Occupational exposure to blood and body fluids and associated factors among healthcare workers in Zanzibar: A case of Mnazi Mmoja Referral Hospital

Original Research

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Abstract

Background: Occupational exposure to blood and body fluids is a risk healthcare workers face. The most common exposures include Hepatitis B and C Virus and Human Immunodeficiency Virus which may be present in patients' blood and body fluids.

Objective: This study aimed to assess occupational exposure to blood and body fluids and associated factors among healthcare workers at Mnazi Mmoja Referral Hospital, Zanzibar.

Method: A hospital-based cross-sectional study was conducted among healthcare workers at Mnazi Mmoja Referral Hospital, Zanzibar. Stratified random sampling was used in selecting study participants. A structured questionnaire and observation checklist were used to collect data. Descriptive statistics, univariate, bivariate, and multiple logistic regression analyses were done using a 95% confidence level and a P-value ≤ 0.05 was considered to be statistically significant for the association between dependent and independent variables.

Results: A total of 301 participants were recruited for the study, 235 (78%) and 213 (71%) respondents reported having been exposed to blood and body fluids in their lifetime and the past 12 months respectively. In addition to this, sharp object injuries were reported as the most occurring exposure at 110 (52%) followed by a splash at 103 (48%). The contributing factors for this type of exposure included inappropriate healthcare workers' practices concerning adhering to SOPs, inadequate use of PPE, lack of on-the-job training, inadequate supervision, and inadequate safety signs.

Conclusion: There is a high prevalence of occupational exposure to blood and body fluids at Mnazi Mmoja referral hospital, Zanzibar. Thus, hospital management should provide standard operating procedures, staff training, and adequate protective equipment to reduce the exposure and the Ministry of Health should develop strategies to ensure that occupational health and safety guidelines are available and implemented in all healthcare facilities.

Key words: Blood-borne, Occupational exposure, Healthcare facilities

Introduction

Occupational exposure to blood and body fluids (BBF) in healthcare settings is a global problem (1). Frontline healthcare workers are at increased risk of getting exposed to blood-borne pathogens. The common blood-borne pathogens include those which penetrates the skin, mucous membranes such as the eyes, nose, or mouth, and non-intact skin exposure (2). Globally, it is estimated that every year one in 10 healthcare workers experience injuries from a sharp object especially needle pricking or cuts from surgical blades (3). Percutaneous injury accounts for 66 to 95% of occupational exposures to blood-borne pathogens (2). The average risk of seroconversion after a single percutaneous exposure to infected blood for hepatitis C (HCV) is approximately 2%, for hepatitis B (HBV) is 6–60%, and for HIV after a single percutaneous exposure to Human Immune-deficiency Virus (HIV)-infected blood is 0.1–0.3% (4). The World Health Organization (WHO) estimates that unsterilized syringes cause between 8 to 16 million cases of hepatitis B, 3 to 4.7 million cases of hepatitis C, and 80,000 to 160,000 cases of HIV every year (5).

In Sub-Saharan Africa, HBV, HCV, and HIV prevalence among healthcare workers due to sharp injuries is higher compared to developed countries due to poor healthcare setting infrastructure, poor working environment, and poor compliance with standards along with inadequate studies done in sub-Sahara Africa (2;3;6). Despite well-established guidelines aimed at preventing occupational exposure and hazards related to blood and blood-borne pathogens from international organizations such as the WHO and the Centers for Disease Control and Prevention (CDC), along with national policies, guidelines, procedures, and exposure management protocols, the prevalence of such incidents remains high. This may be attributed to unsafe practices and conditions within healthcare settings.

In many high-income countries, surveillance systems have been implemented to monitor exposure to body fluids in healthcare settings. These systems play a crucial role in providing up-to-date data and information to policymakers. They assist in monitoring and evaluating the effectiveness of guidelines in place, with the ultimate goal of reducing the risk of transmission of blood-borne pathogens (7).

