

## The Status of Sharp Injury and Risk Factors among Health Care Staffs in the Bule Hora Hospital, South Ethiopia, 2020

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### Abstract

**Background:** Sharp injury is a penetrating cut wound from a needle or other sharp object which may additionally bring in contacting with blood or other body fluids of patients who may be having an infectious disease. Every year, more than half million of health care workers encounter needle stick injury that leads exposure to dangerous blood borne pathogens. This study was conducted to assess the magnitude of needle stick injury and contributing factors among health care staffs in the Bule Hora Hospital, south Ethiopia.

**Methods:** Facility based cross-sectional study was carried out from June 20- July 30, 2020 among health care workers in the Bule Hora Hospital. The sample size for this study was 383. Descriptive statistics, bivariate and multivariable logistic regression were done. Statistical significance adjusted at  $P < 0.05$ .

**Results:** Nearly half of 166 (45.4%) of the study subjects had experienced Sharp injury. The activities mainly causing injuries were; waste collection (37.5%), giving injection (29.2%), and uncooperativeness of the patients (9.7%). Study participants that had not got training on prevention of occupational risks were two times more likely exposed to sharp injuries,  $AOR = 1.67 (1.47-3.53)$ . Health care workers working  $> 40$  hours per week were nearly four times more likely exposed,  $AOR = 3.74 (1.68-8.28)$  to sharp injury.

**Conclusion:** Even though the magnitude of sharp injury was similar to the other studies, the prevalence in the study area was high. Lack of training and prolonged working hours were risk factors identified in this study for sharp injury. Therefore, health care workers should get training on prevention of workplace hazards and working hours must be regulated.

**Keywords:** Sharp Injury, Health Care Staffs, Work Place Hazard, South Ethiopia

### Background

Sharp injury is cut from a needle or other sharp item which may result encountering to the blood or other body liquids of someone else who may be have an irreversible microbes [1]. According to International Labour Organization (ILO) report, every year 2.78 million laborers pass away from occupational related hazards or diseases in the working environment, of which 2.4 million are due to disease and an additional 374 million workers experience the ill effects of non-deadly occupational accidents [2].

There are 35 million medical services laborers that equals to around to 12% of the working people around the world. The health-related problems of this critical workforce have been ignored by both authoritatively and government body's for longer period. In medical services industry, there is a serious misinterpretation exists that

considered as this industry of care is free from diseases. However, in reality there are many infections occurs at health care facility [3].

Annually, around one million health care personnel encountered serious needle stick transmitting blood-borne microbes through tainted needles, sharp instruments or body fluid splashes. There were over 20 other different types of disease causing microbes that can be spread through needle stick related hazards like HBV, HCV, HIV, syphilis, malaria, and herpes [4,5].

These serious presentations among health workers can lead to blood-borne infections prevalently HBV, HCV, and HIV. In an unvaccinated individual, the danger of transmission is the most noted worthy HBV disease is between 6% to 30%. The assessed danger

of transmission of HCV is between 3% to 10%.Transmission of HIV following NSI is 0.3% and 0.1%. Nonetheless, if the source has a high viral load, the transmission rate increases more than ten times. Despite the fact that the transmission of HIV is not as HBV, that is 100 times less and 10 times less than HCV. It is related with significant mental and emotional disturbance, even social disgrace and may drastically influence the job satisfaction of health care personnel and leads to poor performance of work [5,6].

## Methods

### Study area

This study occurred in the Health care facilities of Bule Hora Hospital, which was located in, Oromia regional state, Southern Ethiopia. Study design: A facility-based cross-sectional study design with a quantitative approach was implemented from June 20, to July 30, 2020 among health workers.

### Study population

All health care workers who were found to have direct or indirect contact with patients and those who were practicing in this profession for at least six months and above were incorporated in this study. Health care employees, those who were excluded from this study, were those on annual vacation, sick leave and pregnancy leave and have work experience less than six months.

### Sample size determination and sampling procedure

The standard single population proportion formula was needed to decide the sample size in this study.  $Z(a/2)=1.96$  (95% confidence level of the survey, 52.8 % prevalence from previous studies with similar study setting, and 5% margin of error was used in this study to bring sample size **383**. HCWs were stratified based on their occupation and later by proportional allocation the required number of healthcare workers included in the sample from each stratum.

