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OCCUPATIONAL EXPOSURE TO BLOOD AND BODY FLUIDS AMONG HEALTH WORKERS: THE CASE OF SHAI-OSUDOKU DISTRICT HOSPITAL.

BY

VICTORIA APETORGBOR

(10294807)

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JULY, 2018

DECLARATION

I, Victoria Apetorgbor hereby declare that apart from references to other people's works which have been duly acknowledged, this work is the result of my own original work and that this dissertation has not been submitted for the award of any degree in any institution.

…… ……

Victoria Apetorgbor Date

(Student)

…….. ……

Dr. Collins Ahorlu Date

(Academic Supervisor)

DEDICATION

This Dissertation is dedicated my husband,

Apostle Raphael Ashong.

I am grateful for your unfailing support.

Also to my children,

Adelle Ashong, Baron Ashong

and Casper Ashong

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ABSTRACT

Background: Occupational exposure to blood and body fluids (BBFs) is an everyday risk faced by HCWs as they come into contact with patients in their work activities. The most common pathogens of concern are HBV, HCV and HIV which are the most commonly transmitted.

Objectives: The purpose of this study was to determine the factors that expose HCWs to BBFs. It was also to determine the prevalence of exposure and to investigate behaviours of HCWs after exposure.

Methods: Associations were examined between the exposure and the dependent variables using the Chi square test. Logistic Regression model was used to assess the effect of socio-demographic factors, work factors and HCW factors on exposure. Variables with p-value < 0.05 in the final model were considered as having significant association with exposure to BBFs.

Results: A total of 171 health care workers were included in this study. Majority (67.5%) had BBFs exposures in the past 12 months. Majority, 70.5% of health workers did not report their exposures. Factors closely related to exposures were, PPE availability, risk perception, exposure reporting training, being a midwife, IPC training and attending to more patients per shift. Less than half of those exposed through sharps had the source patient tested for HIV, HBV and HCV. Almost a quarter of tests done were HIV positive and PEP given accordingly.

Conclusion: There was a high rate of exposure to blood and body fluids in spite of high number of participants trained in Infection Prevention and Control. There was also a low rate of reporting of exposure despite the majority of health workers trained in reporting of such incidences. Compliance to protocol is therefore a huge factor in prevention of exposure and good management after exposure.

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LIST OF ACRONYMS

ACRONMYNS	MEANING
BBFs	Blood and Body Fluids
CDC	Centers for Disease Control and Prevention
GDP	Gross Domestic Product
GHS	Ghana Health Service
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HCWs	Health Care Workers
HIV	Human Immunodeficiency Virus
ILO	International Labour Organization
IPC	Infection Prevention and Control
MOH	Ministry of Health
PEP	Post Exposure Prophylaxis
PPE	Personal Protective Equipment
SP	Standard Precaution
WHO	World Health Organization

DEFINITION OF TERMS

ITEM	OPERATIONAL DEFINITION
Occupational Exposure	Skin, Eye, mucous membrane or percutaneous contact with blood and body fluids during the performance of one's professional duties.
Health Care Worker	Someone who works in the hospital or health center
Infection	Disease caused by HBV, HCV or HIV
Percutaneous exposure	A needle stick or sharp object injury that might place the HCW at risk for HBV, HCV or HIV.
Mucous Membrane Exposure	Contact of mucous membrane or non-intact skin with blood and body fluids that might cause infection.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Occupational hazard is a risk to a worker's wellbeing which is present in a particular profession. Occupational health and safety has been defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers (Alli B., 2008).

Occupational exposure to blood and body fluids is a daily risk faced by health care workers. The most common pathogens that can be transmitted are HBV, HCV and HIV among many others. Reviewed articles captured that more than half of studies participants have had occupational exposure to blood and body fluids (Yenesew & Fekadu, 2014; Markovic-Denic et al., 2013).

According to Takala et al., (2012), the only group who reports occupational hazards close to expected number are the high income countries. In contrast, most other region have low levels of reporting which paints a false picture to decision makers and thus exposes the fact that a lot remains to be done to protect HCWs from risks of exposures and infections which may in turn affect quality of health service delivery.

The number of HCWs having had sharps injury and blood and body fluid exposure was high in spite of the low self-reporting for exposure status. These high numbers of exposures points out that HCWs are at high risk of acquiring blood- borne viral infections such as hepatitis B, C and HIV (Alemayehu & Habtewold, 2016).

1.1.1 Global Burden of Hepatitis B, Hepatitis C and HIV

HIV

HIV still remains a global public health problem. In 2016, approximately 36.7million people were living with HIV with a prevalence of 0.8% among adults globally. From the beginning of the epidemic, 70million people have become infected and 35million people have died of AIDS related illness. In just 2016, 1million people died of AIDS related illness. Most of the people living with HIV are in low-and-middle income countries with an approximately 25.5million in sub-Sahara Africa. Sub-Sahara Africa is still the most affected with nearly 1 in 25 adults living with HIV and making up to two-thirds of people living with HIV worldwide (WHO, 2016).

Hepatitis B

Approximately 240million people are chronically infected with Hepatitis B. Each year, 780,000 persons die from Hepatitis B. It is therefore among the top of the list occupational hazards for health workers. It is highest in Sub-Sahara Africa and East Asia where 5-10% of adults are chronically infected. High numbers of infections are also found in the Amazon and Southern parts of Eastern and Central Europe. The Middle East and Indian sub-continent, also have an estimated 2-5% of the general population being chronically infected (WHO, 2015).

Hepatitis C

71million people globally have Hepatitis C infection. Approximately 399,000 people die each year from Hepatitis C related liver diseases. The greatly affected areas are Central and East Asia and North Africa with about 10% prevalence (WHO 2017). The principal mode of

transmission of the virus includes healthcare exposures where infection prevention and control is of low standard (CDC, 2014).

1.1.2 Risk of occupational exposure to HBV, HCV and HIV.

According to WHO (2005), occupational HBV and HCV infections account for about 37% and 39% of all HBV and HBC infections among HCWs. The total occupational HIV infection among HCWs was 4.4%.

CDC (2015)states that ,385000 HCWs had sharp objects related injuries a year (an average of 1000 a day).These were mainly associated with transmission of HBV,HCV,HIV which are the most commonly transmitted during patient care among many others.

MOH policy guide lines (Ghana Health Service, 2010) states that, health workers of the Ghana Health Service (GHS) attend different health care centers when they are unwell. The Service does not have a system to collect and compile data on health issues its staff. It is therefore not in a position to provide information about occurrence of illnesses arising from occupational hazards. Issues of confidentiality also makes it more difficult to get information concerning illnesses of workers resulting from occupational exposures. Estimation of contributions of work factors to ill-health among health workers becomes difficult.

1.1.3 Standard precautions in health Care

Standard precautions are to be adhered to if the risk of transmission of blood borne diseases and other pathogens from all sources is to be reduced. They are the primary requirement of infection control precautions to be used in the care of every patient. Hand hygiene is key and an important method in standard precautionary measures to combat transmission of pathogens associated with health care. The use of personal protective equipment is also very important

and must be guided by risk assessment and anticipation of contact with blood and body fluids, or pathogens. Preventing the spread of pathogens from the source is very vital to avoid transmission of infections (WHO, 2007).

1.1.4 Legal Context of Occupational Health and Safety

Section 24 (1) of the 1992 Constitution states that "Every person has the right to work under safe and healthy conditions…" This fundamental human right has been upheld by the Labour Act, 2003(Act 651) (Ghana Health Service, 2010). According to Section118 (2), an employer is mandated by law to provide the necessary information, instructions, training and supervision to workers to ensure their health and safety and also provide at no cost to the workers enough safety appliance, personal protective equipment, and instruct the workers on how use to use them.

Subsection (3), ultimately mandates every worker to use the safety appliances and personal protective equipment provided by the employer in compliance with the employers instructions.

1.1.5 Problem Statement

A young medical house officer is pricked with the needle of a known HIV patient whiles assisting with surgery. He is tested and finally put on Anti-retroviral drugs. He is said to have lost so much weight within a few days due to anxiety of an unknown and unsure outcome of the treatment. This can become the plight of most healthcare workers who are daily at risk of exposure due to caring for patients whose status may not be known or still in the window period of infection of any blood borne disease if necessary precautions are overlooked.

Healthcare workers become exposed to occupational hazards through needle stick and others sharps injuries, mucus membrane and through broken skin as they carry out their duties. Pathogens of concern are the Human Immunodeficiency Virus (HIV), hepatitis B, and C and the most transmitted during patient care (CDC, 2017).

Records of Global Estimates of Accidents and Illness (2015) revealed that, there were 2.4 million recorded deaths among workers due to work related diseases. Annually most countries loose 4-6% of GDP to work related health issues (WHO, 2014). ILO (2016), estimated 2 million deaths as a result of occupational risks each year of which only 850,000 (43%) were accounted for due to data limitation mostly in developing countries. They believed that 113,000 deaths were missed possibly due to inadequate record keeping systems. Contaminated sharps injuries solely accounted for 40% of Hepatitis B, 40% of Hepatitis C and 4% of HIV/ AIDS infections. This was also believed to be an under -estimate due to significant under-reporting.

According to Yenesew & Fekadu (2014), 74% of their study participants have ever had exposure to BBF and a proportion is as a result of unavailability of PPE.

Singru & Banerjee (2008), also stated that occupational exposure to BBFs was very common among their study population. They also observed a gross under- reporting consequently leading to improper treatment.

Samargandy, Bukhari, Samargandy, & Bahlas (2016), concluded in their study that occupational exposure to BBFs is still an issue of great importance among HCWs and hence preventive and post exposure management guidelines must be adhered to and reinforced.

Shai- Osudoku District Hospital whose attendance has tripled over the last few years with its inevitable accompanying challenges may not be speared these daily occurrence of occupational exposure to Blood and Body Fluids. This may pose increased risks for infections such as HIV, HBV and HCV to the health care workers faced with such work situation.

1.2 Objectives of the Study

1.2.1 General Objective

To investigate the prevalence of occupational exposure to blood and body fluids among Health workers at Shai- Osudoku District Hospital.

1.2.2 Specific Objectives

1. To determine the proportion of HCWs who have been exposed to BBFs.

2. To determine the factors that expose health workers to BBFs.

3. To investigate the behaviours of HCWs after occupational exposure to BBFs.

1.2.3 Research Questions

1. What is the prevalence of occupational exposure to BBFs among HCWs?

2. How are HCWs exposed to BBFs?

3. What do they do after exposure?

1.3 Conceptual Framework

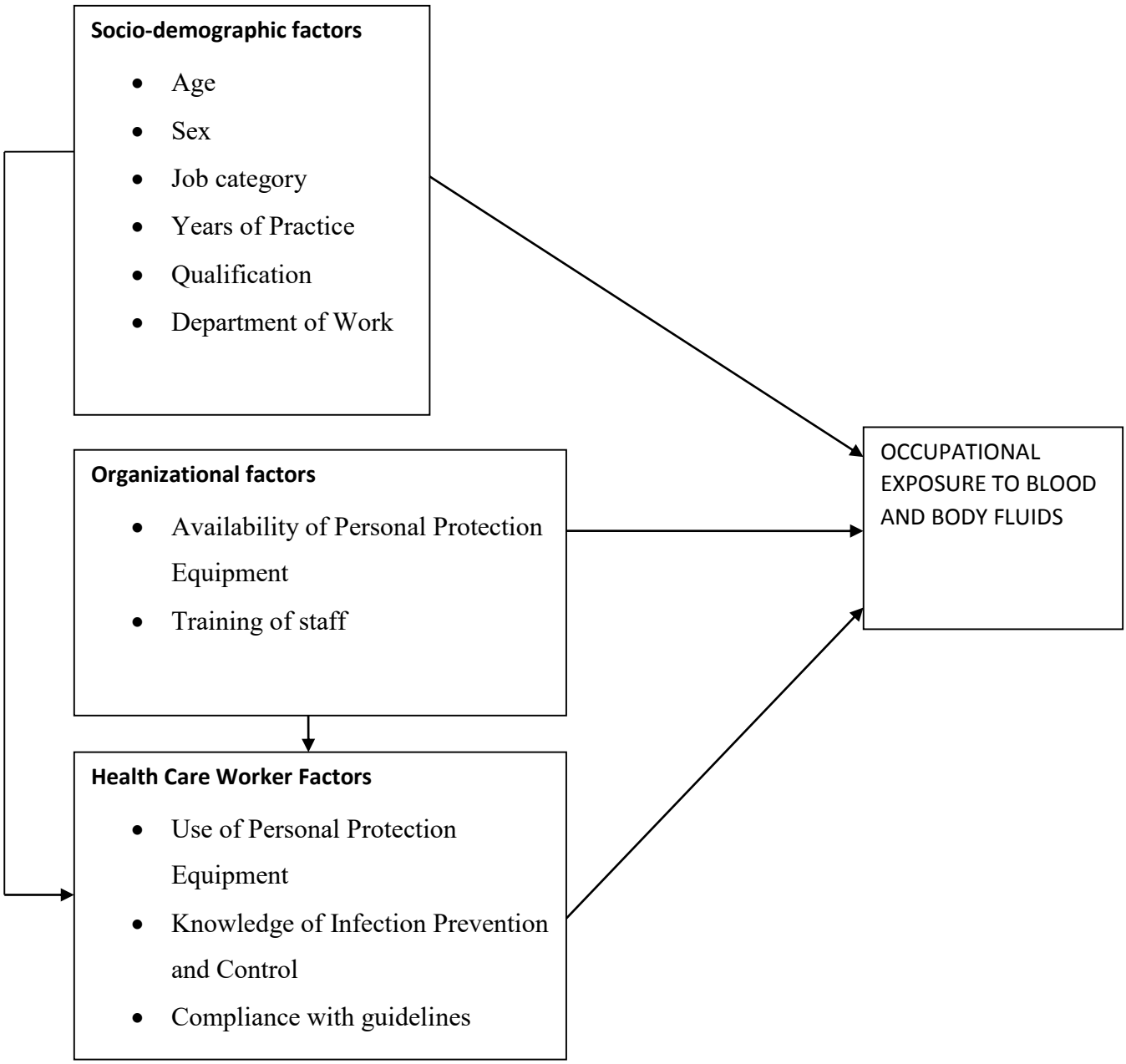

Figure 1: Conceptual Framework for Occupational Exposure to Blood and Body Fluids

1.3.1 Narrative to Conceptual Framework

Occupational hazards in the hospital cannot be done away with completely but can be minimized to a very small insignificant level if standards and protocols are followed meticulously. Job category, number of years of practice, department of work and qualification may directly have an impact on exposure to BBFs. These factors can also influence HCWs factors to affect ones likelihood of exposure.