In many African countries, there is a deficiency in tracking the incidence of events within healthcare settings. Consequently, this inadequacy results in ineffective monitoring and documentation of the performance of existing systems. The consequence of this shortfall is the underreporting of occupational exposure incidents among healthcare workers in Africa. This issue is substantiated by a study conducted in Nigeria, which revealed that a staggering 97% of such incidents went unreported (8). Multiple studies conducted in Tanzania mainland have consistently highlighted risks associated with blood-borne infections. These risks are attributed to factors such as inadequate availability and poor compliance with standards for preventing exposure to blood and body fluids, suboptimal management practices, and an unsatisfactory working environment which contribute significantly to incidents of exposure to blood-borne pathogens through percutaneous injuries, splashes, and cuts from sharp objects (9;10).

Zanzibar, much like many other African countries, boasts a significant number of healthcare facilities operating at the local, regional, and national levels, catering to the healthcare needs of the entire population. However, documentation regarding occupational exposure to blood and body fluids among healthcare workers (HCWs) in Zanzibar has been notably observed to be insufficient \ This inturn results in significant discrepancy in understanding the current situation regarding this crucial matter.

This study aimed to address this gap by proposing an assessment of occupational

exposure to blood and body fluids among healthcare workers. The primary objective was to identify and analyze the factors associated with such exposures at Mnazi Mmoja Referral Hospital through a comprehensive examination of these factors.

Material and methods

Study Design

This was a hospital-based cross-sectional study that was used to examine groups of healthcare workers from different sections of the hospital.

Study Area

The study was conducted at Mnazi Mmoja Referral Hospital in Unguja Zanzibar. The population of Zanzibar was 1,300,000 (census, 2012). Zanzibar is a part of the United Republic of Tanzania and it is made up of two small islands, Unguja and Pemba.

Study population

The study included all healthcare workers working at Mnazi Mmoja Referral Hospital and who have the potential to be exposed to blood and body fluids in their day-to-day professional activities. the study involved 1450 healthcare workers of different cadres such as involved in this study were laboratory technicians, doctors, nurses, mortuary attendants, health orderlies (medical waste cleaners for data collection) and health officers.

However, workers who were on leave such as maternity or annual leave during data collection were excluded.

Sample Size

The sample size was determined by using the formula for single population proportion. To determine the initial sample size, the following assumption was made: assuming 5% marginal error (d), 95% confidence level (alpha = 0.05), and prevalence of healthcare worker's occupational exposure to BBFs was 54.95% (24). Based on the above information the total sample size was calculated by using the following the formula:

$$N = \frac{Z^2 p(1-p)}{d^2}$$

Where:

N = desired sample size

z = level of confidence limit set at 95% which is equal to 1.96

p = prevalence of BBF equal to 54.95%

d = marginal error

$$N = \frac{1.96^2 \times 0.55(1 - 0.55)}{0.05^2}$$

N= 380 participants

In Mnazi Mmoja Referral Hospital there was a total of 1450 health care workers, by applying a sample size for a population of less than 10,000

$$nf = \frac{n}{\frac{(n)}{N} + 1}$$

Where:

nf = desired sample size for a population less than 10,000

n = calculated sample size for a population greater than 10,000

nf = 380 / (380/1450 + 1).

N= total number of population at the study site

nf = 301 participants

The calculated sample size was 301

Sampling procedure

The sampling technique involved in the sampling procedure for selecting representative study participants were as follows:

- Stratified random sampling was used to divide the cadres into strata. Each stratum (cadre) provided several participants present for selection process.
- The selected number of participants in each stratum was picked through simple random sampling at their department and the sampling interval was determined by lottery method, after the first pick of the participant from the list provided by the authority in each department (Registry).
- The execution of sampling procedure is presented in Fig.

