

# Assesment of Percutaneous Exposure Incidents and Associated Factors among Health Care Personnel in Gandhi Memorial Hospital, Addis Ababa

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## Abstract

**Background:** Percutaneous exposure incidents (PEIs) and blood splashes on the skin of health care personnel's are a major concern worldwide. It exposes the healthcare personnel to the risk of infectious diseases. **Objective:** this study was designed to assess percutaneous exposure incidents (PEIs) and associated factors among health care personnel in Gandhi Memorial hospital, Addis Ababa, Ethiopia. **Methods:** Institution-based quantitative cross sectional study design was utilized involving 244 study subjects using systematic random sampling technique. The data was collected using a structured self-administered questionnaire & interview based data collection technique. The data was cleaned and entered into a computer software using Epi Info 6.04 and then exported to statistical package for social sciences (SPSS) version 20.0 for analysis. Bivariate and multivariate logistic regression were also computed to assess statistical association between the outcome variable and selected independent variables using odd ratio, significance of association was assured or tested using 95% confidence interval and P-value (<0.05). **Results:** The prevalence of percutaneous injuries was high among females HCP (65.6%), HCP age group of 18-24 years (45.2%) were the highest exposed to needle stick. Nurses had the highest prevalence of percutaneous injuries (26.9%) from other health professionals and Auxiliary staff (43.0%) had the highest prevalence of sharp injuries from all healthcare workers. The prevalence of mucocutaneous exposure to patient's blood and body fluid was highest among Auxiliary staff (janitors, laundry workers, housekeeping, and maintenance) (55.9 %) than other health care workers. Factors associated with occurrence of needle-stick injuries were job category and working hour. In addition respondents with educational level of BSc degree holders were found to be 33 times at risk for sustaining NSI than those with educational level of primary, secondary school and diploma (AOR=33.01, 95%CI=3.93-77.07, P-value=0.001 **Conclusion and Recommendation:** The findings of this study indicated that occupational exposures were common among healthcare workers, including accidental needle-stick, cuts with contaminated instruments and blood splashes. **Keywords:** Occupational exposure, percutaneous exposure incidents, needle-stick injuries, health care personnel.

## 1. Introduction

Percutaneous exposure incidents (needlestick injuries, sharp injuries, as well as splashes) leading to exposure of the skin or mucosa to blood) are a potential mode of exposure to and transmission of blood-borne infectious diseases among healthcare workers. It constitutes a major occupational hazard for health care workers (1). Needle stick injuries refer to penetrating wound with various types of needles (hypodermic blood collection, intravenous (IV) stylets and IV delivery systems connectors which are potentially contaminated with another person's body fluid (2).

The World Health Organization has estimated that in developing regions, 40%–65% of HBV and HCV infections in HCWs are attributable to percutaneous occupational exposure (3). Healthcare workers (HCWs) in Africa suffer two to four needle stick injuries per year on average (4), with Nigeria, Tanzania and South Africa reporting 2.1% injuries per year on average (5).

These injuries occur in a variety of procedures like during needle recapping, operative procedures, blood collection, intravenous line administration, suturing, checking blood sugar and poor sharp disposal system (6).

Workplace-related health impairment, injuries and illness cause great human suffering and acquire high costs, both for those affected and for the society in general (7). Each day thousands of health care workers around the world suffer accidental occupational exposures to blood-borne pathogens (8). Worldwide occupational exposure accounts for 2.5% of HIV cases and 40% of Hepatitis B and C cases among HCWs (9). Each year as a consequence of occupational exposure, an estimated 66,000 Hepatitis B, 16,000 Hepatitis C and up-to 1,000 HIV infections occur among HCWs. These infections are preventable through infection control measures, which significantly reduce the risk of HIV and Hepatitis transmission among health workers (10).

One serious blood borne infection can cost more than a million dollars in medications, follow up laboratory testing, clinical evaluation, lost wages, and disability payments. The exact costs of occupational exposures to hepatitis B and C and HIV are not available, but a 2007 article estimated the one-year cost for these incidents to be as high as \$400 million (11).

