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# Exposure and transmission risk of blood and body fluids among health care personnel at first level referral public hospitals in Meme division, Cameroon

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### ABSTRACT

Occupational exposure to blood and body fluids is a serious concern for health care personnel (HCP), and posed a serious risk for the transmission of infectious pathogens. The aim of this study was to investigate occupational exposures of HCP at first level hospitals in Meme Division, Cameroon.

We sampled 190 HCP working in 3 first level referral hospitals in Meme division in Cameroon using a structured questionnaire with a participation rate of 94.06 %. Descriptive statistics and multivariate analysis using logistic regression were performed.

Of the 190 HCP who participated in the study, 77 (40.53 %) indicated having at least an encounter with exposure with blood and body fluids within the past 12 months. The physicians (78.57%) and the nurses (40.54%) were the most exposed categories of HCP. Working for long hours, lack of continuous training on infection prevention, 7-10 years working experience, dissatisfaction with current jobs, recapping needles after used were significantly associated with exposure and transmission risk to blood and body fluids among HCP.

There was a high level of exposure to blood and body fluids among HCP at the first level referral hospitals in Meme division in Cameroon. Programs targeting the implementation of surveillance systems for training, registering, reporting, provision of basic personal protective equipment and management of occupational exposures in health care settings should be prioritised.

**Keywords:** Health care personnel, blood and body fluids, public district hospitals, Cameroon

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## Introduction

The World Health Organisation (WHO) report of 2006, estimated that more than 50 million health care personnel (HCP) are at risk to various types of health hazards everyday including biological, chemical and physical hazards [1]. Health care facilities stood as high potential environment for exposure risk to a variety of hazards. Prominent among these exposure risk include both blood and body fluids in addition to infectious airborne aerosols. However, HCP became exposed due to their contacts with infectious fluids and droplets aerosol from broken skin and membranes of their patients leading to the risk of contracting infections such as HIV/AIDS, hepatitis, influenza, tuberculosis and other diseases within the hospital environment.

A study performed among HCP in developing countries showed a greater risk of acquiring infections due to exposure risk at work, especially with blood-borne related types such as; HIV/AIDS and hepatitis viruses [2]. HCP are often challenged with exposure risk due to ergonomic, physical, chemical and psychological hazards as they lift and push their patients within health facilities, in addition to high workload as well as receiving insults from their dissatisfied patients. A condition that is prominent among some poor resource settings such as that of Cameroon and most countries within the Sub-Saharan Africa. In addition to poor wages, this may further leads to psychological stress and depression among HCP, resulting to consequential lack of focus and concentration at work with a possible potential health hazard and exposure risks. Although, many institutions have responded to international norms and standards governing health and safety measures at work for the safety of all according to the International Labour Organisation (ILO) act [3] by setting prevention programs and information in their various facilities and settings, in some cases it has not been very comprehensive or strictly practiced.

Sub-Saharan Africa with Cameroon inclusive, has 11% of the World's population, 25 % of

global burden of diseases, 3 % of human resources for health, and <1% of global health expenditure [4]. The population of Cameroon is estimated at about 19,406,100 inhabitants with health care personnel density ranging from 0.8 to 1.2 personnel per 1,000 population [5]. The country's epidemiologic profile is further strain by transmissible diseases, some of which include; Malaria, HIV/AIDS, lower respiratory infections, diarrheal, hepatitis and others. In Cameroon about 40 % of the population still lives below the poverty line (< \$ 1 USD) with most of the inhabitants concentrated within the suburbs and semi-urban cities. The district level hospitals which are often located in sub-urban cities are the first level referral hospitals according to Cameroon health system organisation which are often less staffed with HCP but has a high patient attendance.

Although, there is a paucity in information regarding infections resulting from work site injuries and complications among health care personnel in Sub-Saharan Africa and Cameroon in particular, a study performed in South Africa have indicated a work related 11.5 % HIV prevalence among HCP in some health facilities of the country [6, 7]. Similarly, in Cameroon, researchers have reported a prevalence of 13.9 % and 9.1 % prevalence of HIV among health care personnel in semi-urban and urban health facilities in Cameroon respectively [8,9]. Also, a study conducted among HCP in an urban health facility in Cameroon also showed 4.6 % hepatitis B and 1.7% hepatitis C viruses, of which the participants indicated no previous history of infection with their sources of infection not yet determined [10].