Promotion of an institutional safety culture may help to improve compliance with recommended precautions and thus subsequent risk reduction to exposures. Provision of adequate safety equipment and PPE, guidelines and training of health workers is crucial for improvement of safety culture in the workplace which can influence HCW's behaviour and ultimately affect their exposure to BBFs. When there is inadequate supply of basic safety equipment and PPE, healthcare workers may be forced to work without them thus exposing themselves to occupational hazards.

Training of staff can also influence the level of knowledge of IPC and compliance with guidelines which may prevent exposures to BBFs.

Non-compliance resulting in working below the standards of infection prevention practices like good hand washing techniques, proper disposal of sharps and wearing of appropriate protective gear can predispose an individual to occupational hazards in the hospital setting.

1.4 Justification of the Study

The facility was chosen because of the important role it plays in health service delivery in increasing its attendance from 13,080 to 42,000 between 2009 and 2012. This led to the new infrastructure to help solve the growing attendance crisis in the district.

The MOH's OHS policy and guidelines for the Health sector (Ghana Health Service, 2010) stated that on-going monitoring including regular audits is a must. This study may serve as a form of audit for the Hospital.

The study will also be the first of its kind in the new hospital since it started operating in 2016. It will therefore unveil the situation among HCWs and may be a wake-up call for management and staff if gaps are identified. Results could inform the design and implementation of interventions programmes and In –service training can then be organised on safety to minimize or prevent occupational hazards among HCWs. It will also serve as baseline for further studies in the facility.

1.5 Limitations

Another study could have been conducted in a private Hospital as well, where several factors may different so as to analyse the different situations but due to time and financial constraints, it will be conducted in only Shai-Osudoku District Hospital.

Another limitation to this study will be that, only self-reported data will be collected. This may result in either under or over reporting due to social desirability issues.

1.6 Variables in the Study

The variables in this study have been summarized in the table below.

Table 1: Variables in the Study

Variable	Definition	Level of measurement
Dependent variable		
Occupational Exposure	Skin absorption, needle pricks, eye and mucous membrane contact with blood and body fluids during the performance of one's professional duties.	Categorical
Independent variables		
Age	At last birthday	Continuous
Sex	Biological	Male, Female
Qualification	Highest qualification attained	Diploma, Degree etc
Employment	Type of work	Doctor, Nurse, Laboratory technician, Health Assistant.
Work experience	Number of years of working	Continuous
Working sector	Department one works in	Medical, surgical etc
Circumstance of exposure	How exposure occurred	
Personal Protection Equipment	Use of PPE	Use or non-use of PPE
Post exposure experiences	Reporting of exposures, treatment of the site of exposure, PEP treatment	

CHAPTER TWO

2.0 LITERATURE REVIEW

Occupational exposure to Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) and HIV in the workplace occurs by the following ways:

- Accidental exposure to blood : Coming into contact with blood or body fluids as a result of needle stick injury that is contaminated with blood or body fluids or other sharp instruments, or through the mucous membrane(eye, mouth), or contact through damaged skin.
- Percutaneous exposure: being exposed to blood or body fluids through non-intact skin.
- Blood splash: Skin noticeably contaminated with blood or body fluids.
- Exposure of undamaged skin to a large volume of blood.
- Human bites by an infected person (Ghana Health Service, 2010).

2.1 Socio-demographic Factors

A study conducted in Kaduna, Nigeria by Nmadu et al (2016), stated that majority (91.3%) of respondents fell within 38.7 ± 8.6 years of age range. Hakim, Aboulezz, & El Okda, (2016) reported of majority of the participants (62.8%) being females and the mean age was 36.9 years (SD-9.4).

It was found out in this study conducted in Tehran that 2/3of the male gender compared to half of female subjects have had at least one episode of occupational exposure (Farsi et al, 2012).

Tesfay & Habtewold, (2014), reported in their study in Debre Berhan in Ethiopia that females were less likely to be exposed than males. He also found out that HCWs working in the OPD had higher risk of exposure (23%), followed by Delivery room (20.3%), and Emergency room (16%). O&G department reported high risk of exposure among HCWs in provincial hospital, Kenya. (Mbaisi,&, Ng'ang'a & Wanzala, 2013). According to Kaweti & Abegaz, (2017), the risk of exposure doubled among HCWs who worked in delivery rooms and operation theaters.

Ogoina, Pondei & Gidado (2014) discovered in two tertiary hospitals in Nigeria that there were high rates of exposures among newly qualified doctors and nurses who have poorer knowledge of IPC than their older counterparts.

Mbah, (2014) reported of all the respondents being professional health workers as in another study in a Brazilian primary health care facility by Garcia & Facchini, (2018) stated that, 96% of the participants were professionals while 6% were auxiliary staff.

A research conducted by Lyngdoh, K, & Akoijam, (2018) indicated that 51.5% also had Diploma and 11.3% had Masters. This was also seen in a study conducted by Cho et al (2012), where majority 51.9% had Diploma and 3.9% had a Masters' degree.

. According to Sabbah, Sabbah, Sabbah, Akoum, & Droubi, (2013), accidental exposure to BBFs were more frequent in older HCWs. But younger aged HCWs had more frequent occupational exposures in a Turkish hospital (Hosoglu et al., 2008.).

A study conducted in South India which stated that as experience increases, incidence of exposure decreases (Tetali & Choudhury, 2016). Lower number of years of work experience was found to be a significant risk factor for occupational exposure in a study in Uganda

(Kumakech, Achora, Berggren & Bajunirwe, 2011). It was found out that years of experience did not relate to occupational exposure. (Farsi et al, 2012)

2.2 Prevalence of Occupational Exposures

A study conducted by Ogoina, Pondei & Gidado (2014) found out among the participants that exposures to BBFs were very common with one or more types of exposure in 85% of respondents which may be due to low practice of standard precautions. They also reported 75.8% of skin contact with patients' blood, 44.7%, 32.9% and 84.4%, needle stick injuries, cuts from sharps, BBF splashes to mucous membranes respectively.

A high proportion (88.6%) of HCWs who participated in the study in Debre Berhan in Ethiopia had experienced between 2-4 risks of occupational exposure in the last one year (Tesfay & Habtewold, 2014). Another study conducted by Farsi et al (2012), on prevalence and factors of occupational exposure to BBFs among a study population of 200 health care workers in Tehran using a descriptive cross-sectional method revealed that 57.5% of HCWs have had a least a one episode of BBFs.

Sreedharan et al., (2010) identified 25.75% of their study participants had BBF splashes. Kaweti & Abegaz, (2017)also reported of 28.4% of BBFs splashes within one year prior to their study period.

In a cross- sectional study of 317 participants conducted in Bahir Dar, 209 (65.9%) of them were exposed to BBFs in the past 12 months and majority were nurses (62.2%) (Yenesew & Fekadu, 2014)

2.3 Mode of exposure

31% needle stick injury, 28.9% of glove breakage, 56.6% skin contact with potentially infectious body fluids was also discovered by Tesfay & Habtewold (2014), as modes of exposure in a study conducted in some hospitals in Ethiopia. Farsi et al (2012), also came to a conclusion in their study that hollow bore needles accounts for the single cause of the highest amount of injuries being 41.5% and not using gloves also related markedly to occupational exposures.

Also found in Matsubara, Sakisaka, Sychareun, Phensavanh, & Ali (2017) study were percutaneous injections, suturing and recapping of needles being activities which caused sharps injuries. Tadesse, Meskele & Boltena, (2016) noted that sudden movement of patient during taking of blood samples, recapping and during waste collection were activities that resulted in sharps injuries

1 in 5 HCWs believe that recapping of needles was an appropriate and safe practice despite the multiple studies highlighting the risk, it remains difficult to change this hazardous activity in most countries. Only 28% of respondents identified the correct method of handling used needles/devices (Butsashvili et al., 2012).

2.4 Organisational Factors

2.4.1 Training

Ogoina, Pondei & Gidado (2014) found out in their study that 48.8% of the participants had had training in infection control despite high prevalence of exposures (85%).Nearly all study

participants were informed about Universal Precautions and guidelines about IPC although 88.6% have had 2-4 exposures in the last year (Tesfay & Habtewold, 2014).

Understanding training is critical to ensure one's safety and others under one's care. A study conducted in Turkey to examine the effect of training on exposure and reporting indicated that, there was a statistically significant difference between the post-training and the pre-training periods in terms of exposure (Ersin, 2016).

A study conducted in Ethiopia found out that taking training was not a protective factor from occupational exposure which poses a serious challenge to infection control effort (Reda, Fisseha, Mengistie, & Vandeweerd, 2010).

Mbaisi, Ng'ang'a, Wanzala & Omolo, (2013), stated in their report that previous training in IPC was a protective factor against exposure. Smith et al (2009), in a study conducted in Japan reported that being properly trained in risk control procedures reduce risk to exposure.

2.4.2 Availability of PPE.

In a study investigating factors that influence compliance with SP among nurses, Efstathiou, Papastavrou, Raftopoulos, & Merkouris (2011), found out that lack of protective equipment forces them not to use PPE even if they must use them in that particular situation and also storage of PPE in places far from where care is being provided does not help.

Yenesew & Fekadu, (2014) gathered in their study that 22.4% of respondents had undergone training infection prevention. Half of them (50.8%) reported that there were enough PPEs available over the past year and that shortness of PPE had a significant association with occupational exposure to BBFs among health workers.

2.4.3 Workload

A study conducted in a Brazilian Primary Healthcare Facility revealed that, higher work load was significant to exposure and higher incidence of exposure were found in HCWs who reported of higher work load (Garcia & Facchini, 2018). Parmeggiani, Abbate, Marinelli, & Angelillo (2010), also reported that attending to a fewer number of patients per work day does not necessarily reduce risk to exposure.

2.5 Health Care Worker Factors

Shokuhi, Gachkar, Yuhanaee, & Sajadi (2012), reported in their studies that there were unusually low use of barrier precautions during contact with patients thereby exposing a high percentage of HCWs to BBFs.

A study conducted in Georgia showed that only 32% of the study participants reported always using gloves when needed, 27% never used facemask, 76% never used eye shield (Bustsashvilli et al., 2012).

It was reported in a cross-sectional in Bahir Dar Town North-West Ethiopia that only 35% of HCWs had a positive attitude towards standard precautions (SP).And those with negative attitude towards SP were 1.8 times more likely to have occupational exposures than other workers. This was attributed to lack of regular on the job training on SP and IPC (Yenesew & Fekadu, 2014).

A cross- sectional study conducted among medical students taking a newly implemented infection control course revealed that 49.6% of 785 participants expressed a lot of concern about contracting HIV whiles caring for patients. 40% thought Physicians sometimes refused

to treat HIV patients because to fear of contracting HIV. Despite this concern of contracting infection, only half (51.5%) of them reported wearing gloves and even fewer of them reported wearing eye protection (Nugmanova et al., 2014).

In Iran, a study reported that 91.2% of individuals with the history of body fluids splash had mucosal exposures as a result of ignoring the utilization of PPE or improper utilization (Shokuhi et al., 2012). Tesfay & Habtewold, (2014), also exposed in their study that although 95.7% of the respondents used PPE and only 23% of them were protected. In another study nearly 60% HCP in this study had practiced more than half of the components of SPs but none had practiced all (Yenesew & Fekadu, 2014).