### Data collection tools and techniques

The data was collected using structured and semi-structured self-administered questionnaires. The questionnaires were later

divided into two parts: Part I: Socio-demographic Variables, Part II: Questionnaires related to the prevalence of needle stick injury.

The study subjects participated in the study voluntarily and they were able to stop participation whenever necessary. The tools were distributed and recollected from the participants after 24 hours. The pretested questionnaires and proper data collection procedure was done to ensure quality of the collected data. Pre-testing was done in Dilla referral Hospital among 10% (38) of the total study subjects.

### Data management and analysis

First, the data was checked for completeness. Next, the cleaned data entered into Epi Data version 4.4.3.1. Finally, the data was exported to SPSS Statistics Version 25 for analysis.

The results of this study were presented by tables, charts, and graphs. Percentage, frequency and mean were calculated using descriptive statistics. The associations between variables were checked using bivariate logistic regression. Variables that had association at  $P < 0.25$  were taken to the multivariate logistic regression to control cofounding variables and check the strength of association. For multivariate logistic regression analysis, statically significance adjusted at  $p < 0.05$  with 95% confidence interval.

## Results

### Socio-demographic Variables of Health Care Workers in the Bule Hora Hospital, 2020

The study was occurred among 383 health care workers with a response rate of 366 (95.56 %). Half of the 189(51.6%) study participants were males and 177(48.4%) were females. The median age of the study subjects was 26. About 209 (57.1%) were married in marital status and the highest number 152 (41.5%) were sanitary workers. In addition, 177 (48.4%) were diploma holders. Regard to the departments they were working 97 (26.6%), 69 (18.9%), and 69 (18.9%) of the health care workers were working in outpatient department, medical-surgical, and Ob-gyne wards respectively. The average service year of the respondent was 3.94+3.335 SD (See Table 1)

**Table 1:** Socio-Demographic Variables of the Study Participants (N=366)

Variables	Variable Category	Frequency(N)	Percent (%)
Sex	Male	189	51.6
	Female	177	48.4
Age	≤25	159	43.44
	25-34	193	52.73
	>34	14	3.83
Marital status	Single	157	42.9
	Married	209	57.1
Profession	Nursing	120	32.8
	Medical doctor	34	9.3

	Midwifery	37	10.1
	Lab. Technician	23	6.3
	Sanitary workers	152	41.5
Education level	Below Diploma	55	15
	Diploma	177	48.4
	Degree	99	27
	Master and above	35	9.6
Work experience	≤5	281	76.8
	>5	85	23.2
Work in department	Outpatient Department	97	26.6
	Emergency ward	46	12.6
	Operating theatre	25	6.8
	Medical-surgical ward	69	18.9
	Oby-Gyne ward	69	18.9
	Pediatrics ward	18	5
	Intensive care unit(ICU)	32	8.7
	Other	9	2.5