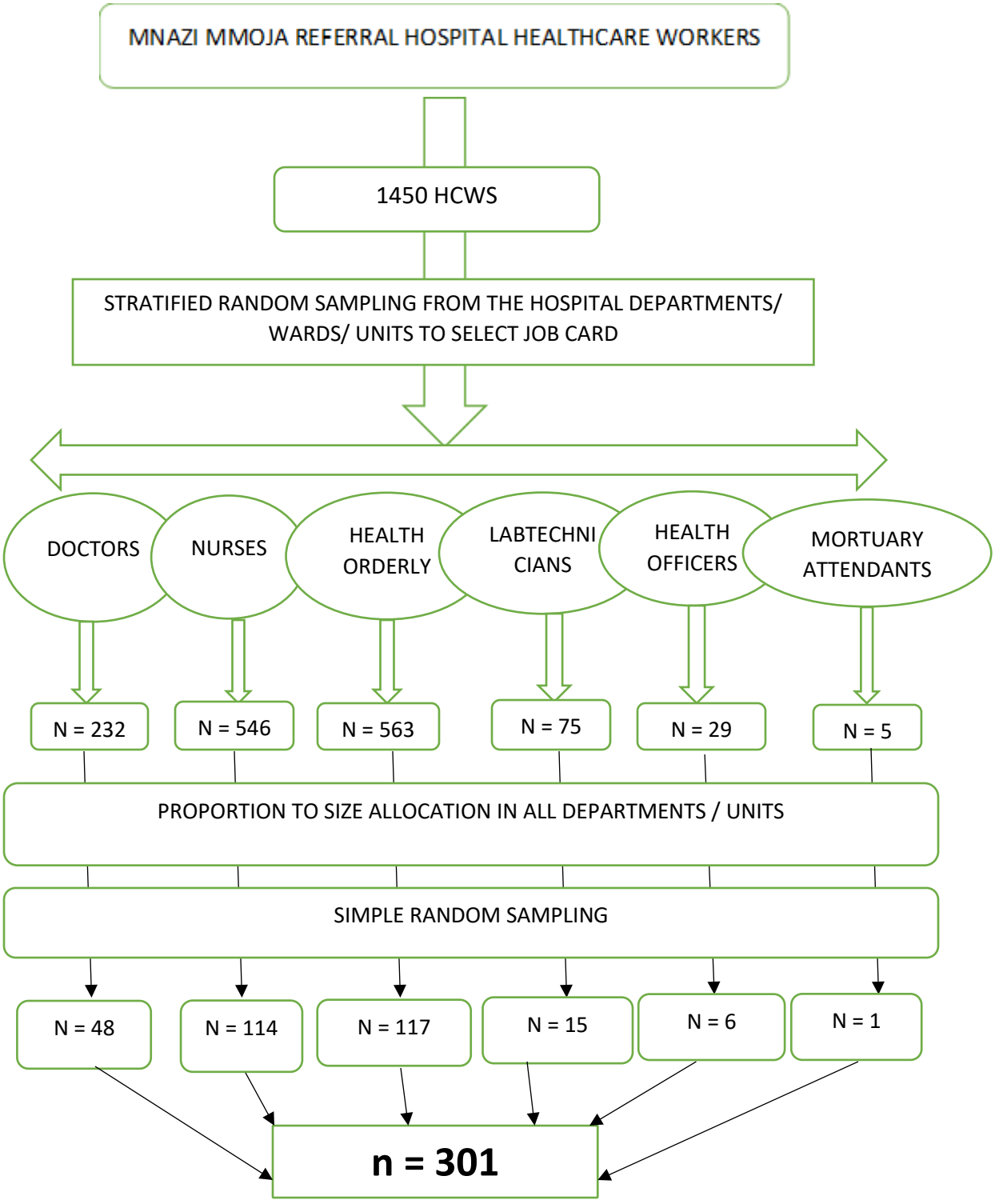

Figure 1: The sapmling procedure of study participants

Data Collection and Analysis

The data collection was conducted using both questionnaire and an observational checklist. The questionnaire was developed and used to interview HCWs who had the potential to be exposed to BBFs while an observation checklist was used to observe the workplace environment, hand washing practices of the respondents, and adherence to standard operating procedures.

The observational checklist and close-ended questions (questionnaire) were developed in both English and translated in Kiwahili. The data were collected using an open data kit (ODK) application (Software) using a smartphone.

***Data analysis*:** Following data cleaning using SPSS statistical software version 20, data analysis was done with descriptive statistics that were performed for all variables. The bivariate and multiple logistic regression analyses were done to assess the association between factors that contribute to exposure to BBFs. Variables with a statistical significance of $P \leq 0.2$ in the bivariate models were included in the multivariate analysis. The analysis was done using a 95% confidence level and a P value ≤ 0.05 that was considered to indicate a statistically significant association between dependent and independent variables.

Validity and reliability: Both the questionnaire and observational checklist were developed from previous research to fit the Tanzania hospital environment and objectives of the study. A pretest of questionnaire and observation checklists was conducted to obtain its applicability and basic corrections before actual data collection. A two-day training on procedures, techniques, and ways of data collection using ODK was conducted for data collectors and supervisors on procedures, techniques, and ways of before the commencement of a data collection. The research team was well-supervised during data collection.