2.6 Barriers to compliance

In a focus group study conducted by Efstathiou et al.,(2011), on compliance to standard precautions among Nurses, participants stated the following-

- Emergency situation as a major hindrance in following precautions.
- A lot of responsibilities due to lack of HCWs in the job makes them avoid the use of SPs since it is time consuming (e.g. putting on a gown).
- The use of PPE makes them feel uncomfortable (mask), reduces their skills (gloves) and impedes their work and therefore affects compliance with SP.
- Not liking some PPEs, example irritations by gloves.
- PPEs damage their hairstyle and make-up so they would prefer not to use them (hair cap and mask).

- Patients may feel bad, experience distress and anxiety over their health status (gloves, `mask).
- When they gain enough experience, they are confident of their capabilities therefore may not follow certain guidelines.
- Feel embarrassed to following guideline especially if they are not used routinely in Department they work in and especially if this is displayed by more experienced colleagues.

Farsi et al (2012), stated in their study that the most common reason for non-compliance to safety measures were rush in the work (40%), unavailability of PPE and safe device (29.5%) and neglecting to consider SPs (16.5%). Hakim et al (2016) identified 10.8% of participants perceived low risk in daily professional activities. Similar to these findings was that of Lahuerta et al., (2016) in Tanzania where only 11% of HCWs perceived low occupational risk. Findings from research conducted in Addis Ababa, Ethiopia indicated that over half (54%) of respondents had a low perception of risk in their daily activities at the work station.

Luo et al (2010) identified the main reason for non-use as difficulty in accessing PPE. Commonly stated reason in another study by Ganczak & Szych (2007) was non-availability of PPE. Cdt, Sangwan, Kotwal, & Verma, (2010) mentioned busy work schedule, non-use by colleagues, patients getting offended and discomfort. Hakim, Aboulezz & El Okda, (2016) gathered from their study that availability and no time to use PPE were reasons why staff were not adhering to PPE use.

2.7 Post exposure behaviours

Underreporting of exposures was noticed in a lot of researches reviewed which can interfere with the chance of PEP if indicated.

Less than a quarter of the exposed persons underwent post-exposure prophylaxis (PEP) against HIV although the same was indicated in about 50% of the affected HCWs based on the HIV status of the source patient (Singru & Banerjee, 2008).

A Study conducted in Tanzania on Reporting and Case Management of Occupational Exposure to Blood-Borne Pathogens noted that, of the 357 of HCWs who had an exposure only 120 (34%) reported it (Lahuerta et al., 2016)

Among the 426 HCWs who were exposed in this study conducted on Occupational Exposure to Blood-borne pathogens in Botswana, only 160 (37%) reported the exposure. Of these 111 (69%) received PEP (Kassa et al, 2016).

Nago et.al (2009) revealed in a study conducted in Japan that, only 22% of those exposed HCWs reported the incidence. Mehrdad & Sharifian, (2014) stated that more than half (52%) of participants who had exposure during their work activities did not report them. In Voide et al., (2012) study, only 9.7% had needle stick and sharps injuries and in contrast 73.1% reported all the injuries sustained. They reported lack of time as the most common reason for non-reporting and estimation that transmission type is low risk. Askarian, Shaghaghian, & Assadian, (2008) reported a prevalence of 49.6% of NSI among HCWs in Fars Province with just a quarter reporting their exposures. Dissatisfaction with administrative response to report was the main reason seen in a study by Azadi, Anoosheh & Delpisheh, (2011).

Among HCWs in three Emergency rooms in Tehran a study found that 72% participants washed site of exposure with water and povidine-iodine or alcohol, 29.5% were referred to Infection control Centre, 23.5% took blood sample to the laboratory, 13% did not do anything after exposure and only 59 out of 200 HCWs reported their exposure (Farsi et al, 2012).

Askarian et al., (2008) stated that of all those who sustained sharps injuries only 3.2% of source patients were tested for HBV surface antigens, 2.2% for HCV antibodies and 2% for HIV antibodies. Of all those tested 46.7% were positive either for HB, HCV or HIV with 2 testing positive for all. Similarly, only 7.8% of HCWs exposed took PEP against HIV after injury in Delhi India (Sharmang, 2012). Of the cases whose source identity were known, 14 had HBAg positive, 11 HCV antibody being positive, 15 had both HBAg and HCV Antibody being positive and 1 HIV antibody positive source patient. All were given PEP as indicated (El-hazmi & Al-majid, 2008).

Nmadu, Sabitu, & Joshua (2016), shockingly found out in their study conducted in Kaduna State, Nigeria that 40.3% of respondents cleaned the site of exposure with bleach, 20.9% cleaned with methylated spirit and only 4% performed the right measure of immediately washing with soap and water.

Engin, İnan, Ceran, Demir, Dağli1& Karagül (2014), conducted a study in Istanbul, Turkey that, 69.7% of their subjects washed exposure site with soap and water, 23.4% of them did nothing to the site and 6.8% washed with soap and water in addition to antiseptic solution.

Sreedharan, Muttappallymyalil, & Venkatramana (2010) reported that 93.1% stated that needle pricks, cuts and scratches should be bled by squeezing. According to Sharma, Rasania & Singh, (2010), majority washed with soap and water while some did not do anything about

the site. Aslam & Ali, (2010) also reported that, majority squeezed blood out of the site while a small proportion washed with disinfectant.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design

This study was quantitative cross-sectional in nature and employed the use of questionnaires to gather data from Healthcare workers on prevalence and factors associated with occupational exposure to BBFs. The study was carried out from May to July 2018.

3.2 Study Area

The study was conducted at Shai- Osudoku District Hospital which started functioning in June 2017. Attendance at the hospital has more than tripled from 13,080 to over 42,000 between 2009 and 2012. Hospital attendance increased further by 50% in 2015. The new hospital was built to take care of the expected increase in attendance. It was designed with the potential of expansion from 125 to 200 bed capacity.

Healthcare facilities in the district include two health centers, five CHPS compound, a private maternity home, a quasi- government hospital and one district hospital. The hospital is located in Dodowa, the capital town. It was established in 1970 as a health post by the people of Shai and handed over to the Ministry of Health. The facility advanced to a Health Centre in 1985 and finally to a district hospital in the middle of 2009.The hospital has a staff strength of 365 Health workers including 11 doctors, 3 Physician Assistants, 2 pharmacists, 30 midwives, 160 nurses, and 5 laboratory personnel. It provides other services such as Hypertension Clinic, Diabetic Clinic, Ultrasound Care, ENT Care, Dental Clinic, ART Clinic, Family Planning, Community Psychiatry, Eye Clinic, Theatre, Maternity and Ante natal Clinic. These services

are offered to the people in Shai-Osudoku, and its environs stretching to Ashalley-Botwe, Adjirigano and Nmai-Dzor (In-Service Training Department, Shai-Osudoku District Hospital).

Figure 2: Shai-Osudoku District Hospital

Figure 3: Aerial View of Shai-Osudoku District Hospital

Figure 4: A Typical Ward in Shai-Osudoku District Hospital

3.3 Study Population

The study population included all healthcare workers at Shai-Osudoku District Hospital who are considered to be at risk of exposure to BBFs. The study participants included Doctors, Nurses, midwives, Laboratory technicians and Health assistants.

3.4 Determination of sample size

The sample size for this study was calculated Using Cochran's formula

$$n = \frac{z^2 p(1-p)}{d^2}$$

Where n= the minimum sample size,

Z =1.96which is the value of the selected α for a confident interval of 95% and an allowance of 5% error margin to ensure a high rate of accuracy.

P= prevalence of occupational exposure. Review of literature revealed as high as 74% of healthcare workers being exposed to BBFs (Yenesew & Fekadu, 2014)Therefore, p was estimated to be 0.74

d=margin of error (0.05).

Therefore,

$$n = \frac{1.96^2 * 0.74(1-0.74)}{0.05^2}.$$

n=295

The sample calculation was done for a finite population of 365 Health Care Workers. Therefore by applying a finite population correction, the sample was computed using the formula

$$n = \frac{n_0}{1+\frac{n_0}{N}}$$

where n= sample size from finite population

n_o = sample size from Infinite population (295)

N = population size (365),

$n=\frac{295}{1+\frac{295}{365}}$ = 163

A non- response rate of 5% will be added to increase the sample size to 171.

3.5 Sampling Procedure

The registers of all the healthcare workers was obtained from the administration of the Hospital. They were stratified into Doctors, Nurses, Midwives, Lab technicians and Health assistants. A quota proportionate to size was allocated to each group. Their names were be numbered and participants were selected using simple random technique until the required number is obtained. Any unwilling or unavailable selected participant was replaced by the very next person on the list who had not been already selected to participate.

3.6 Eligibility Criteria

Doctors, Nurses, Midwives, Laboratory Technicians and Health assistants working at the Shai-Osudoku District Hospital were qualified to participate in the study.

3.7 Exclusion Criteria

Administrative healthcare staff, Orderlies, Pharmacists, Dentists, Nutritionists etc and those who refuse consent were excluded from the study.

3.8 Data Collection Tool

The study was quantitative in nature and employed self- administered questionnaires for data collection. The first part collected data on socio- demographic details of participants which entailed age, sex, educational level, job category, years of work experience and department of work. The second sections elicited information on exposure circumstances. The third section gathered information on reporting of exposures and the final part on post exposure experiences of healthcare workers.

3.9 Data Processing and Analysis

Filled self -administered questionnaires were collected from participants and checked thoroughly by the principal researcher and trained assistants to ensure that all questions have been answered and that writing of participants are eligible enough for easy reading and analysis. Stata 15 software was used for analysis. Age and number of years of work experience were collected as continuous variables and later categorized into intervals. The outcome variable being occupational exposure was categorical, that is either exposed or not. The distribution of variables such as age, sex, level of education, job category, and department of work and years of work experience were reported in tables, graphs and charts and described. Univariate analysis was conducted to find and establish patterns in the data set. Bivariate analysis were also done to determine significant relationships considering socio-demographics of the study, infection prevention practices and occupational exposure using Pearson's test. P-values ≤ 0.05 were accepted as significant. The results were presented in tables. Logistic Regression model for analysis was then used to analyse variables that are

significantly related to determine the factors influencing exposure to BBFs. The post exposure behaviours of the various job categories were also presented in tables.

3.10 Data storage / security / usage

Data collected were entered into the computer and stored in Stata 15 software. This was protected with a password on the laptop and was accessed without the consent of the principal researcher. Results of research were used for academic purposes. Result of the study and recommendations will also be conveyed to the Hospital authorities for necessary interventions.

3.11 Quality Control

The questionnaire was scrutinized and perfected with the help of the supervisor. It was pre-tested at La General Hospital by the principal researcher assisted by well-trained research assistants. Results from the pretesting was used to refine the data collection tool to ensure reliability and consistency in the information to be collected. The research assistants were trained by explaining the rational and objectives of the study to them. They were taken through the questionnaire to make sure they understand and can assist participants to complete it and also be able to answer any question posed to them by participants.

3.12 Ethical Considerations

Ethical Approval

Approval to conduct the study was gotten from Ghana Health Service Ethical Review Board since the hospital was under Ghana Health Service. The study was only conducted after approval was given by the Institution.

Institutional Approval

Permission was sought from the Hospital Management with a letter of introduction informing them about my intention to conduct the research in the facility. This was done after approval by the Ethical clearance Board. The objectives and significance of the study was clearly indicated in the letter from School of Public Health.

Informed Consent

Consent to participate in the study was gotten from selected health workers by signing a consent form before giving out the questionnaires to be filled. They were assured of confidentiality and anonymity since names were not demanded from them. They were also briefed on the aim of the study and assured that it was for academic and possibly occupational safety training purposes only.

Confidentiality

Participants were assured that any information given will be used purely for academic purposes and any information given will be treated with utmost confidentiality. Their names were not to be used in the report of the findings.

Risks

The information given by participants were strictly confidential. They were not forced to answer any question they were not comfortable with. They were also assured that there were no risks attached to this study and their responses will not affect their job in anyway.

Benefits

There were no direct benefits to participants. Their participation helped to gain new and better understanding regarding occupational exposure to blood and body fluids. It was also helpful for the purpose of the research and may help change policies on occupational exposures of health care workers.

Provision of contact details

Study participants were provided with the contact details of the Principal Investigator, Supervisor and the Administrator of the Ethical Review Committee of the Ghana Health Service for further clarification or information if needed.

Conflict of Interest

There was no conflict of interest regarding this study.

Funding

This study was fully funded by the principal investigator.

CHAPTER FOUR

4.0 RESULTS

4.1 Socio-demographic Characteristics of the Study Population

A total of 171 HCWs from Shai-Osudoku District Hospital were sampled and included in this study. A self-administered questionnaire was distributed to all selected participants. All wrongly filled ones were eliminated which finally resulted in a non-response rate of 9 (5.3%). Results presented here came from 162(94.7%) participants out of which, 129 (79.6%) were females while 33 (20.4%) were males.

The age range of respondents was between 24 to 59 years with a mean age of 31.7 ±5.8 years and a median age of 30 years. Majority of participants, 149 (92.0%) were Christians. More than half of the respondents, 93 (57.4%) were married. With regards to the job category, 154 (95.1%) of the respondents were professional health workers and 8 (4.9%) were auxiliary staff.