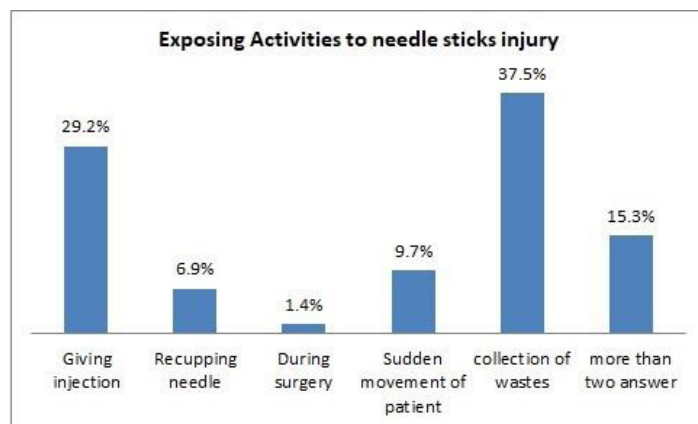
Key: Other: pharmacy

### Prevalence of sharp injury among health care workers in the Bule Hora Hospital, 2020

Majority of the study participants 313(85.5%) reported they gave attention to risk of the sharp injury while they were working and 308 (84.2%) rated the risk as high. Greater number of the HCWs 137(86.1%) agreed on the sharp injury was avoidable. The magnitude of the sharp injury in the Borana zone was 166(45.4%). The common activities which put HCWs at the risk of injuries were waste collection (37.5%), giving injection (29.2%), and uncooperativeness (9.7%) of the patients to the procedure performed to them (See Figure 1). Out of those exposed to sharp injury, 71(42.8%) of injuries happened in the past twelve months. All most all 334(91.3%) of the health care workers reported, there were an infection prevention committee in the zone. Regarding the use of PPE, 228(63.3%) of them always used PPE and 232(63.4%) reported insufficiency of PPE in the health care facility of the west guji zone. Concerning to the implementation of the standard precaution, 214(58.5%) of HCWs practice occasionally, and more than half 200(54.6%) not trained on infection prevention.

Two-thirds of HCWs were working more than forty hours per week and the average working time was 49.88 + 10.190 SD. The

highest 140(84.3%) number of accidents occurred at night shift. Of whom were exposed to sharp injury, 97(58.4%) of them screened the sources of exposures; 193(52.7%) reported as sufficient PEP in the hospital and More than 2/3 (74.9%) of HCWs told as health facility provided PEP services for 24 hours. Out of who were exposed to hazard, 78(47%) took PEP. However, 54(14.8%) of them took the PEP within the first one hour (See Table 2)



**Table 2:** Prevalence of Sharp injury among health care workers at Bule Hora Hospital, 2020 (N=366)

Variables	Category	Frequency	Percent
Do you concerned about risk of Needle Stick Injuries	Yes	313	85.5
	No	53	14.5
How do you rate the risk of Needle Stick Injuries	Less risk	58	15.8
	High risk	308	84.2
Is risk of Needle Stick injury avoidable	Yes	315	86.1
	No	51	13.9
Is there infection prevention committee in your health care institution	Yes	334	91.3
	No	32	8.7
Use of PPE	Occasional	138	37.7
	Always	228	63.3
Availability of Personal Protective Equipment's in your institution	Not Sufficient	232	63.4
	Sufficient	134	36.6
Availability of safety guideline in your working ward.	Yes	311	85
	No	55	15
Ever exposed to NSI	Yes	166	45.4
	No	200	54.6
Exposed to Needle Stick Injuries in past 12 months	Yes	71	42.8
	No	95	57.2
Reporting Injuries to concerned body	Yes	53	31.9
	No	113	68.1
Exposure time to needle sticks injury	Day	26	15.7
	Night	140	84.3
Practice of standard precaution	Sometimes	214	58.5
	Always	152	41.5
Have you ever get training on Infection Prevention?	Yes	166	45.4
	No	200	54.6
Total working hour/week? ( in hours)	≤40	106	29
	>40	260	71
Post exposure screening of the source of exposure?	Yes	97	58.4
	No	69	41.6
Is there someone to administer PEP 24 hours a day in this facility	Yes	274	74.9
	No	92	25.1
Have you ever used Viral infection Post Exposure Prophylaxis?	Yes	78	47
	No	88	53
Time to start PEP after exposures	Within 1hrs	54	14.8
	1-2hrs	237	64.7
	>2hrs	75	20.5

## Factors associated with sharp injury among health care workers in the Bule Hora Hospital, 2020

Factors associated with sharp injury were assessed using both binary logistic and multivariable logistic regression model based on the developed conceptual framework. Variables which reach a P value of less than 0.25 were considered as having association with exposure of sharp injury at bivariate logistic regression.

Accordingly, the independent variable that had a statistically significant association with exposure to sharp injury was: Use of PPE, training, working time, report injury to responsible person and implement the standard precaution package.