Ethical consideration: Ethical clearance was obtained from the Senate Research and Publications Committee of the Muhimbili University of Health and Allied Sciences (MUHAS) and the Zanzibar Health Research Institute (ZAHRI).

Results

A total of 301 respondents were recruited into the study where 192 (63.8%) were female. The majority of the respondents aged between 31-40 years, followed by 18 – 30 years. The summary of the socio-demographic characteristics of respondents is presented in Table 1.

Table 1: Socio-demographic characteristics of the study population **(N=301)**

Variable	n (%)
Age group (years)	
18 to 30	129 (42.9)
31 to 40	139(46.2)
41 and above	33 (11.0)
Sex	
Male	109 (36.2)
Female	192 (63.8)
Education level	
Secondary	90 (29.9)
Certificate	24 (8.0)
Diploma	106 (35.2)
Bachelors	77 (25.6
Masters	4 (1.3)

Department/section	
Labour Ward	109 (36.2)
Operation Theatre	48 (15.9)
Mortuary	1 (0.3)
Health Care Waste and Incinerator	8 (2.7)
Laboratory	55 (18.3)
Laundry	55 (18.3)
Emergency and accident	25 (8.3)
Laundry	55 (18.3)
Job category	
Doctor	48 (15.9)
Nurse	114 (37.9)
Health Attendant	117 (38.9)
Laboratory Technician	15 (5.0)
Health Officer	6 (2.0)
Mortuary Attendant	1 (3.0)

Prevalence of occupational exposure to BBFs

A total of 235 (78%) and 213 (71%) reported having been exposed to blood and body fluids in their lifetime and the past 12 months respectively. Amongst them, (103) 48% reported having been exposed to splash and (110) 52% to injuries.

Prevalence of blood and body fluid exposure by socio-demographic characteristics

Respondents aged 41 years and above reported to have high BBF exposure (94%), followed by the age group of 31 – 40 years (73%). There was a statistically significant association between exposure and age (p-value <0.001). In addition, the study revealed that 82% of the respondents from the labor ward were exposed to BBFs. There was a statistically significant association between exposure and departments/sections in the hospital (p-value 0.006). There was a statistically significant association between exposure and job categories (p-value 0.067). The prevalence of occupational exposure to socio-demographic characteristics is represented in Table 2.

Table 2: Prevalence of occupational exposure by socio-demographic characteristics **(N=110)**

Variable	Exposed (n=213 n (%)	Non-exposed (n=88) n (%)	N 301	P-value
Age group (years)				
18 to 30	80 (62.0)	49 (38.0)	129	0.001
31 to 40	102 (73.4)	37 (26.6)	139	
41 and above	31 (93.9)	2 (6.1)	33	
Sex				
Male	75 (68.8)	34 (31)	109	0.574
Female	138 (72.4)	54 (28)	192	
Education level				
Secondary	61 (67.8)	29 (32.2)	90	0.414
Certificate	17 (70.8)	7 (29.2)	24	
Diploma	80 (75.5)	26 (24.5)	106	
Bachelors	51 (66.2)	26 (33.8)	77	
Masters	4 (100.0)	0 (0)	4	
Work department				
Labour Ward	89 (81.6)	20 (18.4)	109	0.006
Operation Theatre	34 (70.8)	14 (29.2)	48	
Mortuary	1 (100)	0 (0)	1	
Health Care Waste and Incinerator	8 (100)	0 (0)	8	
Laboratory	31 (56.4)	24 (43.6)	55	
Laundry	25 (45.5)	30 (54.5)	55	
Emergence and accident	13 (52.0)	12 (48.5)	25	
Job category				
Doctor	33 (68.8)	15 (31.2)	48	0.067
Nurse	87 (76.3)	27 (23.7)	114	
Health Attendant	83 (70.9)	34 (29.1)	117	
Lab Technician	6 (40.0)	9 (60.0)	15	
Health Officer	3 (50.0)	3 (50.0)	6	
Mortuary Attendant	1 (100.0)	0 (0)	1	

Prevalence of splash exposure by body parts and procedure conducted in the past 12 months

Respondents reported having been exposed to splash in different body parts and with different kinds of body fluids. A total of 38 (36.9)% reported to have been ever exposed at the neck and chest while 34 (33%) reported to have been exposed at the hand and feet. The main body fluids associated with exposure were blood 60 (48%) and amniotic fluids 35 (34%). The exposures to body fluid were associated with the following procedures: 40 (39%) delivery, 14 (14%) operating procedure, and 13 (13%) handling of placenta and other health care waste. This characteristic is presented in Tables 3.