Majority, 65 (40.1%) had Diploma and 58 (35.8%) had Degree. A little over half of respondents 88 (54.3%) had work experience between one to five years and only 16 (9.9%) had above 10 years of work experience. The mean years of service was 5.6 ±4.1and the median year of service was 4.0 years.

Table 2: Socio-demographic and Other Characteristics of Respondents, Shai-Osudoku District Hospital.

Characteristics	Frequency (N=162)	Percent (%)
Sex		
Male	33	20.4
Female	129	79.6
Age		
24 – 29	64	39.5
30- 39	81	50.0
40 – 49	14	8.6
50 – 59	3	1.9
Religion		
Christianity	149	92.0
Islam and others	13	8.0
Marital Status		
Single	66	40.7
Married	93	57.4
Widowed &Divorced	3	1.9
Qualification		
Secondary School Certificate	6	3.7
Certificate	21	13.0
Diploma	65	40.1
Higher Diploma	10	6.2
Degree	58	35.8
Master	2	1.2
Current profession		
Physician/Physician assistant	15	9.3
Midwife	26	16.1
Nurse	104	64.2
Laboratory personnel	9	5.6
Health assistant	8	4.9
Total work experience		
≤5	88	54.3
6 -10	58	35.8
≥11	16	9.9
Number of patients attended to daily		
≤10	62	38.5
11-30	88	54.7
≥31	11	6.8

4.2 Perception of Occupational Risk to Infections and IPC Training

All participants had some level of perceived risk associated with their work; 28 (17.1%) had a perceived low occupational risk, 49 (29.9%) medium risk and 92 (53.0%) high risk. Majority, 127 (77.4%) of the respondents have had Infection prevention and control (IPC) training in the past twelve months. Only 37 (22.6%) reported that they have not taken any IPC training in the past year.

4.3 Use of Personal Protection Equipment

Only one (0.6%) participant reported of not using any PPE in the past 12 months. The rest of the respondents have ever used at least one type of Personal Protection Equipment in their professional daily work in the past year. Furthermore, 69 (42.1%) of them used PPEs all the time, 65(39.6%) do most the time, 18 (11.0%) sometimes and 12 (7.3%) rarely used any PPEs.

Among the study participants, gloves, and 158 (96.3%) was the most widely used personal protection equipment, followed by face masks, 92 (56.0%). Goggles were the least used 16 (9.8%). Less than half 43 (45.3%) of respondents who did not use PPE all the time stated that they were not needed most of the time, 31 (18.8%). The least reason for non-use was inadequate to protect, which was reported by 9 (9.5%) of participants.

Ten (76.9%) of those who reported wearing PPEs all the time stated using all the PPEs in their work activities. 10 (83.3%) of all who rarely used PPEs mentioned using only gloves.

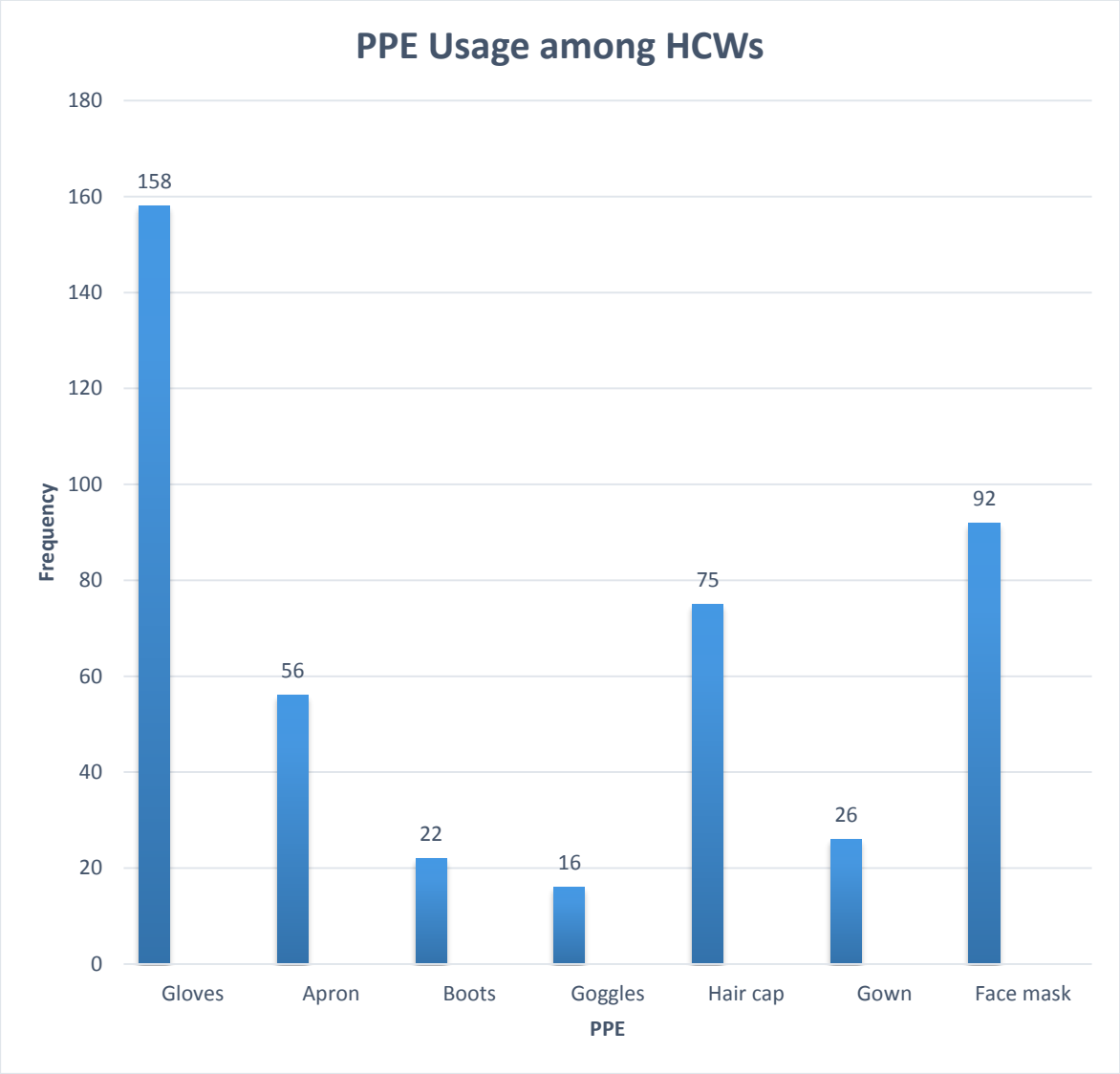

Figure 5: Personal Protection Equipment Usage among Health Workers

4.4 Type of Body Fluids Exposure

The commonest body fluid exposure to Health Care Workers in their daily professional activities was blood. Majority, 88 (64.7%) of respondents were at least once exposed to blood in their work in the past one year. The least exposure is from cerebrospinal fluid 1(0.75%). **(Figure 6).**

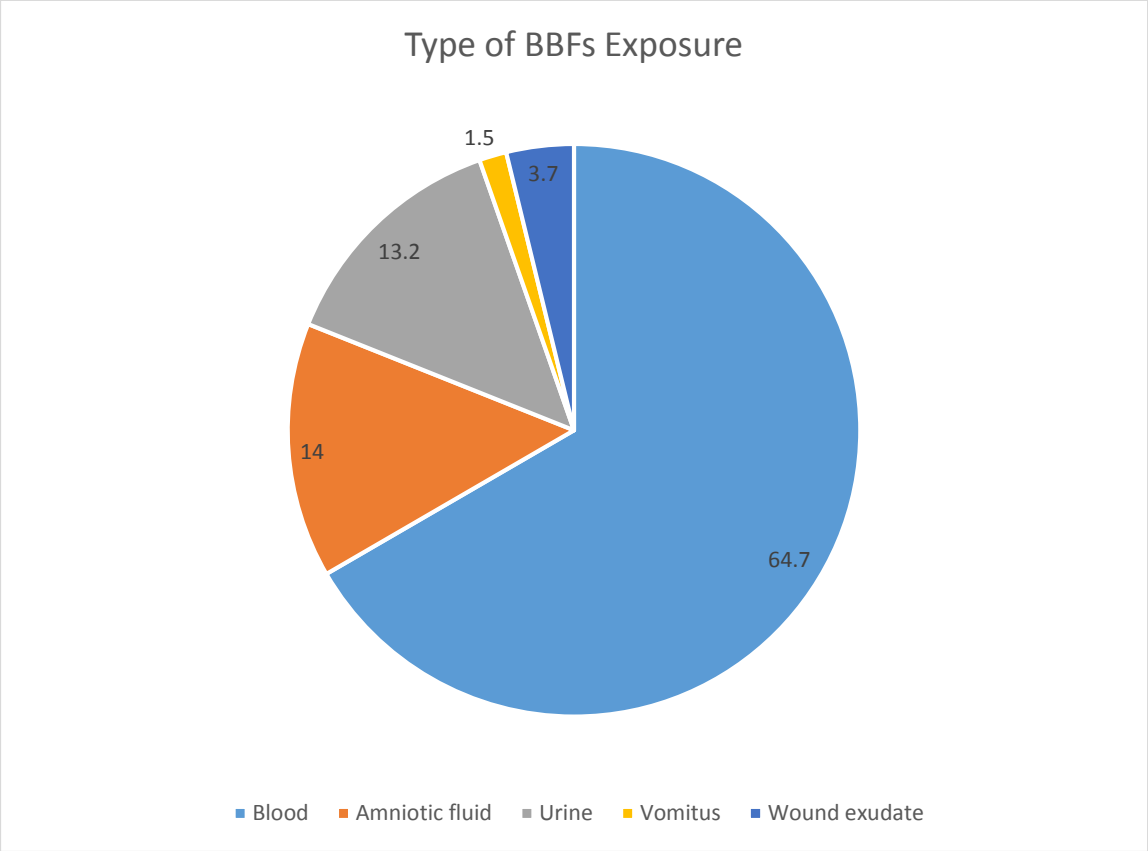

Figure 6: Types of BBFs Exposures

4.5 Sharps Injuries

A quarter 42 (25.9%) of the respondents reported experiencing sharps injuries within the past 12 months: 33 (78.1%) experienced it once, 6 (14.6%) experienced it twice, only one (2.4%) respondent had it thrice and two (4.9%) had it more than three times. Of all the events stated, sudden movement of patients 16 (38.1%) was the most common incident of exposure (**figure 7**)

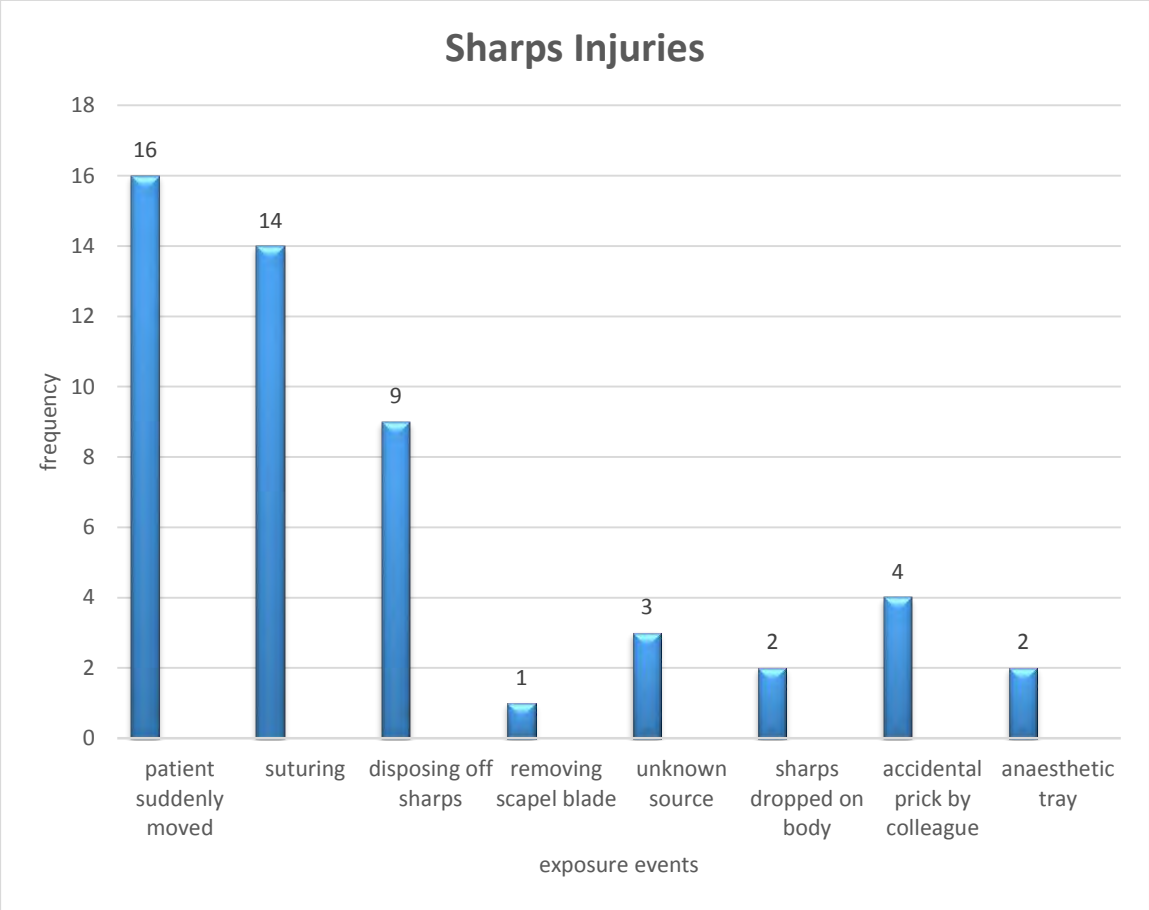

Figure 7: Sharps injuries exposure events

4.6 Measures Taken after Sharps injuries

Exposed HCWs took several measures after the incidence. Over half 22 (53.7%) of them reported their exposure experiences in the past one year. Washing of the site with soap and water was the first and most common measure taken by 16 (39%) of the exposed respondents (Table 2). Out of 42 sharps injured HCWs, 17 (41.5%) took post exposure tests, 10 (24.4%) of the patients statuses were already known, 4 (23.5%) of the HIV tests were positive. All positive results were given PEP. A total of 6(14.6%) Hepatitis B tests done and were all negative.

