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Managements of Exposure to Blood and Body Fluids Among Healthcare Workers and Medical Students in University of Gondar Hospital, Northwest of Ethiopia

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Result: The one-year prevalence of occupational exposure to BBFs at least once during the study period was 157 (62.3%). Majority, 109(71.7%) of source patient for occupational exposure were identified and 29(26.6%) of patients were positive at least one of the three viral diseases (HB, HC and HIV). In this study, only 38.2% of HCWs washed the exposed body part with soap and water after facing BBFs exposure. The 28-day mandatory post-exposure prophylaxis was used by only 12.1% of HCWs after facing BBFs exposure.

Conclusion: BBFs exposure among HCWs was a widespread occupational hazard. *Safety Precuations (SPs) were poorly applied for exposure prevention and post exposure managements to BBFs among participants of this study.* Altering the behavior of HCWs to apply Safety Precautions and an establishment of a surveillance system for registering, reporting and early management of occupational exposure are required.

Keywords : occupational exposure, health care workers, blood and body fluid, post exposure management.

1. INTRODUCTION

Occupational exposure to Blood and body fluid (BBF) to health care workers and the infectious complications associated with it is a global issue (1, 2, 3). Each day thousands of healthcare workers (HCWs), around the world, suffer accidental occupational exposures during the course of their role of caring for patients. These injuries can result in a variety of serious and distressing consequences ranging from extreme anxiety to chronic illness and premature death for the individual involved (4, 5).

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 (3,6).

Adherence to standard infection control practices is best way to prevent blood born infections in health care setting. The exposed person shall inform an appropriate person as soon as possible after exposure so assessment and follow-up can be undertaken, an assessment of risk shall be undertaken as soon as possible after every incident of occupational exposure and Post-exposure prophylaxis, where indicated, should be prescribed as soon as possible after exposure (7).

Occupational hazards faced by healthcare personnel in University of Gondar hospital have received increasing attention but existing surveillance systems and HCWs responsiveness for Safety Precautions are inadequate to describe the scope and magnitude of occupational exposures to infectious agents that HCWs experience, the outcomes of these exposures and injuries, and the impact of preventive measures (8).

a) General Objective

- To assess exposure management practices of HCWs and medical students to blood and body fluids (BBFs) in University of Gondar Hospital.

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b) *Specific Objective*

- To assess precaution measures taken by HCWs and medical students to prevent exposure and
- To identify post exposure practices of HCWs and medical students to BBFs exposure.

II. METHODS

a) *Study Setting*

The study was conducted in University of Gondar Hospital; Gondar was one of the metropolitan cities of Ethiopia, founded in 1636 by Emperor Fasilades, 748 kms northwest from Addis Ababa.

b) *Participants*

Two hundred eighty five participants (including health professionals, janitors and medical students) of Gondar University Hospital were included in the study.

c) *Study Population*

Sampled health professionals, janitors and medical students

III. INCLUSION AND EXCLUSION CRITERIA

Health Care Workers that are assigned for clinical services, academic staffs that had regular program for patient care and graduate batch interns were included in the study.

Health Care Workers who were on leave (maternity, annual, sick, fieldwork) during the study period as well as HCWs who had not worked at least six months within the last one year, were excluded in this study.

a) *Sample Size and Sampling Technique*

Sample size was calculated using a single population proportion. Considering 20.2% of one-year prevalence of at least one BBFs exposure in previous study in Ethiopia (13), a sample size of 285 was required with sampling error of 5%, at a 5% confidence level.

A stratified sampling technique was used to select the participants using lists of monthly payroll as a sampling framework and the number of participants selected from each stratum was determined by proportional to size.

IV. STUDY VARIABLES

a) *Dependent*

Exposures of HCWs and medical students to blood and body fluids.

b) *Independent*

Age, gender, marital status, religion, occupation, work experience in the area, uses of Personal Protective equipments, Infection Prevention trainings, educational status and working shift.

V. DATA COLLECTION PROCEDURES AND QUALITY ASSURANCE

The data collection was done via self-administered questionnaire and interview using structured questionnaire. Self-administered questionnaire was used for Health professionals and interns, and data from janitors was collected by interview using the structured questionnaire.

Quality of data was assured through intensive training for data collectors and supervisors, pre-testing the questionnaire on similar setting that was not included in the study, close supervision and assistance of data collectors, checking filled questionnaires on daily basis for completeness, clarity and accuracy of data. In addition data cleaning was also made before commencement of the analysis.