As a result the study seeks to fill out the gap that is not treated by previous researchers and aims to provide clear perspectives for different stake holders, government and non-governmental organization to comprise the

health care workers and Janitors in infection prevention training and utilization of PEP at the hospital set-up.

## Objectives

### General objectives

To assess percutaneous exposure incidents and associated factors among health care personnel in Gandhi Memorial hospital, Addis Ababa, Ethiopia from Jan 2018 to May 2018.

### Specific objectives

- ✓ To assess the magnitude of percutaneous exposure incidents among health care personnel;
- ✓ To identify factor associated with percutaneous exposure incidents among health care personnel.

## Methodology

### Study area

The study was carried out in Addis Ababa at Gandhi Memorial hospital located near the National Stadium. It is a maternal public hospital that provides appropriate medical service in the obstetrical, gynecological and emergency department services.

Gandhi Memorial hospital is a governmental hospital which specializes in maternity services. The hospital was established in 1954 E.c with the collaboration of an Indian community that lived in Ethiopia and took its name from the famous Indian leader 'Mahatma Gandhi'. Starting from its establishment the hospital has been providing maternity services. The hospital has 383 staff including supportive staff and attends a total of 72,000 deliveries annually, bed capacity of 69 (According to the preliminary survey from the information desk). This hospital was selected since it is the only specialty hospital engaged in maternity service receiving clients from all corners of the country. It also has high flow of clients and health care workers are busy managing 25-30 delivery per day which may lead to vulnerability of occupational exposure of health care personnel.

### Study design and period

A facility based cross sectional study design was used to collect data on involvement of male in promoting skilled delivery attendance and associated factors May 2018

### Source population

All health care personnel working at Gandhi Memorial hospital during the study period was included.

### Study population

All Health care personnel's working at Gandhi Memorial hospital who had contact with sharp instruments, blood and body fluid in the past 12 month were selected. Health care personnel included in this study involves: nurse, midwifery, physician (specialist, resident doctors, intern doctors & general practitioners), laboratory technician, health officer's anesthetists, students, janitors and other supportive staff.

## Eligibility Criteria

### Inclusion criteria

- i. All health care personnel (Nurses, midwives, physicians, surgeons, laboratory clinician, health officers, anesthetics, students (doctor, nurse and midwives) and auxiliary staffs (janitors, laundry workers, maintenance workers, messengers) working in Gandhi memorial hospital who had direct contact with patient's blood/body fluid and needle stick working for the past 12 month were included in the study.

### Exclusion criteria

- i. Health care personnel working in the hospital with service year of less than 12 months.
- ii. Administrative and technical workers (managers, secretaries, finance and pharmacists without contact with needle/sharps, blood and body fluids were excluded.

## Sample Size and Sampling Procedure

Sample size required for this study was calculated by using single population proportions formula with the assumptions of: P Prevalence (P): proportion of Needle stick injury,  $p = 37$ , 95% confidence level, 5% desired degree of accuracy. Since sampling was from a finite population ( $N = 583$  which is less than 10,000, it needs the finite population correction.

Therefore,  $n_f = n / (1 + n / N) = 222$

Where  $n = 358$  and  $N = 583$

By considering 10% non-response rate, the total final sample was **244**

The total sample size was **244**

List of study participants was obtained from payroll of the institution and grouped based on their job category or profession into eight groups. Out of 583 populations of Health Care Personnel at GMH, 244 subjects were selected using systematic random sampling technique for all health care personnel.

K value was calculated as  $K = N/n_f$ ,  $K=2$ ,

Where  $n_f$  = final sample size=244 and  $N$ = the total number of all health care personnel who work at Gandhi memorial hospital =583

Using the k value, health care personnel were selected based on their job category obtained from payroll of the institution in every 2<sup>th</sup> K<sup>th</sup> number intervals and the first study subjects were selected by lottery method. The sample size was distributed into each job category or profession according to proportional allocation.