Table 3: Measures taken by Health Workers after Sharps Injury

(Measures taken)	Frequencies (N=42)	Percent (%)
Washed with soap and water	16	38.1
Washed with alcohol	5	11.9
Washed with soap and water, then alcohol	4	9.5
Washed with soap and water then bleach	2	4.8
Squeezed then washed with soap and water	3	7.1
Washed with normal saline	1	2.4
Washed with antiseptic	11	26.2

4.7 Blood and other Body Fluids Splashes

Most of the respondents, 98 (60.5%) had experienced blood and other body fluids splashes in the past 12 months at work. Among the exposures, more of the participants 48 (49.0%) had one splash and 22 (22.4%) had more than three splashes (**Figure 8**).

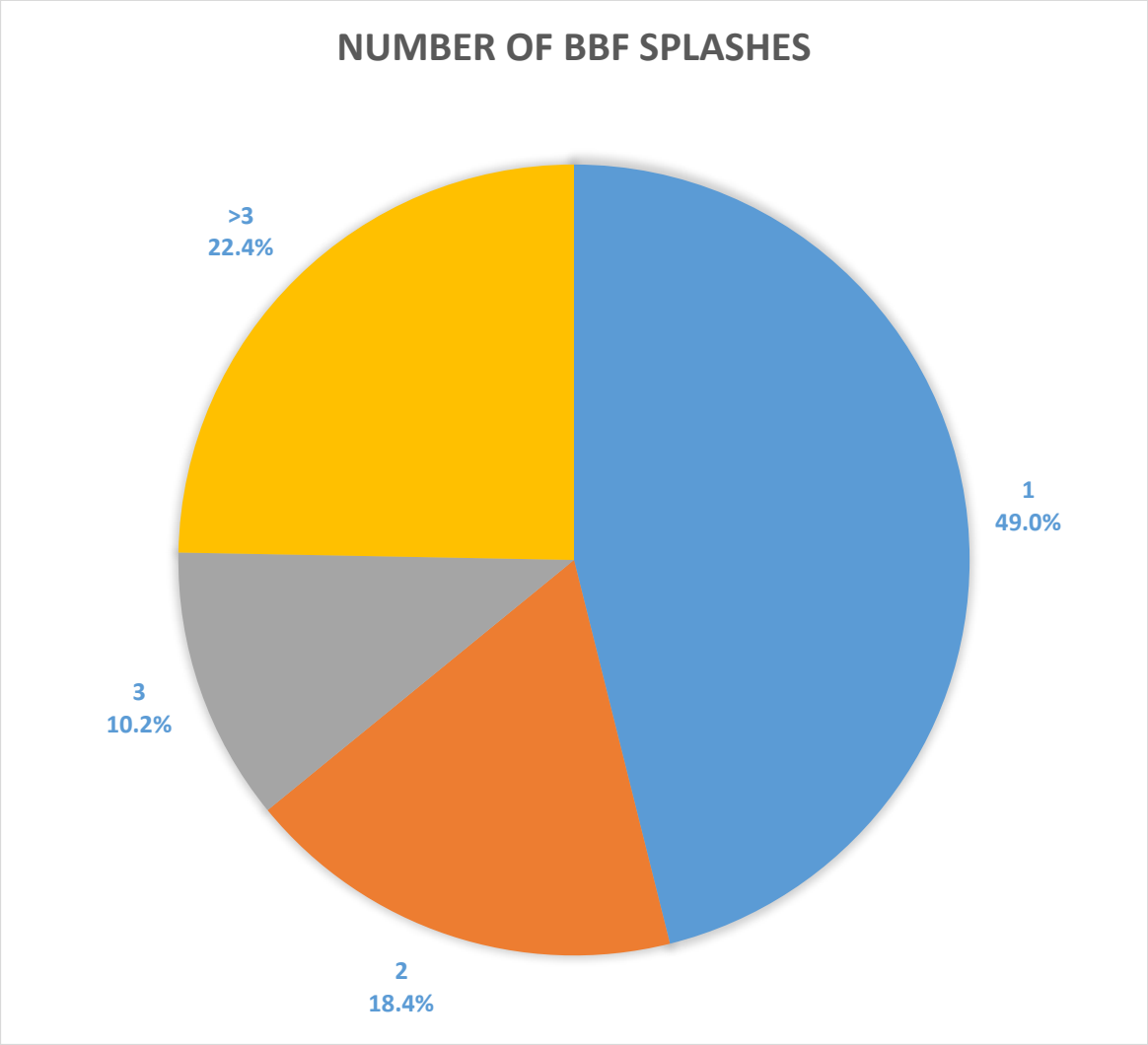

Figure 8: BBFs Splashes suffered by HCWs

4.8 Measures Taken after Blood and Body Fluids Splashes

Study participants indicated different measures taken after BBFs splashes. Most of them 75 (78.9%) washed with soap and water (**Table 4)**. None of them sought PEP because splashes were on intact skin.

Table 4: Measures Taken by Health Workers after Blood and Body Fluids Splashes

Measures Taken	Frequencies (N=	Percent (%)
Washed with soap and water	75	78.9
Washed with soap and water then alcohol	11	11.6
Normal saline	1	1.1
Bleach	2	2.1
Spirit	4	4.2
Disinfectant	2	2.1

4.9 Practices Related to Occupational Exposure

A total 125 (77.2%) of respondents have been trained on Infection Prevention and Control. Half 82 (50.6%) of the participants stated that they have had training on reporting exposures. However, 67 (70.5%) did not report their exposures, 30 (31.6%) reported to their supervisors, 6 (6.3%) reported to Physicians and 2 (2.1%) to Infection control Unit. Of all the reasons stated for not reporting, 24 (26.7%) thought the exposure was low risk for infection (**figure 9).**

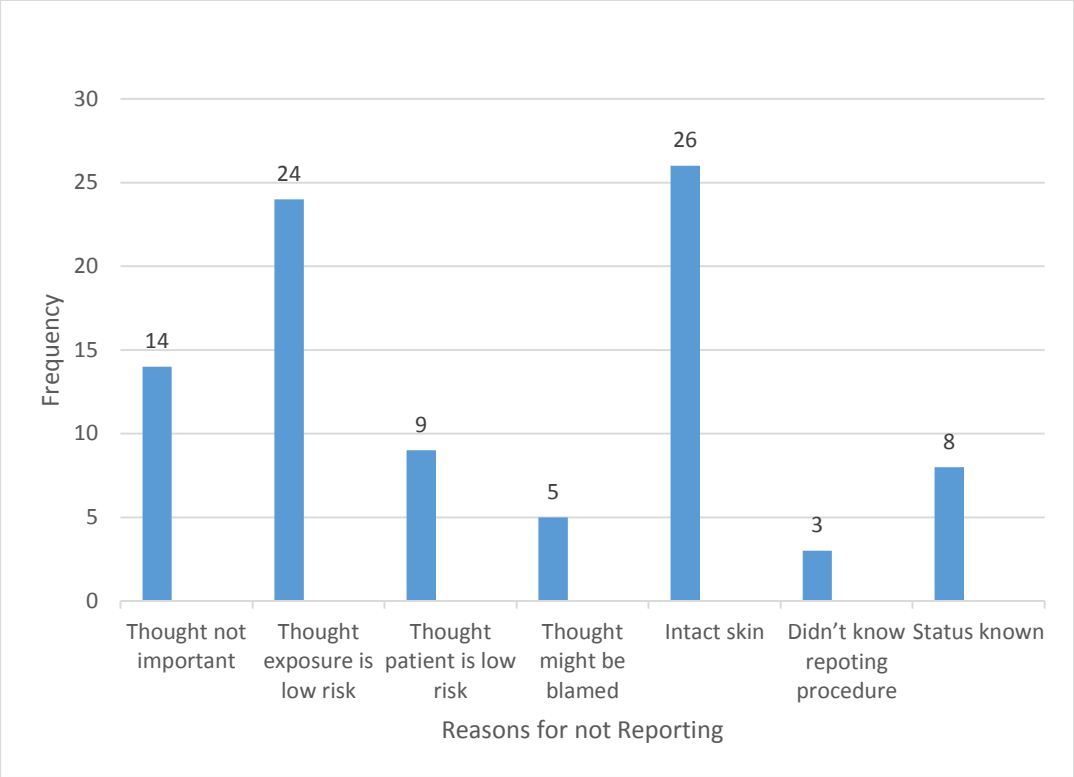

Figure 9: Reasons for not Reporting BBFs Exposures

4.10 Factors associated with Occupational Exposure to BBFs.

Findings in Table 5 below indicated that, age, sex, qualifications, marital status, job category, work experience, PPE use, PPE availability, reporting exposure training and number of patients attended to per day at bivariate level were not statistically significant to BBFs exposure. However, working at the OPD (OR=.18, 95%CI=.05-.70), risk perception (OR=4.43, 95%CI=1.74-11.32) and IPC training (OR=2.25, 95%CI=1.07-4.75) were found to be statistically significant to occupational exposure.

From the logistic Regression in Table 6, being 50 years and above increased the odds of exposure to BBFs (AOR=1.96, 95%CI=0.05-73.16) when compared to the other age groups although it was statistically not significant.

Midwives had a higher chance of getting exposed to BBFs (AOR=2.47 95%CI=0.36-16.81) compared to other staff but not statistically significant.

Medical/surgical showed higher odds of exposure (AOR=1.60, 95%CI=.45-5.68) without statistical significance. Working at the OPD reduced the chances of exposure to BBFs and was found to be statistically significant (AOR=0.13, 955CI=.29-.62). Also working at the Obstetrics and Gynaecology department reduced the risk of exposure (AOR=.29, 95%CI=.05-1.61).

Table 7 of multivariate analysis in which the effects of socio-demographic and work factors was shown on exposure to BBFs revealed that, being 50 years and above still increased the odds of exposure to BBFs (AOR=1.74, 95%CI=0.2-124.96) when compared to the other age groups but remained statistically insignificant.

Midwives had a higher risk of getting exposed to BBFs (AOR=1.70, 95%CI=0.25-11.50) compared to other staff although not significant statistically. Laboratory personnel had the most reduced odds of exposure (AOR=.10, 95%CI=.00-2.09)

Those working at the OPD was found to be significantly associated with occurrence of exposure to BBFs (AOR=.94, 95%CI=.02-.50).

Experience of more than 10 years of work was found to reduce the chances of exposure (AOR=0.46, 95%CI=0.70-2.80). HCWs attending to an average of more than 10 patients a day had a higher risk of exposure compared to those who attended to up to a maximum of 10 patients but not significant statistically.

The odds of being exposed in HCWs who reported that PPE was rarely available in their work station was 6 folds (AOR=6.12, 95%CI=0.27-140.85) compared to other workers who had

PPEs all the time. Participants who had had exposure reporting training had a statistically significant association to the chance of exposure (AOR=2.56. 95%CI=0.99-5.13).

In Table 8, where effect of socio-demographic, work and health worker factors observed on exposure, risk perception remained significant with those having high occupational risk in their work station being almost four fold more exposed than those with low risk perception.

In summary, the results of the analysis showed that the factors that were closely associated with occupational exposure to BBFs were; PPE availability (AOR=6.12, 95%CI=0.27-140.8), perception of occupational risk (AOR=4.43, 95%CI=1.74-4.75), exposure reporting training (AOR=2.56, 95%CI=0.99-5.13), being a midwife (AOR=2.47, 95%CI=0.36-16.81) and IPC training (AOR=2.25, 95%CI=1.07-4.75).

