp injury, and nearly all knew the diseases transmitted through it, more than half of the study participants were recapping the needle and needle recouping was independent for.

## Recommendation

On job training should be given to health professionals and cleaners, and hospital administrators should create room for discussion on how to alleviate the problem. Further research is needed to determine the actual incidence of needle stick and sharp injury exposure, and the type of disease they would acquire.

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