#### 4.6 Study Variables

##### 4.6.1 Dependent variables

Exposure of health care personnel to needle-stick injury

Exposure of health care personnel to blood and body fluid splash

##### 4.6.2 Independent variables

(i) Socio-demographic characteristics (Age, sex, educational level, job category, work experience)

(ii) Behavioral factors (needle recapping, usage of personal protective equipment, follow safety written guidelines)

(iii) Organizational factors (training on infection prevention, working hour, working department, condition of working environment, report protocol, HBV vaccine availability, PEP service utilization)

#### Operational definitions

**Auxiliary staffs:** those who are involved in the non-technical activity of a health facility or who were considered as supportive. It includes cleaners, laundry workers, maintenance, messengers, etc.

**Health care personnel:** Health care personnel is all paid and unpaid persons working in health care settings who have the potential for exposure to infectious materials, including body substances (e.g., blood, tissue and specific body fluids) and contaminated medical supplies and equipment's, and contaminated environmental surfaces. HCP might include but not limited to emergency medical service personnel, dental personnel, nurses, physicians, laboratory technicians, students and trainees, contractual staff not employed by the health care facility and persons not directly involved in patient care but potentially exposed to blood and body fluids (e.g., dietary, house-keeping, maintenance and volunteer personnel).

**Occupational Exposure:** respondents who had history of needle-stick, sharp and splash in the course of a person's employments and involves contact with blood or other body substances.

**Percutaneous Exposure Incidents:** are needle-sticks, sharp injuries, as well as splashes having contact with skin or mucosa.

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

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

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

**Mucocutaneous Exposure:** when blood or body fluid splashes into the eyes, nose or mouth or onto broken skin.

#### Data collection tool, procedure and measurement

A structured, interview administered questionnaire was used to collect data from the study participants. The questionnaire was prepared in English and translated in to local language Amharic by translator, and then translated back to English by a third person to check for consistency. The tool has three sections and it was adapted from the survey tools developed from EPINET/Exposure Prevention Information Network and Agency for Healthcare Research and Quality that were used by other researchers)(13,14). Data collection instrument was pretested for its relevance and clarity to address the research problems appropriately and it were corrected according to the local context one week prior to the actual data collection period. In addition, the data collectors were trained for one day on the techniques of data collection and purpose of the study for study participants before the start of data collection.

#### Ethical Considerations

Ethical approval was obtained from Research Ethical Committee of the Department of Nursing & Midwifery, Addis Ababa University. Written letter of permission was obtained from Ambo town health office and verbal informed consent was obtained from each participant after the data collectors had explained the nature, purpose and procedures of the study. Anonymity and confidentiality of the data provided was strictly maintained.

Participants were assured that their participation is voluntary, and they have right to withdraw or refuse to give information at any time in the study without any penalties.

## Result

### Socio-demographic characteristics of study participants

A total of 244 were enrolled in to the study in Gandhi memorial hospital, of whom 149 (61.1%) were females. Majority (40%) of the study participants were aged between 25-31 years, (30.7%) were aged between 18-24, (18%) were 32-38 and 11% were aged 39 and above with mean and S.D of  $29 \pm 7.3$ ). Concerning educational level of HCW, 66 (27.0%) of participants were BSc degree holders, 97 (39.8%) were university students, 30 (12.3%), diploma graduates, 31 (12.7%) and (8.2 %) were secondary school and primary school respectively. Job category of the HCP 54 (22.1%) were nurses, 10 (4.1%) midwives, 11 (4.5%) physician and 117 (48.0%) auxiliary staff (janitors, laundry workers, maintenance). 177 (72.5%) of the participants had working experience between 1-4 years. (Table 1).

### Prevalence of occupational exposures by potential risk factors

One hundred seventy seven (72.5%) incidents of percutaneous injuries and mucocutaneous exposures were reported by healthcare personnel within the previous 12 months. The majority of injuries were reported by females (65.6%). Exposures were classified as percutaneous and mucocutaneous. Percutaneous injuries (38.1%) were more common than splash exposures (34.4%).