Injury exposure by type of objects, degree of injury, and procedure conducted when exposed in the past 12 months

Injuries due to sharp objects were reported as shown in Table 4 in which most of the injuries were due to needle hollow bore 40 (36%), followed by suture needles 37 (34%), whereas moderate injuries (skin puncture and some bleeding) were 50 (46%) followed by superficial (little or no bleeding) were 34 (30%). Most of these injuries occurred during the stitching and dressing procedure 25 (23%), during waste disposal 23 (20%), assembling and in preparation for reusing instruments 21 (19%), administration of injection 17 (16%), passing instrument to a colleague 14 (13%) and recapping 10 (9%).

Table 3: The prevalence of splashes by types of body fluids, body parts, frequencies, and circumstances related to exposures **(N=103)**

Variable	n (%)
Type of splash	
Blood only	60 (58.3)
Amniotic Fluid only	35 (34.0)
Urine	3 (2.9)
Vomit	5 (4.9)
Body parts exposed	
Eyes	3 (2.9)
Face	16 (15.5)
Neck and Chest	38 (36.9)
Hand and Feet	34 (33.0)
Whole body	12 (11.7)
Frequency of being exposed	
Once	22 (21.4)
Twice	26 (25.0)
Three times	37 (35.9)
More than three times	18 (17.5)
The procedure conducted when exposed	
Delivery Process	40 (38.8)
During operation procedure	14 (13.6)
Vaginal examination	8 (7.8)
During dressing	2 (1.9)
Blood sampling	8 (7.8)
Dislodging blocked I.V.	8 (7.8)
Handling of uncooperative patients	9 (8.7)
During disposal of the placenta and other HCW	13 (12.6)

Table 4: Injury exposure by type of objects, degree of injury, frequency of injury, and procedure conducted when exposed **(N=110)**

Variable	n (%)
Type of sharp objects	
Needle hallow bore	40 (36)
Suture needles	37 (34)
Surgical devices	33 (30)
The degree of Injury	
Superficial (little or no bleeding	34 (30)
Moderate(skin puncture, some bleeding)	50 (46)
Severe(deep cut)	26 (24)
Frequency of being exposed	
Once	13 (12)
Twice	35 (32)
Three times	21 (19)
More than three times	41 (37)
The procedure conducted when exposed	
Administering injection	17 (16)
Stitching and dressing	25 (23)
Recapping	10 (9)
During waste disposal	23 (20)
Assembling and in preparation for reusing instrument	21 (19)
Passing an instrument to a colleague	14 (13)

Healthcare worker's practices associated with blood and body fluids exposure.

A total of 114 (72.6%) of respondents who were exposed to BBF reported wearing gloves a few times when performing procedures, while the most times was 99 (68.8%). In addition to recapping behaviour, a total of 115 (68.5%) of respondents who were exposed to BBF reported recapping needles after use. The results for healthcare workers' practices associated with blood and body fluid exposure are represented in Table 5.

Table 5: Healthcare workers' practices associated with blood and body fluid exposure **(N=301)**

Variable	Present (n=213) n (%)	Absent (n=88)) n (%)	Total (100%)	P-value
Frequency of using gloves when performing the procedure				
Most of the time	99 (68.8)	45 (31.3)	144	0.462
Few times	114 (72.6)	43 (27.4)	157	
How often do you use goggles when performing the procedure?				
Most of the time	49 (65.3)	26 (34.7)	75	0.233
Few times	164 (72.9)	62 (27.4)	226	
Frequency of using masks when performing the procedure				
Most of the time	163 (67.4)	79 (32.6)	242	0.008
Few times	50 (84.7)	9 (15.3)	59	
How often do you use an apron when performing a procedure?				
Most of the time	148 (73.6)	53 (26.4)	201	0.121
Few times	65 (65.0)	35 (35.0)	100	
Frequency of using safety boots when performing procedures				
Most of the time	54 (65.9)	28 (34.1)	82	0.252
Few times	159 (72.6)	60 (27.4)	219	
Do you perform syringe recapping?				
Yes	115 (68.5)	53 (31.5)	168	0.914
No	98 (73.7.5)	35 (26.3)	133	
Place to dispose of the sharp objects				
Safety boxes	156 (71.6)	62 (28.4)	218	0.760
Plastic bags	26 (74.3)	9 (25.7)	35	