VI. DATA PROCESSING AND ANALYSIS

Data was coded and entered into the SPSS version 20. Descriptive statistics was made using frequencies, tables, and figures and narrative explanations. Associations were examined using binary and multiple logistic regressions. P-value less than 0.05 was taken as a cut-off point to say significant at 95% confidence level.

a) *Ethical Considerations*

Ethical approval was obtained from the Research and Ethics Review Committee at Bahir Dar University. Written consent was also obtained from Amhara-regional health Bureau and University of Gondar hospital to conduct the study. All the study participants were informed about the purpose of the study and finally verbal consent was obtained before data collection. The respondents had the right to refuse participation or terminate their involvement at any point during the study. Information provided by each respondent was kept confidential. Furthermore, report writing did not refer a specific respondent with identifiers.

VII. RESULT

Out of the 285 selected HCWs and graduate batch interns, 252 responded giving response rate of 88.4%. Twelve incomplete questionnaires were discarded. Among the respondents, 127 (50.4%) were males. From the total participants 158 (62.7%) were health professionals, (24.6%) were housekeeping staffs, and 32 (12.7%) were graduated interns. Respondents age range from 19 to 54 years with a mean age of 29 years. Among participants in this study 113(44.5%) had less than two years of work experiences. HCWs who hand experiences two to four years were 62(24.6%) and only 45(17.7%) were five years and more experienced in their current position. Other demographic information is presented in Table 1.

Among participants 137(54.4%) of HCWs reported that they were trained on infection prevention and 91(64.4%) of them whispered that the training was satisfactory for prevention of work related BBF exposure. A total of 202 (80.1%) reported that they used gloves and gown during patient care or related activities indiscriminately for all duty. Only 51(20.2%) of them said they used all necessary PPEs based on the characteristics of the procedure during work. Reason of HCWs for deficient usage of PPEs was presented in Figure 1.

The one-year prevalence of occupational exposure to BBFs at least once during the study period was 157 (62.3%). Majority, 109(71.7%) of source patient for occupational exposure were identified and 29(26.6%) of patients were positive at least one of the three viral diseases (HB, HC and HIV). Of those 24(82.8%) were HIV and 5(17.2%) were HB and HC. Only 7(6.4%) confirmed free from all the three viral diseases and 56(51.4%) were free from HIV but unknown status for HB and HC. Other, 17(15.6%) patients were refusal to be tested. There was no one who had been vaccinated or took prophylaxis against HBV among participants in this study. Post exposure practices of healthcare workers and medical students to BBFs are presented in figure 2.

Despite 157 NSI and BBF splash exposures within the last-one year, the 28-day mandatory post-exposure prophylaxis was used by no more than 19 (12.1%) HCWs and only 8 (42.1%) of them completed full course. The main reason given for non-compliance was intolerance to the side effects of the medication.

In multivariate logistic regression occupation, experience and satisfactory training on IP were also associated with BBF exposure (Table 2).

VIII. DISCUSSION

Healthcare workers have increased chance of acquiring blood borne pathogens through occupational exposure in developing countries due to a combination of increased risk and fewer safety precautions (3,9). Most exposures are caused by a departure from standard precautions (10). One of the factors for occurrences of BBFs exposure in this finding was lacks of use of PPEs (39.5%), non-consistent use of PPEs was found to be associated with chance of sustaining NSI previous studies in Ethiopia (11,12,13). Wearing gloves may reduce (>50%) the volume of blood introduced through an injury (7,10). A major reason in this finding for not using PPEs was inadequate supply (59.7%). Previous study of Ethiopia showed that Seventy-nine percent of HCWs reported that they did not wear any of the PPEs because of unavailability (14). Exacerbating the risk to health care workers in developing countries is a lack of gloves, gowns, masks, and goggles to protect them from contact with blood(3).

Study in India explored that exposure was inversely related to training, a sizeable number of those trained were subsequently exposed (15). In this study satisfactory training, but not training by itself, was highly associated with preventions of BBFs exposures. HCWs who was satisfied with trainings given was less likely exposed for BBFs than none trained and unsatisfied one (AOR=0.501, 95% CI=0.23-0.91).

In previous studies in Ethiopia and abroad, needle recapping was major causes of NSI (3,8,17,18), promisingly, it was of interest that needle recapping was not listed as a cause for accidental exposure in university of Gondar hospital, suggesting adherence to the hospital's protocol and guidelines(19).

Viral status of the source patient was unknown in 51.4% of exposures which was similar in study in Iran (50%) (18).

Of all exposure 27% involved source patient were testing positive for one blood borne viruses (HB, HC and HIV) but it was only 12% in NaSH and 15% in Iran (18,20). This difference might be due the high prevalence blood borne pathogens among patients. HBV and HCV are endemic in sub-Saharan Africa (3). In developing countries, patients are admitted with disease states that are associated with high risk, exposing workers to increased risks (21).