In some studies conducted in developed settings such as those of the North America and Europe, the exposure risk of HCP from contracting infection due to blood and body fluids from health facilities is reportedly low with a <0.5% risk [11-13]. This may be due to a well-developed resource based capacity and settings, as opposed to the poorly developing settings such as those of the Sub-Saharan Africa where there

is a limited availability of basic protective equipment for the safety of personnel as well as having inadequate training and human resources for health. In Cameroon for example, a study performed in three hospitals reported that 71.42 % HCP recapped their needles after use [7, 8], and also, in a neighbouring country such as Nigeria only about 15.4 % wore gloves frequently during nursing care activities [14]. These practices coupled with the weak health systems accounts to the exposure risk of contracting infections among HCP during their activities. However, it is estimated that more than 15% of HIV infection among HCP are related to occupational exposure, of which half occur in the Sub-Saharan Africa and [15] this number might be underestimated, as a study performed among health care workers in Africa have suggested that the continent may lose about one-fifth of their HCP due to infectious disease acquired from occupational exposure risk in the years ahead [16].

Although there is a national guideline for safety practices at work for HCP as well as a post injury precautionary prophylaxis measure based on blood and body fluid exposure risk, this study was performed to assess exposure and transmission risk of blood and body fluids among HCP at the first referral level of hospital setting in Cameroon. With the aim of assessing and suggesting some exposure risk intervention and prevention measures that could be use to develop a surveillance prevention guidelines and educational programs at this level of health care that is face with resource constrains.

## Methods

### Study design, setting and population

This was a descriptive cross-sectional hospital based study conducted in three first level referral (district) hospitals classified based on the Cameroon health system organisation from the 2<sup>nd</sup> to the 31<sup>st</sup> of May 2015. Meme division is located some 120 km from Buea the regional capital of the South West Region of Cameroon that has the second referral hospital. The population of the Meme division is estimated at

between 800,000 to 1.2 million inhabitants with neighbouring villages having poor road accessibility that has caused the population to use motorcycles as the main transportation means to the various health facilities. However, they are the only low cost and averagely equipped and staffed public referral hospitals within the division as compared to others health facilities. The Kumba district hospital has 152 beds and located in Kumba at capital city of Meme division with about 400,000 inhabitants, the Konye and Mbonge districts hospitals has 20 beds each, with each located some 50 km from one another. The participants of this study included, all HCP who came into contact with patients or were exposed to blood or body fluids during their activities in the health facilities. These involved the physicians, nurses/midwives, laboratory technicians, others (orderlies, mortuary attendants and health administrators), who were present at the time of the study and participated. These HCP were distributed within the different services of the hospitals which included; the emergency and casualty departments, the outpatient departments, the laboratories, the theatres and delivery departments and the inpatient (medical) departments.

Also, within the hospitals the laboratories are in charge of screening any staff exposed to blood or body fluids from patients during work, while maintaining confidentiality by coding the names of the samples collected. An initial serological screening test for HIV and hepatitis B viruses were set for any exposed case and a follow up to be proceeded, however there was no provision of hepatitis B vaccines to HCP by the institutions. In the event of HIV exposure, a post exposure prophylaxis in the form of antiretroviral drugs were available to all HCP free of charge and obtained from the pharmacy after a prescription by a physician who are always available during working hours and on calls during off hours.

### Sampling procedure

A self-administered questionnaire designed for the purpose of the study was used for data collection. The questionnaire that were made up of 40 closed and open ended questions sampled; demographic characteristics (age, sex, occupation, duration of service and continuous training) including some available services for staff upon an encounter of accidental exposure to blood and body fluids. The questionnaire also sampled some peculiar questions pertaining to number of exposure risk experience within the past 12 months, the measure taken after an event, the frequencies, and safety behaviours and practices at work. The questionnaire was pre-tested for its validity among 50 HCP at a similar district hospital in Fako division (Muyuka district hospital) after obtaining administrative permission and informed consent from participants, corrections were made where necessary.

Three staff (two state registered nurses and one physician) were recruited and trained to assist for the data collection and were supervised by the principal investigator. A series of orientations were made at the various departments of the hospitals to brief the staff on the exercise and the animosity of the questionnaires. Schedule were made with various departments during which a convenience sampling procedure was used upon consenting with the HCP rendering services to the public at the various facilities.