Table 5: Bivariate Analysis of Factors Influencing Exposure to BBFs Among HCWs, Shai- Osudoku District Hospital. (N=162)

Characteristics	BBFs Exposure		COR (95% CI)	P – value
Socio-demographic factors	Yes (%)	No (%)		
Age group in years				
24 -29	37 (57.81)	27 (42.19)	**1.00**	
30 – 39	51 (62.96)	30 (37.04)	**1.24 (.63-2.43)**	**0.53**
40 – 49	5 (35.71)	9 (64.29)	**.41 (.12-1.35)**	**0.14**
50 – 59	2 (66.67)	1 (33.33)	**1.46 (.13-16.93)**	**0.76**
Sex of respondents				
Male	18 (54.55)	15 (45.45)	**1.00**	
Female	77 (59.69)	52 (40.31)	**1.23 (.57-2.67)**	**.59**
Qualification				
Certificate	12 (57.14)	9 (42.86)	**1.00**	
Diploma	38 (58.46)	27 (41.54)	**1.06 (.39-2.86)**	**0.92**
Higher diploma	5 (50.00)	5 (50.00)	**.75 (.17-3.40)**	**0.71**
Degree	36 (62.07)	22 (37.93)	**1.23 (.45-3.38)**	**0.69**
Masters	1 (50.00)	1 (50.00)	**.75 (.04-13.68)**	**0.85**
SS Certificate	3 (50.00)	3 (50.00)	**.75 (.12-4.62)**	**0.76**
Marital status				
Single	34 (51.52)	32 (48.48)	**1.00**	
Married	60 (64.52)	33 (35.48)	**1.71 (.90-3.26)**	**0.10**
Divorced/widowed	1 (33.33)	2 (66.67)	**.47 (.04-5.45)**	**0.55**
Job category				
Physician/physician assist	9 (60.00)	6 (40.00)	**1.00**	
Nurse	60 (57.69)	44 (42.31)	**.91 (.30-2.74)**	**0.87**
Lab personnel	4 (44.44)	5 (55.56)	**.53 (.10-2.84)**	**0.46**
Midwife	17 (65.38)	9 (34.62)	**1.26 (.34-4.67)**	**0.73**
Health assistant	5 (62.50)	3 (37.50)	**1.11 (.19-6.49)**	**0.91**
Work station				
Accident/emergency	13 (65.00)	7 (35.00)	**1.00**	
Medical/Surgical	29 (76.32)	9 (23.68)	**1.74 (.53-5.67)**	**0.36**
Lab	4 (44.44)	5 (55.56)	**.43 (.08-2.14)**	**0.30**
Pediatric	13 (65.00)	7 (35.00)	**1 (.27-3.67)**	**1.00**
O&G	21 (56.76)	16 (43.24)	**.71 (.23-2.18)**	**0.55**
OPD	5 (25.00)	15 (75.00)	**.18 (.05-.70)**	**0.01**
Peri-operative	10 (55.560	8 (44.44)	**.67 (.18-2.49)**	**0.55**
Work experience				
6 -10yrs	50 (56.82)	38 (43.14)	**1.00**	
>= 11yrs	38 (65.52)	20 (34.48)	**1.44 (.73-2.87)**	**0.29**
Perceived Risk				
Low	8 (29.63)	19 (70.37)	**1.00**	
Moderate	31 (63.27)	18 (36.73)	**4.09 (1.49-11.23)**	**0.01**
High	56 (65.12)	30 (34.88)	**4.43 (1.74-11.32)**	**0.00**

Characteristics Socio-demographic factors	BBFs Exposure Yes (%)	 No (%)	COR (95% CI)	P – value
PPE use				
All the time	42 (60.87)	27 (39.13)	**1.00**	
Most of the time	44 (68.75)	20 (31.25)	**1.41 (.69-2.89)**	**0.34**
Sometime	9 (52.94)	8 (47.06)	**.72 (.25-2.10)**	**0.55**
Rarely	0 (0.00)	12 (100.00)	**1.00**	
PPE availability				
All the time	46 (54.12)	39 (45.88)	**1.00**	
Most of the time	43 (67.19)	21 (32.81)	**1.74 (.88-3.41)**	**0.11**
Sometimes	5 (50.00)	5 (50.00)	**.85 (.23-3.15)**	**0.81**
Rarely	1 (1.05)	1 (1.52)	**.85 (.05-14.00)**	**0.91**
Reporting exposure training				
Yes	55 (67.07)	27 (32.93)	**2.03 (1.08-3.85)**	**0.28**
No	40 (50.00)	40 (50.00)	**1.00**	
Number of patients attended to daily				
<= 10	35 (56.45)	27 (43.555)	**1.00**	
11 – 30	55 (62.50)	33 (37.50)	**1.29 (.66-2.49)**	**0.23**
>= 30	4 (36.36)	7 (63.64)	**.44 (.12-1.66)**	**0.31**
IPC Training				
Yes	79 (63.20)	46 (36.80)	**2.25 (1.07-4.75)**	**0.03**
No	16 (43.24)	21 (56.76)	**1.00**	

Table 6: Multivariate Logistic Regression Analysis of Factors Associated with Exposure to BBFs among HCWs in Shai-Osudoku District Hospital. (N=162)

Characteristics	Multivariate analysis (Model 1)		
Socio-demographic factors	**AOR**	**95% CI**	**P value**
Age group in years			
24 -29			
30 – 39	**.68**	**.26-1.77**	**.43**
40 – 49	**.31**	**.05-2.06**	**.23**
50 – 59	**1.96**	**.05-73.16**	**.72**
Sex of respondents			
Male			
Female	**1.28**	**.49-3.35**	**.62**
Qualification			
Certificate			
Diploma	**.70**	**.19-2.56**	**.60**
Higher diploma	**1.33**	**.20-9.00**	**.77**
Degree	**.90**	**.22-3.67**	**.88**
Masters	**.81**	**.02-40.42**	**.92**
SS Certificate	**1.30**	**.07-24.61**	**.86**
Marital status			
Single			
Married	**2.00**	**.84-4.74**	**.12**
Divorced/widowed	**.39**	**.20-7.40**	**.53**
Job category			
Physician/physician assistant			
Nurse	**.63**	**.13-3.16**	**.58**
Lab personnel	**.36**	**.03-4.27**	**.42**
Midwife	**2.47**	**.36-16.81**	**.36**
Health assistant	**1.44**	**.05-36.72**	**.82**
Work station			
Accident/emergency			
Medical/Surgical	**1.60**	**.45-5.68**	**.47**
Lab	**1**		
Pediatrics'	**1.08**	**.27-4.26**	**.91**
O&G	**.29**	**.05-1.61**	**.16**
OPD	**.13**	**.29-.62**	**.01**
Peri-op	**.57**	**.13-2.39**	**.44**
Work experience			
<=5			
6-10 yrs	**1.22**	**.48-3.09**	**.68**
>= 11 yrs	**.64**	**.11-3.65**	**.62**

Table 7: Multivariate Logistic Regression Analysis of Factors Influencing Exposure to BBFs Among HCWs in Shai- Osudoku District Hospital, 2018.

Characteristics	Multivariate analysis (Model 2)		
Socio-demographic+ work factors	**AOR**	**95% CI**	**P value**
Age group in years			
24 -29			
30 – 39	**.97**	**.38-2.44**	**.94**
40 – 49	**.66**	**.10-4.26**	**.66**
50 – 59	**1.74**	**.02-124.96**	**.80**
Job category			
Physician/physician assistant			
Nurse	**.46**	**.10-2.24**	**.34**
Lab personnel	**.10**	**.00-2.09**	**.14**
Midwife	**1.70**	**.25-11.50**	**.58**
Health assistant	**.99**	**.10-10.00**	**.99**
Work station			
Accident/emergency			
Medical/Surgical	**1.01**	**.25-4.02**	**.99**
Lab	**1**		
Pediatrics	**.83**	**.20-3.41**	**.80**
O&G	**.21**	**.04-1.24**	**.09**
OPD	**.94**	**.02-.50**	**.01**
Peri-operative	**.86**	**.19-3.76**	**.84**
Work experience			
<=5			
6-10 yrs	**1.02**	**.40-2.58**	**.96**
>= 11 yrs	**.46**	**.07-2.80**	**.40**
IPC training			
Yes	**1.58**	**.58-4.32**	**.37**
No			
PPE availability			
All the time			
Most of the time	**1.82**	**.83-3.97**	**.14**
Sometimes	**.84**	**.18-3.96**	**.82**
Rarely	**6.12**	**.27-140.85**	**.26**
Reporting exposure training			
Yes	**2.56**	**.99-5.13**	**.05**
No			
Number of patients attended to daily			
<= 10			
11 – 30	**1.85**	**.74-4.62**	**.19**
>= 30	**1.62**	**.17-15.64**	**.68**

Table 8: Socio-demographic+ work environment+ health worker factors

Characteristics	Multivariate analysis (Model 2)		
Socio-demographic+ work+ HCW factors	**AOR**	**CI (95%)**	**P value**
Age group in years			
24 -29			
30 – 39			
40 – 49			
50 – 59			
Job category			
Physician/physician assistant			
Nurse			
Lab personnel			
Midwife			
Health assistant			
Work station			
Accident/emergency			
Medical/Surgical			
Laboratory			
Pediatrics'			
O&G			
OPD			
Peri-operative			
Work experience			
<=5	**1**		
6-10 yrs	**1.26**	**.59-2.70**	**.55**
>= 11 yrs	**.45**	**.13-1.57**	**.21**
Perceived Risk			
Low	**1**		
Moderate	**3.54**	**1.18-10.60**	**.02**
High	**3.92**	**1.33-11.61**	**0.01**
PPE use			
All the time			
Most of the time			
Sometime			
Rarely			
PPE availability			
All the time			
Most of the time	**1.60**	**.75-3.40**	**.22**
Sometimes	**.92**	**.21-4.12**	**.91**
Rarely	**4.09**	**.19-86.23**	**.37**
Reporting exposure training			
Yes	**1.63**	**.76-3.49**	**.21**
No			

Socio-demographic+ work+ HCW factors	AOR	95%CI	P value
Number of patients attended to daily			
<= 10			
11 – 30	**1.37**	**.64-2.94**	**.41**
>= 31	**.64**	**.84-4.86**	**.67**
IPC training			
Yes	**1.92**	**.75-4.91**	**.17**
No	**1**		

CHAPTER FIVE

DISCUSSION

Occupational hazard is a risk to the wellbeing of a worker in a particular profession. Occupational exposure to BBFs is a day to day risk faced by HCWs and the most common pathogens of concern are HBV, HCV and HIV the most commonly transmitted. The purpose of this study was to determine the factors that expose HCPs to BBFS at Shai-Osudoku District Hospital. It was also to determine the prevalence occupational exposure to BBFs and to investigate behaviours of HCWs after exposure.

Factors influencing exposure to BBFs were assessed with the aid of the conceptual framework illustrated in Figure 1. Associations were examined between the exposure and the dependent variables using the Chi square test. Logistic Regression was used to assess the effect of socio-demographic factors, work factors and HCW factors on exposure. Variables that had p- values <0.05 and those found in literature to be significantly associated were kept in subsequent levels of analysis. In the level 1 of the regression model, the effect of effect of the socio-demographic factors on the exposure were assessed. In level 2, work factors were included in the analysis and their effect assessed in the presence of the socio-demographic factors. Finally, HCW factors were included in the analysis to see their effect in the presence of socio-demographic factors and work factors. Variables with p- value < 0.05 in the final level were considered as having significant association with exposure to BBFs.

5.1 Discussions

In this study, ages of HCWs ranged from 24 to 59 years with majority (98.1%) falling between the productive ages of up to 49 years. The mean age was 31.7 years (SD-5.8). This was also seen in the study conducted in Kaduna, Nigeria by Nmadu et al (2016), which stated that majority (91.3%) of respondents fell within this same age range.

Majority, (79.6%) of the respondents were females with a mean age of 31.7 years (SD-5.5). Hakim, Aboulezz, & El Okda, (2016) also reported of majority of the participants (62.8%) being females. The mean age was 36.9 years (SD-9.4).

54.5% of the males in this study compared to 59.7% were exposed to BBFs. As otherwise found out in this study conducted in Tehran, 2/3 of the male gender compared to half of female subjects have had at least one episode of occupational exposure (Farsi et al, 2012). This was contrary to a study by Tesfay & Habtewold, (2014), who reported in their study in Debre Berhan in Ethiopia that females were less likely to be exposed than males.

95.1% of the respondents were professional health workers and 4.9% auxiliary staff in this study. Mbah, (2014) also reported of all the respondents being professional health workers as in another study in a Brazilian primary health care facility by Garcia & Facchini, (2018) stated that, 96% 0f the participants were professionals while 6% were auxiliary staff.

Majority of the participants 40.1% had Diploma and 1.2% had masters. A research conducted by Lyngdoh, K, & Akoijam, (2018) indicated that 51.5% also had Diploma and 11.3% had Masters. This was also seen in a study conducted by Cho et al (2012), where majority 51.9% had Diploma and 3.9% had a Masters' degree.

All study participants had perception of risk in their occupation. Only 17.1% a low risk perception of work activities in their work stations. Hakim et al (2016) also identified 10.8% of participants perceived low risk in daily professional activities. Similar to these findings was that of Lahuerta et al., (2016) in Tanzania where only 11% of HCWs perceived low occupational risk. In contrast, findings from research conducted in Addis Ababa, Ethiopia indicated that over half (54%) of respondents had a low perception of activities in the work station.