Among all known source patients, 7% were con-infected with HBV and HIV, 10% of HBV and HCV and 83% of HIV infected sources. There was no HCW who had been vaccinated for HBV and prophylaxis against HBV among participants in this study. In an unvaccinated person, the risk of HBV infection from single needle stick injury to HBV infected blood ranges from 6%-30 % (3, 22, 23). The estimated risk for Hepatitis C virus transmission (HCV) are up to 3% and for HIV is 0.03%. Indeed it is important to note that the lower risk of HCV and HIV transmission compared with HBV is offset by the greater risk of chronic infection. Eighty percent of all those infected will develop chronic HCV infection leading to further complications (3, 22).

Wounds and skin sites that have been in contact with blood or body fluids should be washed with soap and water; mucous membranes should be flushed with water and immediate evaluation must be performed by a qualified health care professional (7,22). In this study, only 38.2% of HCWs washed the exposed body part with soap and water. HCWs reported to the PEP focal persons to get service were 17.2%, which were 46% in study by NaSH (20). Accessibility of vaccination and PEP might encourage HCWs to report blood and body fluid exposures in developed countries. Hepatitis B vaccination coverage was 86% in Iran as free vaccination strategy program (18). The major reasons for under reporting and deficient use of VCT services were negligence by HCWs (83.1%). Study in India found that, less than a quarter of the exposed HCWs took a course of PEP against HIV. This low rate

of PEP was due to under-reporting to concerned hospital authorities (5). Unreported needle-stick and sharp injuries are a serious problem and prevent injured HCWs from receiving PEP against HIV, which is shown to be 80% effective against HIV infection (1,5).

Despite high prevalence of NSI and BBF splash exposure within the last one year in this study, the 28-day mandatory post-exposure prophylaxis was used by only 12.1% of HCWs, of those only eight workers (42.1%) completed full course. In developed country, NaSH reported that in 2007 the median duration of taking PEP by all HCWs was 28 days after exposure to HIV positive sources, consistent with U.S. public health service Guidelines (20). The main reason given in this study for non-compliance was intolerance to the side effects of the medication. Persons receiving PEP should complete a full regimen. However, as a result of toxicity and side effects among HCWs, a substantial proportion of HCWs have been unable to complete a full course of HIV PEP (1, 5, 10, 24).

a) *Strength and Limitations of The Study*

Including both health professionals and non health professionals like janitors/cleaners to assess occupational exposure to BBF could be taken as the strength of the study but not screening of viral infections like HIV and hepatitis for exposed HCWs and since the study was based on self report about previous one year and life time occupational exposure to BBF the result might be affected by recall bias.

IX. CONCLUSION

BBFs exposure among HCWs during patient care was a common occupational problem in the study area and *SPs were poorly applied for exposure prevention and post exposure managements to BBFs among participants of this study*. Only 38.2% of HCWs washed the exposed body part with soap and water and the 28-day mandatory post-exposure prophylaxis was taken by 12.1% of HCWs after facing BBFs exposure. In industrialized countries; the cost of protective devices and equipment that reduce blood exposure may be offset by lower expenditures associated with post exposure testing and prophylaxis, medical treatment of infected workers, institutional insurance premiums, and workers' compensation payments (3). In most developing countries, however, similar economic incentives do not exist; there are costs associated with failing to protect scarce number of health care workers in developing countries (2, 3).

X. RECOMMENDATIONS

1. It is supposed to be focused on altering the behavior of HCWs to follow standard operating procedures during care for patient and consistent availability of PPEs.

2. The institution is advised to ensure a mechanism is in place and made known to all healthcare workers and medical students about incidence reporting and recording to early manage infections, identify emerging problems, monitor trends, and evaluate preventive measures.
3. Healthcare workers are recommended to give attention for the standard precautions and other preventive measures and to develop habits of early reporting of blood and body fluids exposures and took full courses of PEP.

a) *Competing Interest*

The authors declare that they have no any financial or non-financial competing interests (political, personal, religious, ideological, academic, intellectual, commercial or any other).

b) *Authors' Contributions*

ZY was involved in the conception, design, data collection, analysis and interpretation, report and manuscript writing. TE and GT had been involved in the design, analysis and interpretation of the data, and report and manuscript writing.