### **Statistical analysis**

Data were inputted in an excel sheet, accuracy checked, coded, exported and analysed with the help of the Statistical Package for Social Sciences (SPSS), version 22.0. A descriptive analysis was performed to determine the response rate, the representativeness of the data with the total HCP of the institutions. In order to measure the exposure and transmission risk from blood and body fluid, the frequencies for ever sustaining a work related injury (percutaneous injury) and for the past 12 months was set as the dependent variable. The independent variables consisting of age, gender, occupation, duration of service, knowledge and

safety behaviours and practices at work were used to analyse the association between dependent and independent variables with the aid of bivariate and multivariate logistic regression model. A significance level of 0.05 (p-value) was set to check for the existence of association.

### **Results**

Out of the 202 HCP, 190 consented and participated in the study giving a 94.06 % response rate. The Mean standard deviation (SD) age was  $33 \pm 5$  years ranging from 25 to 55 years. The females were the most represented with 129 (67.89 %) compared to the males 61 (32.11 %) as presented on Table 1.

### **Staff distribution, qualifications, and services**

The majority of the participants were nurses 111 (58.42 %), 14 (7.37 %) were physicians, 24 (12.63 %) were laboratory technicians and 41 (21.58 %) were others (orderlies, mortuary attendants, and administrators). Of all this, 51 (26.84 %) had at least a university qualification, 69 (36.320%) had a high school diploma, 53 (27.89 %) completed secondary school and 17 (8.95) had less than or primary school education. Inpatients departments (medical wards) were the most staffed 76 (40 %) among the other departments followed by the Emergency departments 20 (10.53 %), outpatient departments 18 (9.47 %) and the theatre and delivery departments 11 (5.79 %) as illustrated on Table 1.

### **Associated factors with exposure risk to blood and body fluids**

Using bivariate logistic regression analysis, factors such as female gender, university qualification, physicians and nurses occupational categories, between 7- 10 years duration of service, working longer hours per week, experiencing blood and body fluid exposure during the past 12 months, not routinely applying safety standards, always and sometimes recapping needle after use, no safety training, not using gloves and dissatisfied with

current occupation, were seen to be significantly associated with the exposure and transmission risk of blood and body fluids, while age, and availability of posted safety charts were not significantly association Table 2. However, after adjusting for other variables in multivariable logistic regression analysis, the female gender, were about twice (AOR, 2.01, 95% CI: 1.03-2.84), more at risk of exposure compared to the male gender. On the other hand, and as compared to laboratory technicians and others (orderlies, mortuary attendants and health administrators), practicing with a university qualification (AOR=2.11; 95% CI: 0.46-2.96), physician (AOR=3.31; 95%CI: 1.97-6.66), the nurse (AOR= 2.88; 95% CI: 1.44-3.01), more than forty hours a week (AOR=2.73; 95% CI: 0.88-3.61) and serving between 7-10 years (AOR=1.92; 95% CI: 0.28-2.97) has more significantly increased exposure and transmission risk to blood and body fluids. Based on HCP who had previous history of encounter with exposure and transmission risk from blood and body fluids, there were about three times (AOR=3.01; 95% CI: 1.88-4.92), increased exposure risk as compared to those who had no such encounter. Also, there were equally a high significantly increased of exposure risk among HCP who practiced the recapping of needles (72.11%) after used and those who were not routinely using gloves (64.21%) during their activities as compared to those who were not recapping needles and using gloves. In this study, participants 123 (64.74 %) were dissatisfied with their current occupation which also significantly increased their exposure and transmission risk to blood and body fluids. In general, the association between both groups was somewhat highly significant as indicated on Table 2.

However, it was observed that there was no statistically significant difference among study participants based on variation of age, the availability of safety posters in departments, training on safety standards and routinely applying safety standards.

## **Knowledge on infections and management resulting from exposure risk to blood and body fluids**

Among the HCP, 146 (76.84 %), and 136 (71.58 %) cited HIV and hepatitis B viruses as viruses that could be transmitted during contact with blood and body fluids at work respectively. However, some identified, tuberculosis 102 (53.68 %), malaria 72 (37.89 %), Influenza 71 (37.36 %) as potential infections that could be contracted during exposure to blood and body fluids.