Only one (0.6%) participant reported of not using any PPE in the past 12 months. The rest of the respondents have ever used at least one type of Personal Protection Equipment in their professional daily work in the past year. Furthermore, 69(42.1%) of them used PPEs all the time, 65(39.6%) do most the time, 18 (11.0%) sometimes and 12(7.3%) rarely used any PPEs.

Contrary to this, Shokuhi, Gachkar, Yuhanaee, & Sajadi (2012), reported in their studies that there were unusually low use of barrier precautions during contact with patients thereby exposing a high percentage of HCWs to BBFs.

A study conducted in Georgia also showed that only 32% of the study participants reported always using gloves when needed, 27% never used facemask, 76% never used eye shield (Butsashvili et al., 2012).Likewise a cross- sectional study conducted among medical students taking a newly implemented infection control course revealed that 49.6% of 785 participants expressed a lot of concern about contracting HIV whiles caring for patients. 40% thought Physicians sometimes refused to treat HIV patients because to fear of contracting HIV. Despite this concern of contracting infection, only half (51.5%) of them reported wearing gloves and even fewer of them reported wearing eye protection (Nugmanova et al., 2014).

Under-reporting of exposures was noticed in a lot of researches reviewed which can interfere with the chance to receive PEP if indicated. Only 29.5% of all those who were exposed to blood splashes and NSI reported the exposures in this study. Similarly, Nago et.al (2009) revealed in a study conducted in Japan that, only 22% of those exposed HCWs reported the incidence. Mehrdad & Sharifian, (2014) also stated that more than half (52%) of participants who had exposure during their work activities did not report them. The main reason for under-reporting were personal perception of lack of time and estimation that transmission type is low risk (Voide et al., 2012). Dissatisfaction with administrative response to report was the main reason seen in a study by Azadi, Anoosheh & Delpisheh, (2011).

Again only 50% of the exposed individuals reported the occurrence of exposure to concerned hospital authorities. Less than a quarter of the exposed persons underwent post-exposure prophylaxis (PEP) against HIV although the same was indicated in about 50% of the affected HCWs based on the HIV status of the source patient (Singru & Banerjee, 2008).

Yet again another study conducted in Tanzania on Reporting and Case Management of Occupational Exposure to Blood-Borne Pathogens similarly noted that, of the 357 of HCWs who had an exposure only 120 (34%) reported it (Lahuerta et al., 2016)

Another study on Occupational Exposure to Blood-borne pathogens in Botswana, among 426 HCWs likewise showed that, of those who were exposed only 160 (37%) reported the exposure. Of these 111 (69%) received PEP (Kassa et al, 2016).

Reasons for non-use of PPE in this study were stated as not needed, difficulty using them, non-availability, don't feel like using them and inadequate to protect. Luo et al (2010) identified the main reason for non-use as difficulty in accessing PPE. Commonly stated reason

in another study by Ganczak & Szych (2007) was non-availability of PPE. Cdt, Sangwan, Kotwal, & Verma, (2010) mentioned busy work schedule, non-use by colleagues, patients getting offended and discomfort. Hakim, Aboulezz & El Okda, (2016) gathered from their study that availability and no time to use PPE were reasons why staff were not adhering to PPE use.

In a focus group study conducted by Efstathiou et al.,(2011), on compliance to standard precautions among Nurses, participants stated the following-

- Emergency situation as a major hindrance in following precautions.
- A lot of responsibilities due to lack of HCWs in the job makes them avoid the use of SPs since it is time consuming (e.g. putting on a gown).
- The use of PPE makes them feel uncomfortable (mask), reduces their skills (gloves) and impedes their work and therefore affects compliance with SP.
- Not liking some PPEs, example irritations by gloves.
- PPEs damage their hairstyle and make-up so they would prefer not to use them (hair cap and mask).
- Patients may feel bad, experience distress and anxiety over their health status (gloves, `mask).
- When they gain enough experience, they are confident of their capabilities therefore may not follow certain guidelines.
- Feel embarrassed to following guideline especially if they are not used routinely in Department they work in and especially if this is displayed by more experienced colleagues.

Farsi et al (2012), stated in their study that the most common reason for non-compliance to safety measures were rush in the work (40%), unavailability of PPE and safe device (29.5%) and neglecting to consider SPs (16.5%).

In a study investigating factors that influence compliance with SP among nurses, Efstathiou, Papastavrou, Raftopoulos, & Merkouris (2011), found out that lack of protective equipment forces them not to use PPE even if they must use them in that particular situation and also storage of PPE in places far from where care is being provided does not help.

In this study over half 60.5% of respondents experienced BBFs splashes in the past year. Contrary to this, Sreedharan et al., (2010) identified 25.75% of their study participants had BBF splashes. Kaweti & Abegaz, (2017)also reported of 28.4% of BBFs splashes within one year prior to their study period.

A quarter of the participants (25.9%) experienced sharps injuries and only half of them reported their injuries. In Voide et al., (2012) study, only 9.7% had needle stick and sharps injuries and in contrast 73.1% reported all the injuries sustained. They reported lack of time as the most common reason for non-reporting. Askarian, Shaghaghian, & Assadian, (2008) reported a prevalence of 49.6% of NSI among HCWs in Fars Province also with just a quarter reporting their exposures.

A study conducted by Ogoina, Pondei & Gidado (2014) also found out among the participants that exposures to BBFs were very common with one or more types of exposure in 85% of respondents which may be due to low practice of standard precautions.

A high proportion (88.6%) of HCWs who participated in the study in Debre Berhan in Ethiopia similarly had experienced between 2-4 risks of occupational exposure in the last one

year (Tesfay & Habtewold, 2014). Another study conducted by Farsi et al (2012), on prevalence and factors of occupational exposure to BBFs among a study population of 200 health care workers in Tehran using a descriptive cross-sectional method revealed that 57.5% of HCWs have had a least a one episode of BBFs exposure.

Activities resulting in sharps injuries were sudden movement of patient during insertion of needle, suturing and disposing of sharps. Also found in Matsubara, Sakisaka, Sychareun, Phensavanh, & Ali, (2017)study was percutaneous injections, suturing and recapping of needles being activities which caused sharps injuries.

Tadesse, Meskele & Boltena, (2016) also noted that sudden movement of patient during taking of blood samples, recapping and during waste collection were activities that resulted in sharps injuries. 31% needle stick injury, 28.9% of glove breakage, 56.6% skin contact with potentially infectious body fluids was also discovered by Tesfay & Habtewold (2014), as modes of exposure in a study conducted in some hospitals in Ethiopia.

Farsi et al (2012), also came to a conclusion in their study that hollow bore needles accounts for the single cause of the highest amount of injuries being 41.5% and not using gloves also related markedly to occupational exposures.

Measures taken after sharps injuries by majority was to wash the site with soap and water only. A few reported of squeezing the site and then washed with soap and water. In contrast, Sreedharan, Muttappallymyalil, & Venkatramana (2010) reported that 93.1% stated that needle pricks, cuts and scratches should be bled by squeezing. According to Sharma, Rasania & Singh, (2010), majority washed with soap and water while some did not do anything about

the site. Aslam & Ali, (2010) also reported that, majority squeezed blood out of the site while a small proportion washed with disinfectant.

Out of 25.9% sharps injured HCWs, less than half of the source patient took post exposure tests, almost a quarter of the patients statuses were already known, almost a quarter of the HIV tests were positive. All positive results were given PEP. A few Hepatitis B tests done were all negative. (Askarian et al., 2008)stated that of all those who sustained sharps injuries only 3.2% of source patients were tested for HBV surface antigens, 2.2% for HCV antibodies and 2% for HIV antibodies. Of all those tested 46.7% were positive either for HB, HCV or HIV with 2 testing positive for all. Similarly, only 7.8% of HCWs exposed took PEP against HIV after injury in Delhi India (Sharmang, 2012). Of the cases whose source identity were known, 14 had HBAg positive, 11 HCV antibody being positive, 15 had both HBAg and HCV Antibody being positive and 1 HIV antibody positive source patient. All were given PEP as indicated (El-hazmi & Al-majid, 2008).

Among HCWs in three Emergency rooms in Tehran a study also found that majority, 72% of participants washed site of exposure with water and povidine-iodine or alcohol, 29.5% were referred to Infection control Centre, 23.5% took blood sample to the laboratory, 13% did not do anything after exposure and only 59 out of 200 HCWs reported their exposure (Farsi et al, 2012).

Nmadu, Sabitu, & Joshua (2016), shockingly found out in their study conducted in Kaduna State, Nigeria that 40.3% of respondents cleaned the site of exposure with bleach, 20.9% cleaned with methylated spirit and only 4% performed the right measure of immediately washing with soap and water.

Engin, İnan, Ceran, Demir, Dağli1& Karagül (2014), conducted a study in Istanbul, Turkey that, 69.7% of their subjects washed exposure site with soap and water, 23.4% of them did nothing to the site and 6.8% washed with soap and water in addition to antiseptic solution.

Being 50 years and above increased the risk to exposure compared to younger ages. According to Sabbah, Sabbah, Sabbah, Akoum, & Droubi, (2013), accidental exposure to BBFs were similarly more frequent in older HCWs. In contrast, younger aged HCWs had more frequent occupational exposures in a Turkish hospital (Hosoglu et al., 2008.)

OPD and O&G were protective factors for exposure occurrence. In contrast, O&G department reported high risk of exposure among HCWs in provincial hospital, Kenya. (Mbaisi,&, Ng'ang'a & Wanzala, 2013). According to Kaweti & Abegaz, (2017), the risk of exposure doubled among HCWs who worked in delivery rooms and operation theaters. Tesfay & Habtewold, (2014), found out that HCWs working in the OPD rather had higher risk of exposure (23%), followed by Delivery room (20.3%), and Emergency room (16%).

Chances of exposure were reduced among staff who had work experience of ten years and above. Supported by this is a study conducted in South India which stated that as experience increases, incidence of exposure decreases (Tetali & Choudhury, 2016). In line with this, lower number of years of work experience was found to be a significant risk factor for occupational exposure in a study in Uganda (Kumakech, Achora, Berggren & Bajunirwe, 2011). In contrast it was found out that years of experience did not relate to occupational exposure. (Farsi et al, 2012)

Attending to more than ten patients per shift increased the risk to exposure. A similar study reported that, higher work load was significant to exposure and higher incidence of exposure were found in HCWs who reported of higher work load (Garcia & Facchini, 2018). In contrast, Parmeggiani, Abbate, Marinelli, & Angelillo (2010), reported that attending to a fewer number of patients per work day does not necessarily reduce risk to exposure.

The odds of being exposed in HCWs who reported that PPEs were rarely available in their work station were six times higher than those who had PPE all the time. Yenesew & Fekadu, (2014)gathered in their study that shortness of PPE had a significant association with occupational exposure to BBFs among health workers.

Understanding training is critical to ensure one's safety and others under one's care. Exposure reporting training was not a protective factor against occupational exposure but rather increased the chances of exposure. In contrast, a study conducted in Turkey to examine the effect of training on exposure and reporting indicated that, there was a statistically significant difference between the post-training and the pre-training periods in terms of exposure (Ersin, 2016).

There was a discrepancy between knowledge and practice. IPC training was not a protective factor to exposure and rather increased the chances of exposure. Though a lot of the participants were trained in IPC, more of them were exposed to BBFs. A study conducted in Ethiopia also found out that taking training was not a protective factor from occupational exposure which poses a serious challenge to infection control effort (Reda, Fisseha, Mengistie, & Vandeweerd, 2010). Nearly all study participants were informed about Universal Precautions and guidelines about IPC although 88.6% have had 2-4 exposures in the last year (Tesfay & Habtewold, 2014).

In contrast, Mbaisi, Ng'ang'a, Wanzala & Omolo, (2013), stated that previous training in IPC was a protective factor against exposure. Smith et al (2009), in a study conducted in Japan also reported that being properly trained in risk control procedures reduce risk to exposure. Ogoina, Pondei & Gidado (2014) discovered in two tertiary hospitals in Nigeria that there were high rates of exposures among newly qualified doctors and nurses who have poorer knowledge of IPC than their older counterparts. Ogoina, Pondei & Gidado (2014) again found out in their study that 48.8% of the participants had had training in infection control despite high prevalence of exposures (85%).

5.2 Limitations

The results of this study might have been affected by social desirability bias especially relating to exposure to BBFs, IPC training, PPE use and exposure reporting training which might have affected the result of the study.

Additional information from earlier points in time before the 12 months period asked in the study might have been of help to identify other factors leading to occupational exposure to BBFs.

It also depended on participants' recollection of events. The trustworthiness and accuracy of which could not be verified. It might therefore be prone to recall bias. Nevertheless this will provide insight into occupational exposure among the health workers in the hospital and a basis for further studies.

5.3 Contribution to Knowledge

This study revealed that Infection Prevention and Control training did not necessarily prevent or reduce occupational exposures as otherwise found out in many other researches as majority of the participants were trained and yet most of them were exposed more than once.

Exposure reporting training did not have much influence on health care workers reporting of exposure when they occurred for appropriate management.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter is a summary of the conclusions and recommendations from the study which examined the factors leading to occupational exposure among health workers in Shai-Osudoku District Hospital.