Administrative factors associated with occupational exposure to BBFs

Several administrative factors that might have contributed to exposure to BBFs were reported (Table 6). However, of all the factors only instruction on the use of PPEs and availability of health care waste management guidelines showed significant associations with p-values of 0.003) and 0.062 respectively.

Table 6: Administrative factors associated with exposure to BBFs **(N=301)**

Variable	Blood and body fluid exposure		Total (100%)	p-value
	Exposed (n, %)	Non-exposed (n, %)		
	213 (71)	88 (29)		
On-job OHS training				
Attended	9 (75.0)	3 (25.0)	12	1.000
Not attended	204 (70.6)	85 (29.4)	289	
Regular OHS				
Conducted	12 (85.7)	2 (14.3)	14	0.364
Not conducted	201 (70.0)	86 (30.0)	287	
Availability of Guideline				
Available	13 (54.2)	11 (45.8)	24	0.062
Not available	200 (72.2)	77 (27.8)	277	
Availability of PPE				
Available but not adequate	141 (67.8)	67 (32.2)	208	0.236
Available	35 (78)	10 (22)	45	
Not available	37 (77)	11(23)	48	
Protocol for reporting injury				
Available	91 (72)	36 (28)	127	0.798
Not available	122 (70)	52 (30)	174	
Instruction on PPE use				
Yes	52 (58.4)	37 (41.6)	212	0.003
No	161 (75.6)	51 (24.1)	89	
Register to record incidents				
Available	6 (100)	0 (0)	6	0.186
Not incidents available	207 (70.2)	88 (29.8)	295	
Availability of work procedure				
Available	196 (70.5)	82 (29.5)	280	0.816
Not available	17 (73.9)	6 (26.1)	23	

Unadjusted and adjusted odds ratios (95% CI) for logistic regression between factors and occupational exposure to BBFs among healthcare workers

In logistic regression analysis, age group depicted a high influencing factor to the occupational exposure to BBF where those in the age group between 31 to 40 years old had significantly higher odds followed by age group 41 and above years old, OR= 9.5, 95%CI, (2.17 – 41.43) and OR=5.6 95%CI, (1.28 – 24.66) respectively. For the adjusted odds ratio, age group remained constant to depict the association with other factors.

Availability of PPEs in hospitals was also associated risk. Respondents who reported available but not adequate had higher unadjusted and adjusted odds, followed by those who responded not available, OR (95% Cl), 3.0 (1.36 – 5.54), 1.6 (1.76 – 4.32), and 2.7 (1.33-6.28), 1.2 (0.33-7.56) respectively. And those HCWs who used gloves a few times and had recapping behaviour had higher unadjusted and adjusted odd, 2.2 (1.73 – 5.98), 3.3 (1.77 – 8.13) and 2.7

(1.33-6.55), 2.3 (1.66-7.88) respectively. Table 7 summarizes unadjusted odds ratios (95% CI) for logistic regression between factors and occupational exposure to BBFs among healthcare workers.

Table 7: Unadjusted and adjusted odds ratios for logistic regression between factors and exposure to BBFs among HCWs

Variable	Unadjusted Odds ratio	95% CI	*Adjusted Odds ratio	95% CI
Age group (years)*				
18 to 30	1			
31 to 40	9.5	2.17 – 41.43		
41 and above	5.6	1.28 – 24.66		
Working experience (Years)				
Below 3	1			
3 to 5	1.9	0.91 – 4.07	1.6	0.83-2.87
6 and above	2.1	0.99 – 4.26	2.1	1.26-3.43
Attended any training				
Yes	1		1	
No	2.0	0.58 – 3.59	1.5	0.83-2.87
Instruction on PPE use				
Yes	1			
No	1.4	0.26 – 2.75	2.1	1.26-3.49
Regular supervision				
Yes	1			
No	1.4	0.08 – 4.76	3.7	1.38-8.99
Protocol for reporting the accident				
Yes	1			
No	1.1	0.65 – 1.78	1.9	0.57-2.68
On job training				