During the study period, 66 (34.74 %) of HCP indicated haven received their complete dose of hepatitis B virus vaccine with 15 (7.89 %) still to complete their doses of vaccination. Of all the categories of HCP, physicians were more immunized 10 (5.26 %), as compared to other categories of nurses 49 (25.79 %), laboratory technicians 2 (1.05 %), and others 5 (2.63 %).

Regarding the management of injury from the exposure and transmission risk from blood and body fluids, most 40 (21.05 %) indicated running the affected area under tap water or wash with water as a first aid measure. Some 22 (11.57 %) indicated using antiseptic and or solution before using water as a means to disinfect the affected area. While about 15 (7.89 %) did not bother to take any action of first aid. 18 (9.47 %) of participants who were exposed, cited that, they did their first screening test for HIV and non-indicated taking a post exposure therapy and follow up.

## **Observational results**

During the study, some irregularities were observed that contradicted with the responses of participants on the questionnaires. It was observed that some orderlies were seen collecting and cleaning messy surfaces and transporting waste without gloves or reinforced gloves for very risky task within the hospital premises. Some staff members were seen performing their routine activities with exposed wounds covered only with gloves and without using a sticky plaster or come to work with the

**Table 1.** Demographic characteristics and services of the general and sampled health care personnel of first level referral hospitals in Meme Division, Cameroon (N=190)

Variables	General number of total HCP (N=202)	Number of sampled HCP (N= 190)
	Number (%)	Number (%)
<b>District (first level referral) hospitals</b>		
Kumba	172 (85.15)	159 (83.68)
Konye	18 (8.92)	16 (8.42)
Mbonge	16 (7.92)	15 (7.89)
<b>Gender</b>		
Male	68 (33.66)	61 (32.11)
Female	134 (66.34)	129 (67.89)
<b>Age (years)</b>		
25-34	62 (30.69)	59 (31.05)
35-44	89 (44.06)	81 (42.63)
>45	51 (25.25)	50 (26.31)
<b>Occupation</b>		
Physician**	16 (7.92)	14 (7.37)
Nurses**	115 (56.93)	111 (58.42)
Laboratory Technicians**	26 (12.87)	24 (12.63)
Others	45 (22.28)	41 (21.58)
<b>Educational Level</b>		
≤Primary school	22 (10.89)	17 (8.95)
Secondary school	53 (26.24)	53 (27.89)
High school	72 (35.64)	69 (36.32)
≥University	55 (27.22)	51 (26.84)
<b>Departments/Units</b>		
Outpatient	18 (8.91)	18 (9.47)
Emergency	20 (9.90)	20 (10.53)
Inpatient departments	81 (40.11)	76 (40)
Theatre and delivery unit	12 (5.94)	11 (5.79)
Laboratory	26 (12.87)	24 (12.63)
Others	45 (22.27)	41 (21.58)

\*\*Include all grades and categories

HCP; health care personnel

**Table 2.** Multivariate logistic regression analyses of factors associated with health care personnel exposure and transmission risk to blood and body fluids at first level referral hospitals in Meme Division, Cameroon (N=190)

Variables	Exposed to blood and body fluids		Crude OR (95%,CI)	Adjusted OR (95% CI)
	Yes	No		
	N (%)	N (%)		
<b>Gender</b>				
Male	21 (34.43)	40 (65.57)	Ref	Ref
Female	56 (37.98)	73 (62.02)	1.81 (1.34-3.20)*	2.01 (1.03-2.84)*
<b>Age (years)</b>				
25-34	20 (33.90)	39 (66.10)	1.14 (1.04-1.91)	0.91 (0.43-1.01)
35-44	39 (48.15)	42 (51.85)	1.86 (1.41-2.02)	1.72 (1.44-2.02)
≥45	18(36)	32 (64)	Ref	Ref
<b>Educational Level</b>				
≤Primary school	5 (29.41)	12 (70.59)	Ref	Ref
Secondary school	20 (35.09)	37 (64.91)	2.11 (0.21-1.08)	2.88 (0.56-2.01)
High school	22 (37.93)	36 (62.07)	2.93 (1.01-2.11)	2.44 (0.80-1.21)
≥University	30 (51.72)	28 (48.28)	2.03 (0.13-2.77)*	2.11 (0.46-2.96)*
<b>Occupation</b>				
Physician**	11 (78.57)	3 (21.43)	3.32 (2.08-5.05)*	3.31 (1.97-6.66)*
Nurses**	45 (40.54)	66 (59.46)	3.11 (2.11-4.87)*	2.88 (1.44-3.01)*