6.1 Conclusions

The followings conclusions were made from the findings of this study

Occupational exposures were common among HCWs with a prevalent rate of 67.5% in the past 12 months although majority had had IPC training. Majority of HCWs had BBFs splashes within the past year. A quarter had sharps injuries. Common event of exposure to BBFs was sudden movement of patients.

Half have had exposure report training within the past year only a little over half of the exposed reported at least one of their exposures. More of the sharps injuries were reported compared to the BBFs splashes. One of the commonest reason for non-reporting was that respondents thought exposure was low risk for HBV, HBC and HIV infections.

The study identified the highest prevalence of BBFs exposure among midwives. Other vital associations that were observed were attending to more number of patients per day, availability of PPEs and high risk perception in the work station. It was also noted that IPC training and exposure report training did not have much bearing on exposure and reporting. Only a small proportion of those exposed sought PEP.

The report of high prevalence of occupational exposure in the study revealed a gap between knowledge on IPC and practice. Furthermore, underreporting also showed importance of increasing training as part of preventive strategies to improve reporting of exposures.

6.2 Recommendations

Existing training programmes on PPE use must be improved by the IPC Board of the MOH to increase awareness of the dangers of not using them and perception of risk. This can lead to change in attitude and practices that lead to exposure.

Management of the Hospital must ensure that they address the reasons for non-use of PPEs, non-compliance to IPC practices and underreporting of exposures through regular In-service trainings to foster compliance to standards. Protocols on them must also be boldly written and posted at vantage points as reminders.

GHS in collaboration with Ghana Medical Stores must provide the improved version and quality PPEs that are comfortable to use and offer the needed protection to encourage compliance. Staff must be asked what they really need at the various work stations and ensure that they are made readily available at all times.

Ghana Health Service must inculcate IPC practices into evaluation protocol of staff for promotion to encourage compliance.

Supervision by Hospital Management must be increased together with the use of sanctions and rewards to encourage IPC practices.

Health Care staff must explain procedure to patients and get them set for it before starting to ensure that they are not startled to prevent sudden movements.

Reduction of workload by right distribution of staff by Hospital Management in the various work stations to prevent exposures.

Health Care staff must be educated on PEP and the possible risk of sero-conversion by IPC team of the Hospital when exposed to BBFs.

Further studies must be conducted by the Hospital Research team to explore why IPC training and exposure reporting are high yet exposures and under-reporting are also very common among the HCWs.

A study by the Hospital IPC team into how HCWs make risk assessment at time of exposure will be helpful in developing training protocols.

Another study the Hospital IPC team into PPE use at the time of exposure would be very helpful as to solicit information on their protectiveness.

Interventional studies to determine the effectiveness of training programs (IPC and exposure reporting) on occupational exposure and reporting among HCWs must be done by the Hospital Research team.

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APPENDICES

Appendix 1: Consent Form

Title of study: Occupational exposure to blood and body fluids among Health Workers: The case of Shai-Osudoku District Hospital

Name and address of Principal Investigator

Victoria Apetorgbor, Department of Social and Behavioural Science, University of Ghana, Accra, Legon.

Mobile: 0244606289

Email Address: victoriaapetorgbor82@gmail.com

Institution affiliated

School of Public Health, University of Ghana, Legon, Accra.

Introduction

I am a Masters student from the school of Public Health, University of Ghana, Legon. As a requirement, we carry out Research work to gain new and better understanding about the topic being studied. My study is on occupational exposure to blood and body fluids among health care workers. Healthcare facilities are potentially hazardous workplaces that expose workers to a wide range of hazards. Health workers are confronted with physical, chemical, ergonomic and psychological hazards daily. Generally, it is assumed among healthcare workers that the greatest occupational health and safety risk faced by them is infection resulting from exposure to blood and body fluids as well as infected air-borne aerosols. The findings of this study is

hoped to be able to inform the design and implementation of interventions programs and In-service training on safety to minimize or prevent occupational hazards.

Please kindly spend some few minutes to fill the questionnaire. All information collected will be treated as confidential and no information can be traced back to you.

Study procedure

The study is targeted at health care workers who are at risk of exposure to blood and body fluids. Selection of participants is by random sampling. Participants will be made to complete questionnaires and return them to the principal investigator or assistants.

Risks

The information we are asking you to share will be strictly confidential. You do not have to answer any question you are not comfortable with. However, there are no risks attached to this study. Your responses will not affect your job in anyway.

Benefits

There will be no direct benefits to you. Your participation will help us gain new and better understanding regarding occupational exposure to blood and body fluids. Your participation will be helpful for the purpose of the research and may help change policies on occupational exposures of health care workers to blood and body fluids.

Right to refuse

Your consent to participate in this study is voluntary, you are not under any obligation to participate, and you are at liberty to withdraw from this study at any point in time. However, I would appreciate it if you can complete the questionnaire.

Anonymity and confidentiality

Be assured that any information given will be used purely for academic purposes. Any information given will be treated with utmost confidentiality. Your name will not be used in any report, but your ideas and suggestions will be help us to design programmes or policies that will improve occupational health of health care workers.

Your right as a Participant

This research has been reviewed and approved by the Ethical Review Committee of the Ghana Health Service. If you have any questions about your rights as a research participant you can contact the Ethical Review Coordinator on 0507041223 (Ms Hannah Frimpong)

Do you have any questions to ask about the study? Yes [ ] No [ ]

(If yes, note questions below)

……

……

……

……

……

Declaration of conflict of interest

I, Victoria Apetorgbor (Principal Investigator), declare that, to the best of my knowledge, there is no actual, perceived or potential conflict of interest that will or may arise as a result of my involvement with this study.

Voluntary agreement form for health care workers

I have read and understood the above document describing the benefits, risks and procedures for the research topic "occupational exposure to blood and body fluids among health care workers". I have been given an opportunity to ask any question about the research. I agree to participate in the study.

Name……

Date……/……/……Signature……

Who to contact

In cases of any questions regarding the research, you can contact:

- GHS/Ethical Review Committee administrator, Ms Hannah Frimpong (0507041223)
- School of Public health, University of Ghana, Legon.

Or

- Dr. Collins Ahorlu

Mobile number: 0208195705

E-mail: cahorlu@noguchi.ug.edu.gh

Appendix 2: Questionnaire on Occupational Exposure To Blood And Body Fluids Among Healthcare Workers

SECTION I: SOCIODEMOGRAPHIC DETAILS

If you have questions or problems completing this, please ask for help.

1. Age _____

2. Sex [ ] Male [ ] Female

3. Religion [ ] Christianity [ ] Islam Other specify _____

4. Educational level [ ] Certificate [ ] Diploma [ ] Higher Diploma

[ ] Degree [ ] Masters Other, specify _____

5.Marital status

[ ] Single [ ] Married [ ] Divorced [ ] Widowed

6. Job category

[ ] Doctor [ ] Nurse [ ] Laboratory personnel [ ] Midwife [ ] Health assistant

7. What department are you currently working in? _____

8. What best describes your work? (Tick one)

[ ] Theater staff [ ] Laboratory staff [ ] Medical staff [ ] Obs & Gynae

[ ] Surgical staff Other, specify _____

9. How long have you been working in this profession? _____

SECTION II: EXPOSURES CIRCUMSTANCES

The following questions are about exposure circumstances from sharp objects such as needles or blood or body fluids contact with the eyes, mouth, or skin.

10. How many patients do you averagely attend to in a day? _____

11. Have you had any Infection Prevention and Control (IPC) training in the past 12 months?

[ ] No [ ] Yes

12. How do you perceive your occupational risk to body fluids and blood- borne pathogens in your work area? [ ] No risk [ ] Low risk [ ] Moderate risk [ ] High risk

13. Do you use the appropriate Personal Protection Equipment in your daily work?

[ ] All the time [ ] Most of the time [ ] Sometimes [ ] Rarely

14. If no, why? (Tick all that apply to you)

[ ] Non-availability [ ] Difficulty using them [ ] Inadequacy to protect [ ] Mess up hair/make-up

(Specify other reasons if any) _____

15. Which of these do you usually use? (Tick all that apply)

[ ] Goggles [ ] Facemask [ ] Gown [ ] Boots [ ] Apron [ ] Gloves [ ] Hair cap [ ] None

16. Are Personal Protection Equipment (PPE) readily available in your unit?

[ ] All the time [ ] Most of the time [ ] Sometimes [ ] Rarely

17. In the past 12 months did blood/ body fluids come into direct contact with your eye, mouth or skin? [ ] Yes [ ] No

18. Which of the following were you exposed to? (Tick all that apply to your exposures)

[ ] Urine [ ] Sputum [ ] Amniotic fluids [ ] Blood [ ] Cerebrospinal fluids

[ ] Exudates from wounds [ ] None Other, specify _____

19. In the past 12 months, have you been injured by a sharp such as a needle or a scalpel that was previously used on a patient?

[ ] No [ ] Yes

20. Activity / Event when exposure occurred. (Tick all that apply to your exposures)

[ ] Patient suddenly moved during procedure [ ] Bleeding vessel

[ ] Airway manipulation (e.g. suctioning airway) [ ] Vaginal delivery

[ ] Tube manipulation (e.g. NG, urine catheter) [ ] Manipulating specimen container

[ ] IV or arterial line manipulation [ ] Wound care

[ ] Surgical procedure (including c-section etc) [ ] Cleaning contaminated equipment

[ ] Unknown source

Others, indicate _____

21. When and how did the injury occur? **(Select the point during or after use that most closely represents when the injuries occurred. Select one or more circumstances that reflect how the injuries happened under each time.)**

A. During use of the item [ ]

[ ] Patient moved and jarred device [ ] Manipulating suture needle in holder

[ ] While inserting needle [ ] Receiving equipment

[ ] Suturing [ ] Collided with co-worker or other during procedure

[ ] Accidental prick/cut by colleague [ ] Sharp object dropped on body during procedure

B. After use, before disposal of item [ ]

[ ] Handling equipment on a tray or stand [ ] Collided with co-worker/other person

[ ] Decontaminating used equipment. [ ] Processing specimen

[ ] Transferring specimen into specimen container [ ] Recapping

[ ] Sharp object dropped on body after procedure [ ] Passing equipment

C. During or after disposal of item [ ]

[ ] Placing sharp in container [ ] Sharp in unusual location

[ ] Sharp protruding from open container [ ] Collided with co-worker or other person

[ ] Sharp object dropped [ ] Injured by sharp being disposed by another

Other (Specify) _____

SECTION III: REPORTING OCCUPATIONAL EXPOSURES

22. Have you been trained on how to report exposures to blood and body fluids?

[ ] No [ ] Yes

23. How many contaminated sharps injuries did you sustain in the past 12 months?

[ ] 1 [ ] 2 [ ] 3 [ ] More than 3

24. For how many of these exposures did you report? _____

25. How many blood / body fluids exposures came into direct contact with eyes, mouth or skin in the past 12 months?

[ ] 1 [ ] 2 [ ] 3 [ ] More than 3

26. For how many of these exposures did you report? _____

27. If you had an exposure that you did not report, please indicate the reasons for not reporting (Tick all that apply)

[ ] I did not have time to report [ ] I did not know the reporting procedure

[ ] I was concerned about confidentiality [ ] I did not think it was important to report

[ ] I thought I might be blamed or get in trouble for having the exposure

[ ] I thought the source patient was low risk for HIV and / or hepatitis B or C

[ ] I thought the type of exposure was low risk for HIV and / or hepatitis B or C

Other (please specify) _____

28. Who did you contact first when you were injured by a needle or sharp object, or when you were exposure to blood or body fluid?

[ ] Supervisor [ ] Emergency room [ ] Physician [ ] Infection Control

[ ] Did not contact anyone Other (please specify) _____

SECTION IV: POST EXPOSURE EXPERIENCES

29. How was the exposed site(s) treated after each exposure?

Sharps injury _____

Blood and body fluid splashes _____

30. Was there any test(s) done? [ ] No [ ] Yes

Specify particular test(s) if yes _____

If no, indicate why _____

31. Was there any treatment given? [ ] Yes [ ] No

If yes, indicate type of treatment _____

If no, indicate why _____

Appendix 3: Debrief Sheet

Researcher: Victoria Apetorgbor

Research Title: Occupational Exposure to Blood and Body Fluids Among Health Workers: The Case of Shai- Osudoku District Hospital.

Thank you for having taken part in the study

Aim of the study: This study was conducted in partial fulfillment for the award of a masters degree in Public Health. The main focus of the study is to explore the factors that expose health workers to blood and body fluids (BBFs). Other general objectives to be considered are to determine the proportion of health workers who are exposed to BBFs and their behaviours after exposure.

Anonymity and confidentiality

Be assured that any information you have given will be used purely for academic purposes. Any information given will be treated with utmost confidentiality. Your name will not be used in any report, but your ideas and suggestions may help to design programmes or policies that will improve occupational health of health care workers.

Thank you for your participation in this research. Should you require any background information to the study please contact the Ethical Review Coordinator on 0507041223

(Ms Hannah Frimpong).