The prevalence of percutaneous injuries was high among female HCPs accounting (65.6%). Distribution of injuries between age groups of 18-24 years were (45.2%) with highest exposed to needle stick injury. The prevalence of percutaneous injuries was high among university and student (33.8%), followed by degree (BSc) holders (23.8%).

Nurses had the highest prevalence of percutaneous injuries (26.9%) compared to other health professionals, Physicians (1.1%) Midwives, Anesthetics and Laboratory technician had (4.3%) each. However other staffs such as students account for (16.1%), Auxiliary staff (43%) had the highest prevalence of sharp injuries from all healthcare workers.

Respondents with year of experience 1-4 years (92.5%) and working hour >40 hour (58.1%) reported percutaneous injuries in the last 12 month (Table 2).

### Prevalence of needle-stick injuries and nature of exposure

Of all study participants, 69 (28.3%) reported needle stick injuries, of which 24 (9.8%) sharp injuries, and 84 (34.4%) reported splashes among healthcare personal in the last 12 months. Among the 93(38.1%) who sustained needle stick and sharp injuries, 74 (79.6%) sustained at least once with mean number of injuries of 1.26 (SD 0.55), 14 (15.1%) 2-4 times and 5 (5.4%)  $\geq 5$  times. Concerning depth of injury fifty one (54.84%) of sharp injuries were superficial without bleeding, 33 (35.48%) moderate injuries with some bleeding and 9 (9.68%) severe injuries with profuse bleeding.

The prevalence of mucocutaneous exposure to patient's blood and body fluid was highest among Auxiliary staff (janitors, laundry workers, housekeeping, and maintenance) 47 (55.9 %) than other health professionals.

For both the health professionals and auxiliary staff, the BBF exposure mainly affected the hand 48 (57.14%), followed by face 13 (15.48%), 10 neck and chest (11.9%) and 7 (8.33%) feet.

Study participants reported they were engaged in activities such as 5(5.95%) IV secure, 8 (9.52%) Dislodging blocked intravenous line, 5 (5.95%) Rapid gush of amniotic fluid, 4 (4.76%) Accidental splash by colleague, 2 (2.38%) Rapid expulsion of fetus during delivery, 7(8.33%) delivery Conducting delivery, 9 (10.71%) Withdrawal of blood for sampling, 5 (5.95%) Disinfecting reusable instruments, 6 (7.14) Laundry of patient used cloth, 16 (19.05%) Collection of waste placenta & blood, 12 (14.29%) Vaginal examination, 4 (4.76%) Glove breakage and 1(1.19%) Performing operation at time of accidental splash occurred. (Table 3)

### Circumstance leading to occupational exposure to needle-stick and sharp injury

Various factors were associated with percutaneous injuries and splash exposures. These include work shift, working department, working hour, condition of working environment, procedure, occupation type of device. Majority of injuries (65.5%) occurred with working hour >40 hr, (54.8%) working condition with dim light and most of injuries (79.6%) occurred during day time Most of sharp injured occurred in the 28(30.1%) emergency department, 25(26.9%) delivery room, 22(23.7%) outpatient department, 10(10.4%) gynecology ward, 6(6.5%) Laboratory room, and 2(2.15%) Operation room

### Organizational and behavioral factors associated with needle stick and sharp injuries among HCP

Nearly all the respondents 241(98.8%) reported that the universal precautions and guidelines about infection prevention had been posted in their health institution; of whom 234 (95.9 %) followed the posted guidelines.

Regarding the report protocol 26 (31%) reported that there is a protocol for reporting occupational exposure in the institution. Concerning use of personal protective equipments, 62 (73.8%) reported they use personnel protective equipment. Concerning the type of personnel protective equipment as they reported, 33 (53.2%) used examination glove, 23 (37%) used utility glove and 6 (9.7%) apron. On Hepatitis B virus Vaccination status (50.8%) of the respondents received hepatitis B virus vaccine and 4 (4.76%) of the respondents received post exposure prophylaxis. Of all respondents, (24.6%) of health professionals had training on infection prevention and 184 (75.4%) hadn't trained on infection prevention of the respondents. (**Table 5**)

### **Multivariate logistic regression analysis on occupational exposure**

On Multivariate analysis job category, educational level and working hour were found to be the factors that are significantly associated with percutaneous exposure. However age, sex, work experience, work guidelines and training on infection prevention were not significantly associated with percutaneous exposure.