	Laboratory** Technicians	9 (37.50)	15 (62.50)	2.01 (1.02-2.08)	1.48 (1.03-1.99)
	Others	12 (29.27)	29 (70.73)	Ref	Ref
<b>Duration of Service as HCP (years)</b>					
	≤3	12 (30.77)	27 (69.23)	Ref	Ref
	4-6	22 (41.51)	31 (58.49)	1.98 (0.46-1.46)	2.01 (0.87-2.18)
	7-10	37 ( 48.05)	40 (51.95)	1.22 (0.86-2.48)*	1.92 (0.28-2.97)*
	≥11	6 (28.57)	15 (71.48)	2.92 (1.46-2.32)	3.11 (2.41-3.01)
<b>Service hours (≥40 hours)</b>					
Yes	Yes	49 (37.12)	83 (62.87)	2.88 (1.27-3.38)*	2.73 (0.88-3.61)*
No	No	28 (48.28)	30 (51.72)	Ref	Ref
<b>Experience of BBFs exposure</b>					
	Yes	29 (49.45)	30 (50.85)	3.26 (2.11-4.76)*	3.01 (1.88-4.92)*
	No	48 (36.64)	83 (63.36)	Ref	Ref
<b>Training on safety standards</b>					
	Yes	24 (41.38)	34 (58.85)	Ref	Ref
	No	53 (46.90)	79 (69.91)	2.11 (0.43-3.01)*	1.91 (0.38-1.11)
<b>Routinely applying safety standards</b>					
	Yes	34 (47.89)	37 (52.11)	Ref	Ref



	No	43 (36.13)	76 (63.87)	1.76 (0.86-3.92)*	2.41 (0.99-2.44)
<b>After use recapping needles</b>					
	Never	16 (30.19)	37 (60.38)	Ref	Ref
	Always	30 (53.57)	26 (45.61)	3.11 (1.07-4.96)*	2.98 (2.01-5.61)*
	Sometimes	31 (38.27)	50 (61.73)	3.83 (1.91-3.66)*	3.12 (2.15-4.56)*
<b>Availability of posted safety charts</b>					
	Yes	25 (43.86)	32 (56.14)	Ref	Ref
	No	52 (39.10)	81 (60.90)	0.42 (0.22-0.96)	0.71 (0.52-1.08)
<b>Use of Gloves</b>					
	Yes	30 (44.12)	38 (55.88)	Ref	Ref
	No	47 (38.52)	75 (61.48)	1.51 (0.33-2.34)*	1.87 (0.29-2.99)*
<b>Satisfied with current occupation</b>					
	Yes	36 (53.73)	31 (46.27)	Ref	Ref
	No	41 (33.33)	82 (66.67)	3.11 (0.43-2.01)*	3.91 (0.37-3.11)*

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\*significant at  $p < 0.05$ ,

Ref, Reference

BBFs; Blood and body fluids

\*\*Includes all grades and categories

wounds exposed. Sharps were found in ordinary waste bins and sometimes mineral water bottles were used to discard sharps as well as overfilled sharp containers were seen to be lying around some services carelessly for close to a week and sometime even more. Out of curiosity, we seek some of these concerns from some staffs, and their explanations ranged from overwork burden and limited time to attain to some of the irregularities. Some nurses were using gloves repeatedly, washing and reused sometimes. Lighting of various services especially the wards and laboratories were not very bright and HCP were seen to either displace patients or use additional light from their cell phones to administer treatment and in some cases the laboratory technicians go out of the building to fully read results.

## Discussion

In Cameroon, the aggregate density of health care personnel-to-population is reported to be 1.3 per 1,000 population which is far lower than the WHO recommended critical shortage threshold value of 2.5 [1, 17]. This shortages is even more severe at the peripheral (districts) levels of health care delivery systems were there is also a high concentration of the population.