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Table 1 : Socio-demographic variables of healthcare workers and medical students in University of Gondar Hospital, 2012

Demographic Variables	Frequency(N=252)	(%)
Age of respondent		
19-24 years	106	42.1
25-34 years	118	46.8
35 and above	28	11.1
Marital status		
Single	161	63.9
Married	83	32.9
Divorced & widowed	8	3.2
Religion		
Orthodox	215	85.3
Muslim	18	7.1
Other Christians	19	7.5
Educational status		
Intern	32	12.7
12/10 not completed	5	2.0
12/10 completed	41	16.3
Diploma	56	22.2
1 st degree and above	118	46.8

Table 2 : Multivariate logistic regression results of blood and body fluids exposure within the previous one year in University of Gondar hospital, Sep. 2012

Variable	Exposed (n=157)	Not Exposed (n=95)	AOR (95% CI)	P- Value
Occupation				
Intern	29(19)	3(3)	9.4(1.8-49.9)*	0.009
Health Prof.	100(64)	58(61)	1.2(0.37-3.69)	0.799
Housekeep.	28(18)	34(36)	1	
Experience in years				
< two years	86(55)	59(62)	0.94(0.5-2)	0.863
2-4years	47(30)	15(16)	3.2(1.4-7.5)*	0.008
Above four years	24(15)	21(22)	1	
IP training				
Satisfactory	49(31)	42(44)	0.5(0.3-0.9)*	0.023
Not satisfactory	108(69)	53(56)	1	

Figure 1 : Major reason for none using of personal protective equipments by healthcare workers and medical students in the last one year, University of Gondar Hospital, 2012

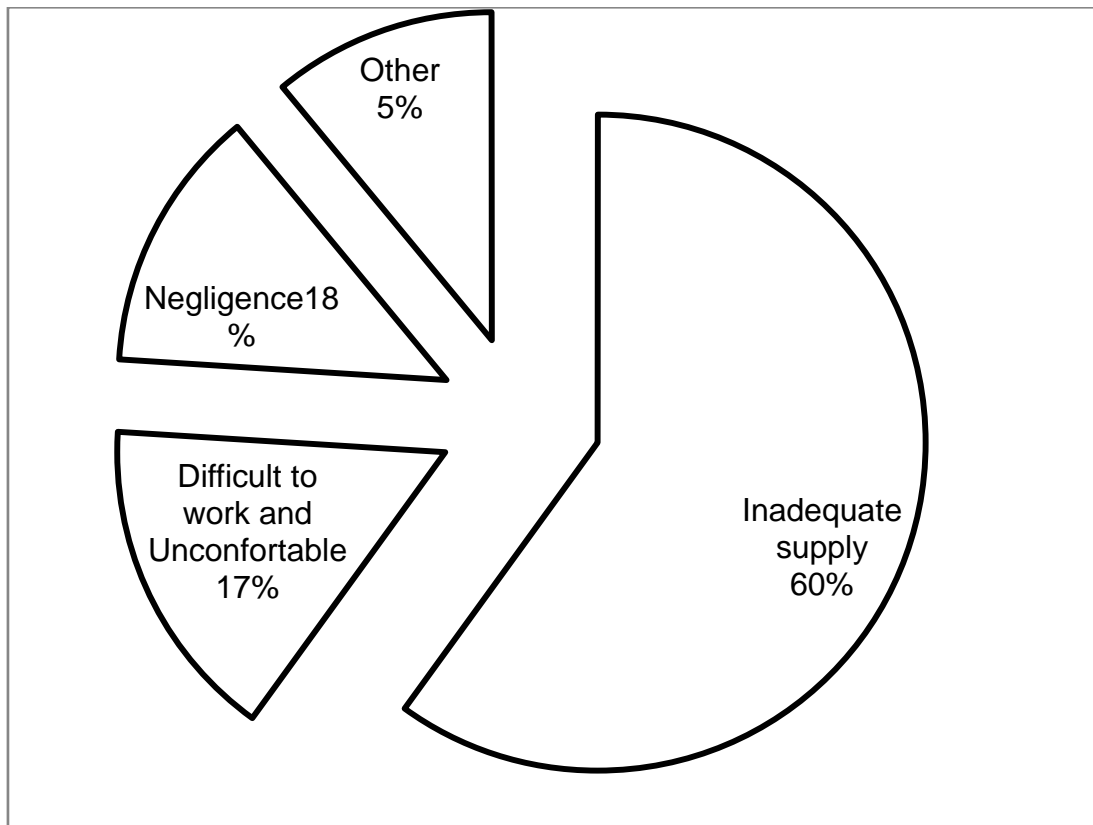


Figure 2 : Post exposure practices of healthcare workers and medical students to blood and body fluids in the last one year, University of Gondar hospital, Sep.2012