Job category was found to be associated with of NSI among laboratory workers than other health care personnel. The association showed protective effect in the laboratory workers compared to other healthcare personnel (AOR=0.06, 95%CI=0.11-0.28, P-value=0.000).

In addition respondents with educational level of BSc degree holders were found to be 33 times at risk for sustaining NSI than those with educational level of primary, secondary school and diploma (AOR=33.01, 95%CI=3.93-77.07, P-value=0.001)

Healthcare personnel who had extended working hours (>40 hrs/week) were more than 10 times at a higher risk to needle-stick and sharp injuries as compared to those who work ( $\leq$ 40 hrs/week) (AOR=9.8, 95%CI=2.68-35.83, P-value=0.001 (**Table 6**).

On Multivariate analysis job category and educational level were found to be the factors that are significantly associated with mucocutaneous exposure. However age, sex, working hour, work experience, work guidelines and training on infection prevention were not significantly associated with percutaneous exposure.

Respondents with job category had statistical significance for the occurrence of blood and body fluid splash. Midwives were less likely to be exposed than other healthcare personnel (AOR=0.02, 95%CI=0.001-0.41, P-value=0.01) were found to be significantly associated with exposure to mucocutaneous exposure to blood and body fluid splash in multivariate logistic regression model.

Respondents who are vaccinated against hepatitis B virus were 4 times protective than who did not take HBV vaccine for blood and body fluid splash (AOR=3.56, 95%CI=1.07-11.80, P-value=0.037)

Respondents with working hour >40 hour were also found to be 6 times more at risk to splash exposures compared with those worked for less than 40 hours (AOR=5.85, 95%CI=1.29-26.6. P-value=0.02) (**Table 7**).

### **Discussion**

The prevalence of needle stick and sharp injury in the previous twelve months was 38.8%, implying that needlestick and sharp injury are common occupational health hazard to HCPs in the study area. The finding is higher when compared to studies done in, Northern Uganda, Kenya and Bahirdar Northwest Ethiopia where the proportion of injury in the last 12 months was 22.7%, 19% and 31.0% respectively (15-17). This study indicated that there was significant association between age and percutaneous exposure, HCP age group of 18-24 years (45.2%) were the highest exposed to needle stick. The finding of this study also showed that the prevalence of percutaneous injuries was high among those with experience less than 1-4 years (92.5%) which is comparable to the study conducted in Turkey in which young age was risk factors for occupational injuries (18). This is possibly due to limited work experience and the fact that young HCWs tend to be hasty and aggressive in their work.

Majority of exposures occurred during the day shift 79.6%. This may attributed to busy schedule at time and the high work load, high patient flow during day time (19)

The prevalence of mucocutaneous exposure to blood and body fluids were (34.4%) splashes were reported among healthcare personal in the last 12 months. This result was less than a study conducted in Northern Uganda revealed that 46% (20) respondents were found to have been exposed to potentially infectious body fluids. Although all healthcare workers in contact with patients are at risk to exposure to blood and body fluids, (55.9%) auxiliary staff (janitors, laundry workers, housekeeping, and maintenance) were the highest splash exposures than other health professionals.

About 38.1% of respondents who encountered NSI in the last one year, only 7.4% of HCWs were to report injuries to the employee health service. About 78.8% of respondents who encountered NSI in the last one year didn't report to any responsible body in their facilities. The proportion is higher than that reported from Germany and UK (21).

In line with this finding, respondents with working hour >40 hour were also found to be 10 times more at risk to NSI compared with those worked for less than 40 hours (AOR=9.80, 95% CI=2.68-35.83, P-value=0.02). It has been previously associated with recapping and poor compliance with universal precaution (22).