The strength of association between the independent variables and exposure to sharp was done by using multivariable logistic regression. The result showed HCWs who were not got training on infection prevention were nearly two times more exposed AOR=1.67, with 95%CI (1.47-3.53) to sharp injury than trained health care workers. Working more than forty hours per week was significantly associated with sharp injury. Health care providers who work more than forty hours per week were nearly four times more exposed , AOR= 3.74, 95%CI (1.68-8.28) than those working less than forty hours per week. (See Table 3)

**Table 3:** Factors associated with Sharp injury among health care workers at Bule Hora Hospital, 2020

Predictors Variables	Exposed to NSI		COR(95%CI)	P-Value	AOR(95%CI)	P-Value
	No	Yes				
Use of PPE Occasional Always	64(32.2) 136(67.8)	74(44.4) 92(55.6)	1 0.59(0.31-.083)	0.05*	1 0.97(0.41-2.35)	0.95
Training on IP Yes No	108(54) 92(46)	58(34.7) 108(65.3)	1 2.18(1.16-4.20)	0.016*	1 1.67(1.47-3.53)	0.031**
Working Hours/week ≤ 40 >40	78(39.1) 122(60.9)	28(16.7) 138(83.3)	1 3.15(1.50-6.82)	0.002*	1 3.74(1.68-8.28)	0.001**
Reporting injury No Yes	120(59.8) 81(40.2)	131(79.2) 34(20.8)	1 0.38(0.19-0.79)	0.01*	1 0.69(0.24-1.96)	0.49
Standard precaution Pr Occasional Always	99(49.4) 101(50.6)	115(69.4) 51(30.6)	1 0.43(0.22-0.83)	0.01*	1 0.54(0.20-1.42)	0.21

**Key:** COR- crude odds ratio, AOR- adjusted odds ratio, \*Significant at P value < 0.25, \*\*Significant at P value <0.05

## Discussion

This study assessed the magnitude of sharp injury and risk factors among health care workers in the Bule Hora Hospital. The prevalence of sharp injury was 166(45.4%). This finding is comparable with studies done in northern Ethiopia Tigray region (38.5%), Addis Ababa (39%) and Southeast Ethiopia Bale zone (37.1%) [7-9] and higher than studies conducted in Malaysia (20.9%) and Saudi Arabia (13.84%)[10,11]. This result is lower than a systematic review and meta-analysis of 21 African countries (65.7%), Workers in Gondar Town 73.3%, and the study done in Serbia (56.5%) [12-14]. The observed difference might be due to the difference in setting of the study, study population, study time gap, and awareness level of study participants regarding the implementation of the standard precaution packages.

In this study, one-year prevalence of sharp injury was 71(42.8%). This result is in agreement with a systematic review and meta-analysis of 21 African countries (65.7%), Tanzania (48.6%) and the

global systematic review and meta-analysis (44.5%)[12,15,16]. This higher than studies done in northern Ethiopia Tigray region (38.5%), Addis Ababa (39%), Southeast Ethiopia Bale zone (37.1%), and in Serbia[7-9,14]. The difference might be explained by variation in study setting and study variables.

The common activities which put HCWs at the risk of injuries were waste collection (37.5%), giving injection (29.2%), and uncooperativeness (9.7%) of the patients to the procedure performed to them. This result agreed with studies done in northern Ethiopia Tigray, uncooperativeness of patients (28.1%), waste collection (18.1) and injection (14.6%), Southeast Ethiopia Bale zone, reaping needle (46%), and waste collection (16.7%) and Kenya routen procedure 22% and waste collection (3.4%) [7,8,17]. This is might be due to the fact that the similarity of service provided in all health care setup.

According to this study, the higher number of injuries occurred

during the night shift. This finding contradicts with studies done in northern Ethiopia Tigray region and Kenya that the majority of an accident occurred at day time [1,17]. In the present study, (31.9%) study participants not reported accidents to the concerned authority. This is comparable with the study conducted in Tanzania (32.1%) [15] and lower than systematic review and meta-analysis among healthcare workers in Africa (48%), and in Eastern Ethiopia Dire Dawa (65.3%) [16,18]. This might be explained by difference regarding importance of reporting the injuries to the concerned authorities. In this study, 200 (54.6%) of the study participants not get training on infection prevention. This result was supported by a study done in southern Ethiopia, Wilaita area, 58.9% [19]. This similarity may be explained by geographic location which was far from the training providing center. However, the result is lower than the study carried out in Southeast Ethiopia Bale zone (65.3%) [9].