Attended	1			
Not attended	1.3	0.33-4.73	3.1	0.24-9.76
Availability of PPE				
Available and adequate	1			
Available but not adequate	3.0	1.36-5.54	2.7	1.33-6.28
Not available	1.6	1.76-4.32	1.2	0.33-7.56
Gloves usage				
Most of the time	1			
Few times	2.2	1.73-5.98	2.7	1.33-6.55
Recapping practices				
Recapping not done	1			
Recapping done	3.3	1.78-8.13	2.3	(1.66-7.88)

**Adjusted for age*

Discussion

This study indicated the high prevalence of blood and body fluids exposure in a lifetime and the past 12 months was 78% and 71% respectively. The reason behind the high prevalence was due to improper use of PPE, regular training, poor healthcare waste management, and supportive supervision. Similarly, a study done in West Hararghe Hospital, Ethiopia reported that about 77.7% of the HCWs were exposed to BBFs (21). However, other studies done in Kenya, Rift Valley, and North-western, Tanzania presented lower prevalence compared to this study (25%, and 48.6%, respectively) (16;22). Furthermore, this study indicated that HCWs in the age group of at least 41 years, showed to be highly exposed to BBF (94%), whereas a study done in Gandhi Memorial Hospital, Addis Ababa, Ethiopia showed that the age group that was highly exposed was between 18-24 years old. (28). This difference might be because the age group 41 and above in this study were few and they work in different places, which put them at high risk of exposure to blood and body fluids.

This study also reported that there are three working areas at the hospital in which the workers are found to be highly exposed to BBF (incinerator 100% exposed, labor ward 82% exposed, and operational theatre 71% exposed), on the contrary a study done in Tikuranbesa University Hospital, Ethiopia showed that the highest number of exposures occurred in inpatient wards 34.4%, followed by the emergency department 19.8%, then the operating theatre 13.7% (25). Moreover, a CDC report in 2013 indicated that the majority of injuries (40%) occur due to sharp objects in inpatient units, particularly in medical departments, intensive care units, and operating rooms (17). In addition to this, the report depicted that the professions with a high risk of BBF exposure are nurses, health attendants/ orderly, and doctors' prevalence of nurses was 76% followed by Health attendants/orderly was 71%, and Doctors were 69%, however, in this study, a professional group that enlightened was mortuary attendants (17). These differences may be due to the number of professionals and the departments involved in the study, as well as a measure taken to prevent blood and body fluids exposure. It was observed that most of the injuries related to sharp objects were due to either stitching, or dressing activities 23%, Waste Disposal 20%, administration of injection 16% Recapping 9%, and assembling and in preparation for reusing instrument. In contrast a study done in Gandhi Memorial Hospital, Addis Ababa, Ethiopia, reported that most of the injuries took place during the administration of injection 18%, recapping a used needle 17%, stitching 14%, disposal of sharp waste 8% (28).

With regards to splash, this study reported that activities like delivering process 39%, and operational process 14% were amongst the main causes leading to BBF exposure in healthcare workers. Thus, healthcare workers in the labor and operation room were more at risk of getting a blood-borne infection. In comparison to studies done in Gandhi Memorial Hospital, Ethiopia reported accidental splash, 2.4% Rapid expulsion of the foetus during delivery, 8% delivery, conducting delivery, 10.7%, withdrawal of blood for sampling, 19.1% collection of waste placenta and blood, 14.3% vaginal examination, 4.8%, glove breakage and 1.2% operating (28).

Another study done in Arada Sub-City Health Centres, Ethiopia reported that reasons were during childbirth (35%); the abrupt motion of a patient during the blood draw, or the intramuscular or venous injection of drugs (31%) (29).