In addition respondents with educational level of BSc degree holders were found to be 33 times at risk for sustaining NSI than those with educational level of primary, secondary school and diploma (AOR=33.01, 95%CI=3.93-77.07, P-value=0.001)

#### Limitations of the Study

A limitation of this study is that it is purely quantitative and doesn't have the capacity to explore the myriad of contextual and social factors that may be limiting male partner involvement in birth, so it would be very worthwhile to suggest future qualitative research to follow-up on these findings.

#### Conclusion

The aim of this study was to assess the prevalence percutaneous exposure incidents and the associated factors. 244 study participants 38.1% male and 61.1% female were enrolled in this study. The prevalence of needle-stick and sharp injuries were 38.1% and the prevalence of blood and body fluid splash were 34.4%. The highest proportion of needle stick injuries among health care personnel were related to 11.5% administration of injection followed by 7% recapping of needles. Even though most of health care personnel were informed as well as being familiar to universal standards and guidelines, this study revealed that majority of the respondents had experienced the risky occupational exposure during the previous the last 12 months. Concerning report exposure, only 7.4% of respondents were report NSIs to the employee health service the majority of exposed health workers didn't report their injury. The statistically significant determinant factors for NSI were educational level, job category and working hour.

#### Recommendation

The Gandhi Memorial hospital should incorporate auxiliary staffs (janitors, laundry workers, housekeeping, and maintenance) training on infection prevention. Furthermore reducing the working hour or heavy work over load was also advantageous to reduce occupational exposure of healthcare workers. This can be addressed by increasing the number of staff at Ghandi hospital.

Auxiliary staffs engaged at risk of exposure to needle-stick and blood and body fluids should be incorporated in the immunization programs to HBV vaccine.

A clear injury reporting protocol system is required including adequate counseling and testing as well as post exposure prophylaxis for victims whenever necessary. Furthermore, large scale research may be needed to determine the actual incidence of needle stick and sharp injury as well as splash exposure to blood and body fluids.

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### List of Tables

**Table 1: Socio-demographic characteristics of HCP (244) in GMH, Addis Ababa, Ethiopia, 2018.**

Variable	Category	Frequency	Percent (%)
Age	18-24	75	30.7
	25-31	98	40.2
	32-38	44	18.0
	39-45	8	3.3
	46+	19	7.8
Sex	Male	95	38.9
	Female	149	61.1
Educational level	Primary school	20	8.2
	Secondary school	31	12.7
	Diploma	30	12.3
	Degree (BSc)	66	27.0
	Other higher level	9	3.7
	University students	88	36.1
Job category	Nurses	54	22.1
	Midwifes	10	4.1
	Physician	11	4.5
	Anesthetists	6	2.5
	Laboratory technician	8	3.3
	Health officers	9	3.7
	Students	29	11.9
	Auxiliary staffs	117	48.0
Year of experience (in years)	1- 4	177	72.5
	5 - 9	41	16.8
	10 -14	18	7.4
	15 -19	3	1.2
	≥20	5	2.0

**Table 2: Prevalence of occupational exposures by potential risk factors, among HCP in Gandhi memorial hospital, Addis Ababa, Ethiopia, March, 2018**

Variable	Category	Prevalence, (%)	
		Percutaneous	Splashes
Age	18-24	42(45.2)	14(16.7)
	25-31	36(38.7)	39(46.4)
	32-38	11(11.8)	23(27.4)
	39-45	2 (2.15)	3 (3.6)
	≥46	2 (2.15)	5 (6.0)
Sex	Male	32 (34.4)	29(34.5)
	Female	61 (65.6)	55(65.5)
Educational level	Primary school	3 (11.3)	12 (14.3)
	Secondary school	14 (11.3)	15(17.9)
	Diploma	7 (15.2)	12 (14.3)
	Degree	30 (23.8)	22 (26.2)
	Other higher level	2 (4.6)	2(2.4)
	University students	37 (33.8)	21(25.0)
Job category	Nurse	25 (26.9)	23 (27.4)
	Midwives	4 (4.3)	9 (10.7)
	Physician	1 (1.1)	1 ( 1.2)
	Anesthetics	4 (4.3)	0 (0.0)
	Laboratory technician	4 (4.3)	0 (0.0)
	Student	15 (16.1)	4 (4.8)
	Auxiliary staffs	40 (43)	47 (55.9)
	Year of experience	1-4	86 (92.5)
	5-9	4 (4.3)	21 (25.0)
	10-14	3 (3.2)	11 (13.1)
Working hour/week	<40 hr	39 (41.9)	29 (34.5)
	>40 hr	54 (58.1)	55 (65.5)