This study projected the exposure and transmission risk to blood and body fluids conditions and present some prevailing factors underlining the hospital based activities of HCP at first referral public district hospitals in Meme division. In this study 77 (40.53 %) of HCP reported an exposure risk to blood and body fluids. This is congruent with previous studies performed in East Africa that expressed a >40% of exposure risk among HCPs [18]. However, incongruent with a similar study performed in Cameroon [8], our study showed a greater risk of exposure. Perhaps this may have been due to the availability and differences in settings, work environment and available resources. As inadequate human resources for health coupled with insufficient training, over loaded with work, stress and fatigue could account for exposure risk in a healthcare setting [7].

Consistent with previous studies [9,13] the most common medium of exposure and transmission risk were from needle stick injuries, cuts and splash from blood and body fluids which was mainly amongst the nurses and physicians as they were the categories more involved in risky prone activities (performing surgery, blood collection from veins, venous administration of medication etc). These activities have been characterised by high exposure risk to blood and body fluids infections among HCP which must be addressed at all time. Similar studies performed in Sub-Saharan Africa have raised these concerns [19-21]. Therefore, there is the need for programs that will identify and enhance the effective training and use of safety standards at hospital environments including the use of personal protective equipment which are often taken for granted by some HCP or their shortages in the various departments of the hospitals in some cases. This is further expressed in the case that, beside the use of professional uniforms (white coats), other protective equipment were not often respected when caring on routine activities in this study. For example, about 64.21 % of staff indicated they were not using gloves, talk less of using gloves made up of nitrile or butyl which are recommended for some risky activities to prevent the contact of body fluids and other substances with the skin.

However, in most instances even the latex gloves were out of stock and this has caused some HCP to wash gloves and reused. Similar observation of such practices have been reported in Cameroon [7]. This kind of practices in addition to the washing and reuse of syringes are outdated especially in this period of modernism where these item are to be used and discarded at once, as they are often referred to as disposables. A study performed in a Sub-Saharan country identified that of the 1,219 syringes that were sterilized for reuse, 3 (0.219) had HIV and 400 (32.81%) were found with other bacterial pathogens [22].

Most 72.11 %, of HCP reported recapping needles (mostly bimanually) after used and were at significantly increased risk of sustaining injury and exposure to blood and body fluids, other than those who did not recap, which was congruent with studies performed in Ethiopia, Uganda and Morocco[23-25]. This practices is far beyond international standards that recommended a single use and discard, and even if a recapping is to be done, it should be done single handed, which was not the case among participants this study. Also, the HCP were also at risk of high exposure in their activities as observed limited lighting in some departments and in some cases inconsistent power supply leading to accidental exposure especially during intravenous activities in addition to multiple task and overwork burden.

Based on the number of hours put in service per week, HCP who put in more than 40 hours a week were significantly at an increased exposure risk to blood and body fluids within the last 12 months as compared to those who had practiced lesser hours per week. An explanation could be that, enormous hours at work per week can results to psychological stress and burnout which could leads to mix-up and poor compliance of standard precautions during work, paving a higher risk of exposure to blood and body fluids [26, 27]. Studies have identified that excessive working hours have significantly increased the exposure risk of workers in occupational environment [28, 29].

With respect to the different categories of HCP, the physicians (78.57 %) expressed a higher proportion of exposure risk to blood and body fluids compared to other categories. This may be so, due to the high number of patients to physicians as a whole in Cameroon, in addition to their performance of more complex and risky procedures in comparism with other staff categories. These concerns have also been expressed by a study performed in Tanzanian [30]. Thus, it is of importance to enhance prevention control and management within this category of HCP as well as increasing the

recruitment and deployment of more physicians to the various levels on healthcare services in Cameroon.

Training and refresher courses on safety standards among HCP is a means of updating and improving their skills on prevention measures. In this study, HCP indicated significantly the lack of training on safety standards as a means of increased in risk for exposure to blood and body fluids. HCP with between 7-10 years of work experience were significantly exposed to the risk of blood and body fluids more than those with fewer years of services. This could be attributed to the fact that those with less than 7 years in service might still be fresh with the safety standards they acquired during their training in school. However, a study have reported a rather low rate of exposure risk among HCP who had less than 10 years of experience [31].