The practices of health care workers associated with exposure to BBFs in this study are comparable with studies done in Harare Hospital, university of Gonda Hospital, Ethiopia that showed 66.8% of HCWs had low practice in PPE use and hand washing practices (16). This was comparable with regarding hand washing practices study done in Southwest, Ethiopia reported that about 46.8% of the workers wash their hands before and after any procedure. Similarly, a study done in Kampala Uganda showed 79.5% of workers, wash their hands before and after the procedure, 68% after handling soiled materials, 46% wash their hands when they were dirty and 53.5% did so after using the toilet (26). Furthermore, a study done in North-western, Tanzania, indicated that about

55.6% of healthcare workers were washing the exposed site with soap and water and only 32.1% reported the incident of exposure to the relevant authority (16). Along with this, Tikuranbes Hospital reported that about 50% of healthcare workers did not undergo repeat or follow-up HIV testing at 12 weeks as a measured practice to safeguard oneself after the exposure, and less than a quarter of the HCWs exposed to patients' BBFs took PEP for HIV and half of those stopped medications later before the stipulated time (27). Similarly, another study done in Arada Sub-City Health Centres, Ethiopia, reported measures taken after exposure to blood and body fluid products were applying pressure 36.1%, applying and washing with iodine 25.72%, getting tested for HIV, 22.3%, seeking PEP 8.4% (29). This may be attributed to the difference in regular training about safety precautions and infection prevention, inadequate supervision, and availability of guidelines.

This study reported occupational health training, instructions on proper wearing of PPEs, SOP displayed, and regular health and safety supervision are not conducted by the management, along with this, 70% of respondents portrayed that there is neither protocol for reporting injury nor register for recording incidents. Also regarding the availability of PPE, about 69% of healthcare workers reported the PPE to be available but not adequate, this was also stipulated in a study done in South, and West Ethiopia where they reported that the PPE was not sufficient, and not enough infection prevention methods in the hospital (20). Another study done on Workers in Gondar Town, Northwest, Ethiopia showed that 56% had no infection prevention committee in the health care facility (26), and the provision of PPE and training was administrative factors (24). Therefore, the depiction of these snapshots indicates that administrative factors have a high contribution to frequently occurring exposure to blood and body fluids

Conclusion

This study concludes that there is a high prevalence of occupational exposure to Blood-Borne Pathogens (BBFs) among healthcare workers at Mnazi Mmoja Referral Hospital with prevalence of 78% for lifetime and 71% for the past 12 months. Factors associated with occupational exposures included inappropriate healthcare workers' practices and adherence to the SOPs, such as improper use of PPE, recapping, and improper handling of healthcare waste. Administrative factors linked to exposure included inadequate provision of occupational health and safety training, insufficient instructions on PPE usage, irregular supervision, and inadequate availability of PPE. Additionally, socio-demographic factors, such as age and working experience, were identified as contributing to occupational exposure. Therefore, to address this issue and create a safer working environment for healthcare workers (HCWs), the study recommends that the hospital, in collaboration with the Ministry of Health, to undertake the following measures:

Healthcare workers must consistently wear Personal Protective Equipment (PPE) at high risks designation areas. It is imperative to discourage recapping behavior and emphasize proper collection of healthcare waste based on color coding and volume. HCWs should diligently follow established guidelines and procedures to ensure their safety.

A collaborative effort between the hospital and the Ministry of Health should result in the establishment of an Occupational Health and Safety Program and a focal person to oversee and supervise the adherence of health and safety issues at Mnazi Mmoja Referral Hospital. This entity should work closely with the Quality Improvement Unit to guarantee a secure working environment for healthcare workers.

Conduct regular training sessions and workshops focusing on the prevention of exposure to Blood-Borne Pathogens (BBFs) among healthcare workers. Emphasis should be placed on correct PPE usage, proper disposal of healthcare waste, avoidance of needle recapping, prevention of sharp injuries through appropriate collection and disposal of sharp objects, and overall healthcare waste management.

Development of Preventive Occupational Health Interventions: Collaborate with relevant stakeholders to develop effective occupational health interventions aimed at reducing the prevalence of occupational exposures to BBFs among healthcare workers. This

may involve the implementation of targeted measures and protocols to address and prevent incidents of exposure.

Establishment of Written Protocols: Develop comprehensive written protocols at the hospital for reporting, evaluation, counseling, treatment, and follow-up procedures concerning occupational exposures among healthcare workers. These protocols should serve as a guide for addressing incidents promptly and effectively, ensuring the well-being of the healthcare workforce.

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Contributions

Conceived and executed analyses, and wrote first draft: MK and HM. Edited subsequent drafts: RE and SM

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