**Table 3: Characteristics of occupational exposures to blood and body fluids**

Variable	Category	Frequency	%
Body part exposed	Eye	6	7.14
	Face	13	15.48
	Neck and chest	10	11.9
	Hand	48	57.14
	Feet	7	8.33
Activity at time of exposure	IV secure	5	5.95
	Dislodging blocked intravenous line	8	9.52
	Rapid gush of amniotic fluid	5	5.95
	Accidental splash by colleague	4	4.76
	Rapid expulsion of fetus during delivery	2	2.38
	Conducting delivery	7	8.33
	Withdrawal of blood for sampling	9	10.71
	Disinfecting reusable instruments	5	5.95
	Laundry of patient used cloth	6	7.14
	Collection of waste placenta, blood	16	19.05
	Vaginal examination	12	14.29
	Glove breakage	4	4.76
	Performing operation	1	1.19
Depth of injury	Superficial without bleeding	51	54.84
	Moderate with some bleeding	33	35.48
	Sever with profuse bleeding	9	9.68

**Table 4: Organizational and behavioral factors associated with needle stick and sharp injuries among HCP, in Gandhi memorial hospital, Addis Ababa, Ethiopia, March, 2018.**

Variables	Category	Frequency (n=244)	%
Availability of safety working guidelines	Yes	241	98.8
	No	3	1.2
Availability of report protocol	Yes	26	31
	No	58	69
Training on infection prevention	Yes	60	24.6
	No	184	75.4
Vaccinated for hepatitis B virus	Yes	124	50.8
	No	120	49.2
Report exposure to the employee health service	Yes	18	21.4
	No	66	78.6
Use of personal protective equipment	Yes	62	73.8
	No	22	26.1
Type of personal protective equipment	Examination glove	33	53.2
	Utility glove	23	37
	Apron	6	9.7
Receive Post exposure prophylaxis	Yes	4	4.76
	No	80	95.23
Follow safety guidelines	Yes	234	95.9
	No	10	4.1

**Table 6 Multivariate logistic regression analysis of factors associated with needle-stick and sharp injuries among HCP in GMH, Addis Ababa, Ethiopia, 2018 (N= 244)**

Variable	Category	Exposed	No-exposed	AOR (95%CI)	P-value
Job category	Nurse	25	29	0.09(0.001-0.29)	0.018*
	Laboratory technician	4	4	0.06(0.11-0.28)	0.000*
	Janitors	12	8	0.64(0.005-0.77)	0.03*
Educational level	Primary school	3	17	17.14(1.68-174.41)	0.016*
	Secondary school	14	17	8.29(1.42-48.37)	0.019*
	Diploma	30	36	33.01(3.93-77.02)	0.016*
Working hour/week	Degree	7	23	13.29(1.604-110.06)	0.001*
	≤40hrs	39	96		
	>40hrs			9.80(2.68-35.83)	0.001*
		54	55		

\* Significant for (P-value<0.05).

**Table 7: Multivariate logistic regression analysis of factors associated with blood and body fluid splash exposures among HCP in GMH, Addis Ababa, Ethiopia, 2018 (N= 244)**

Variable	Category	Exposed	Non-exposed	AOR(95%CI)	P-value
Job category	Midwives	9	1	0.021(0.001-0.41)	0.01**
Working hour/week	≤40 hour	29	106		
	>40 hour	55	54	5.85(1.29-26.6)	0.02**
Vaccinated HBV	Yes	44	80		
	No	40	80	3.57(1.078-11.803)	0.037**

\* Significant for (P-value<0.05).