Also, of the 64.74 % of HCP that expressed dissatisfaction with their current occupation, with their major concern being due to over work burden that gives them very little time to rest and attain to other family chores. This often caused some of the HCP to be nervous, rude to their patients which could results in improper handling and execution of their activities in accordance with safety standards, thus rendering them prone to exposure and transmission risk from blood and body fluids from their patients. This is consistent with a similar study performed in Ethiopia that showed an increased exposure risk of HCP to HIV/AIDS due to dissatisfaction with their job [32].

Congruent with similar studies [33, 34] that indicated the absence of safety and manage protocol for exposure and transmission risk from blood and body fluids, this study participants (70%) reported the absence of reporting protocol guidelines regarding any accidental exposure risk at their various departments. Therefore, the availability of standard protocols in all departments of the hospitals may provide a great measure to safeguard both the HCP and the patients in a hospital environment.

Only 34.74 % of HCP were vaccinated for hepatitis B virus in this study. This was far lower than a similar study performed in Pakistan that showed (86.3%) of HCP that were vaccinated [35]. It is a general recommendation that the vaccination against hepatitis B virus be taken by HCP upon commencement of their job [36] but such measure are not made mandatory in Cameroon or followed by HCP strictly for their safety. Also, cases that were exposed to HIV/AIDS indicated their reluctance to have themselves tested for HIV as a standard measure to begin antiretroviral (ARV) treatment for the monitoring and transmission of the disease with regards to post exposure prophylaxis measure. In Cameroon it is recommended that HCP who are exposed to the risk of HIV during their activities at work should undergo a pre-test and a three months monitoring and follow up until after six months, so as to be excluded from any of such infection [7]. Most of the HCP who were exposed did not completely declared their exposure and follow up with PEP for fear of stigmatisation and some expressed concern over the reaction of ARV therapy.

Despite the importance to report all occupational exposure to blood and body fluids, a majority (76.62 %) of the participants in this study failed to comply. This number is higher than similar studies performed in East Africa countries [18, 27] where less than 66% of HCP failed to report their exposure risk. This failure may render more increasing chances of risk from occupational exposure and infection among HCP, as no post exposure measures and follow-up were taken to curb the situation. Some have articulated their non-reporting, as they are too busy or not considering the situation serious or claim to manage their crisis as HCP without any assistance. This is consistent with previous studies on the blame for busy at work and even failure to do so in due course [33, 34].

In this study, 65 % of HCP reported their occupational environment to have put them at high risk of acquiring infectious diseases

especially HIV and hepatitis B viruses and this has resulted to some HCP treating patients with HIV/AIDS separately from other patients. This has depicted the general conception in working environment that is associated with stigma towards patients suffering from HIV/AIDS among HCP in this study as well as concern raised in previous studies [35, 36].

### Limitations

This is a cross-sectional study and the limitation that comes with this type of study design should be taken in consideration when interpreting the results. Since this was a self-reporting data collection in the assessment of exposure and transmission risk among HCP, this could have led to information and recall bias. This study based its findings only on first level referral hospitals in Meme Division of the South West region of Cameroon and it's not enough to generalized its inference to other HCP in similar facilities around the country. Also, staff specific grades and services were not differentiated to give a comparison of their difference.

Although all HCP were targeted, not all took part in the study, as some were on sick and maternity leaves, some on excused duty and others were too busy to participate. However, a 94.06 % participation rate was much higher than similar studies performed in the country with <80% of participation rate [7, 8]. Thus our results reflected the actuality on the ground.

### Conclusion

Based on the findings, it could be concluded that HCP at the first level referral hospital in Meme division are at high exposure and transmission risk from blood and body fluids. With respect to most developing countries where resources are scarce and stock-outs are common, a situation which is commonly witnessed in Cameroon and health facilities in Meme division are not left out. With the lack of continuous education and training on safety standards at work, the absence of safety guidelines at all departments, excessive working hours, dissatisfaction with current job, lack of basic personal protective

equipment were some factors which could be avoidable that put HCP at an exposure and transmission risk of infection from blood and body fluids. Efficient and suitable strategies that will address the provision of personal protective equipment and basic materials at all time, training programs for the prevention and control of infections pathogens as well as a careful surveillance and registration of all exposed situations for follow-up should be encouraged. Also, the health care delivery system may want to strengthen its human resources and effective distribution at all levels of state health facilities as well as stressing the importance for HCP to consider occupational exposure risk and prevention within their various working environments as a priority.

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