In this study, more than half of the health care workers (58.5%) not adhered to standard precaution during performing tasks. This finding agreed with the study conducted in Addis Ababa (58.8%) and Northwest Ethiopia Awi zone (57.9%) [8,20]. The similarity explained in terms of non-adherence to standard precaution is a common problem across the country which needs awareness creation for all health care workers regarding the usefulness of consistent practice of standard precaution in preventing exposure of needle stick injury. The finding from this indicates 97 (58.4%) of the study subjects screened sources of exposure. This is much lower than the study carried out in Tanzania (82.5%) and Kenya (91.5%) [15,17]. This considerable difference may be due to awareness regarding screening sources after exposure, fear of discrimination by colleagues, and less concern to infection transmitted via needle stick injury.

Health care providers who were not got educational training on infection prevention were two times more likely exposed to sharp injury, AOR=1.67 (1.47-3.53) than trained HCWs. This line with systematic review and meta-analysis of 21 African countries that HCWs without training were more exposed to sharp injury than trained one (AOR: 1.791, 95% CI: 1.234-2.071), Northern Ethiopia Gondar town, no training AOR=3.36, 95% (CI: 1.1, 11.2), study done in Tanzania AOR=3.10, 95% CI (2.58-626), Kenya protective training in infection prevention was [AOR= 0.52, 95% CI (0.03-0.90) [12,13,15,17]. This is due to the fact that lack of training increases the chances of exposure to sharp hazard.

This study shows HCWs work more than forty hours per week, nearly four times highly exposed, AOR= 3.74, 95% CI (1.68-8.28) sharp injury than those working less than forty hours per week. This finding supported with the study carried out in North Ethiopia, Tigray region, AOR=16.09795% CI (6.252, 41.448) and a systematic review and meta-analysis of 21 African countries that health-care workers who worked less than forty hours per week were less likely exposed than those who worked more hours AOR:

2.221; 95% CI (1.001-4.926) [7,12]. This may be due to over work load from too much time working results in fatigability which enhances the risks of hazard.

The limitation of this study was from design itself, cross-sectional study design was used in this survey that it was difficult to assume a causal relationship between variables. This study was conducted in a single zone, which is difficult to generalize the findings.

## Conclusion

Nearly half of health care workers exposed to sharp injury. Even though the result is comparable with the similar studies, it is impossible to say the low magnitude of hazard. More than half HCWs were not trained on infection prevention and not consistently practice the standard precaution packages. Two-thirds of HCWs work more than forty hours per week and more than half of them reported as shortage of PPE in the institution. Use of PPE, reporting injury to a responsible person, practice of standard precaution, training on infection prevention, and working hours per week were factors significantly associated with sharp injury. As a result, health care workers should get training on prevention of workplace hazards and working hours must be regulated.

## What is already known on this topic?

- Sharp injury is a common problem among health care workers that face them at health care facilities.
- Even though different concerned bodies provide intervention to the problem; the magnitude of injuries still need greater concern.

## What you add to this research ?

- This study identified the status sharp injury and contributing factors among health care staffs in the Bule Hora Hospital which enables to give solution to the problem
- Lack of training and working for longer periods of times in the health care facilities were risk factors to sharp injury.
- Continuous training for health care workers regarding how to prevent the risk of sharp injury was a crucial intervention in the prevention of sharp injury in the health care facilities.

## Lists of Abbreviations

AIDS: Acquired Immune Deficiency Syndrome; BBF: Blood and body fluid; CDC: Communicable disease control; HBV : Hepatitis B virus; HCV: Hepatitis C virus; HCW: Healthcare workers; HIV: Human immune deficiency virus; ILO: International Labour Organization; NSI: Needle stick injury; PPE: Personal protective equipment; PEP: Post exposure prophylaxis

## Declarations

### Ethics approval and consent to participate

Ethical clearance was obtained from Bule Hora University, College of Health and Medical Science, Institutional Review Board (IRB). Permission letter was given to managers of health care in-

stitutions and informed consent was obtained from all respondents after explaining the objective of the study. The confidentiality of the collected data was assured and voluntary participation of study subjects was also maintained in this study.

### Consent for publication

Not applicable

### Availability of Data and materials

Author of this study declare that all data needed in this study can be available upon request by the side of corresponding author.

### Competing Interests

Author of this study affirm that there was no compete of interests

### Funding

Bule Hora University was funded for this study. The University has no role in designing and organizing, data collection, analysis, and report writing.

### Authors' contributions

Shiferaw Gelchu Adola -Conceived and designed the study, analyzed the data, and wrote the manuscript.

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