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SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA, LEGON

ASSESSMENT OF BLOOD BORNE INFECTIONS PREVENTION AMONG HEALTH WORKERS AT KWESIMINTSIM HOSPITAL IN TAKORADI.

BY

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DECLARATION

I, MAGDALENE ESENAM BOAMAH, declare that with the exception of references to the literature and works of other researchers which have been duly cited and acknowledged, this work is my original work and has not been submitted in part or whole for any degree ever.

..... **.....**

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(STUDENT)

..... **.....**

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(SUPERVISOR)

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DEDICATION

This work is dedicated to the Almighty God, who has brought me this far by His infinite mercies.

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ACKNOWLEDGEMENT

I express my profound gratitude to the Almighty God for His mercies, protection and direction from the beginning through to the successful end of this study.

To my supervisor, Dr. Mawuli Dzodzomenyo for his unwavering support, guidance and assistance throughout the study, my sincere gratitude.

Again to my husband and family, God bless you for your encouragement, support and prayers throughout this program.

I wish to also express my appreciation to the administrator and staff of the Kwesimitsim Hospital for allowing me to use their facility for the study.

Finally, my appreciation goes to all who assisted me in diverse ways. I say God bless you all.

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ABSTRACT

Background: Blood borne pathogens such as hepatitis B, hepatitis C and human immunodeficiency virus are often transmitted through needle stick and other sharp injuries in the hospital environment. In delivering service, HWs improvise and device approaches rather than use the approved preventive measures, predisposing them to blood borne infections and injuries.

Objectives: The main objective of the study was to determine compliance with blood borne infection protocols among health workers in Kwesimintsim Hospital.

Methods: Study was a cross-sectional design, using a quantitative approach. Seven departments of the hospital were randomly selected. Purposive sampling technique was employed to sample one hundred and thirty three health workers from these departments of which one hundred and fifteen were analyzed. A structured questionnaire was used to collect data to assess compliance. Collected data was coded, entered carefully and analyzed using Statistical Package for Social Science (SPSS). Logistic regression was used to analyze the relationship between multiple independent variables and a categorical dependent variable ($p < 0.05$ denote statistical significance).

Results: Compliance with prevention of blood borne infection protocol was high. Logistic regression of sociodemographic factors indicated that profession and years of practice were significantly associated to compliance with Universal Precautions with p values <0.05. Females were more likely to adhere with universal precautions than their male counterparts ($p < 0.05$). Universal precautions were found to be available in the facility. Inability to anticipate risk and protect oneself during emergency situations were found to be some of the factors affecting compliance. The results also revealed that though there was a reporting system in place, most of the HWs do not report but wash with soap and water post exposure.

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Conclusion: Compliance with blood borne infection prevention protocols was high and nurses were found to comply with blood borne infection prevention protocols than other profession. Availability of universal precautions was found to be adequate. There was also evidence of some factors that influence compliance. Reportage of injuries due to exposure was noticeably low.

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LIST OF ACRONYMS/ ABBREVIATION

HBV	Hepatitis B virus
HCV	Hepatitis C virus
HWs	Health workers
HCWs	Health care workers
HIV	Human immunodeficiency virus
PPE	Personal protective equipment
SPs	Standard Precautions
UPs	Universal Precautions
WHO	World Health Organization
BBFs	Blood and body fluids
BBV	Blood borne virus
NSI	Needle Stick Injury
HAIs	Hospital Associated Infections
PEP	Post Exposure Prophylaxis
IEC	Information, Education & Communication materials
OSHA	Occupational Safety and Health Administration
CDC	Center for Disease Control and Prevention

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DEFINITIONS OF TERMS

Compliance

Conformity to a rule such as specification, policy, standards or law. Acting according to certain accepted standards.

Universal Precautions

A standard set of guidelines aimed at preventing the transmission of blood borne pathogens from exposure to blood and other potentially infectious materials (OPIM).

Standard Precaution

They are a set of infection control practices used to prevent transmission of diseases that can occur through interaction with blood, body fluids, non-intact skin (including rashes), and mucous membranes.

Occupational exposure

Contact with a potentially harmful physical, chemical, or biological agent as a result of one's work. For example, a health care professional may be occupationally exposed to HIV or another infectious agent through a needle stick injury.

Personal protective equipment

Specific clothing or equipment such as gloves, gowns, masks, and eye protection worn to ensure employee for protection.

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CHAPTER ONE

INTRODUCTION

1.0 Background

Pathogens are disease causing agents and blood borne pathogens are infectious microorganisms in human blood that can cause disease. Though numerous blood borne infectious pathogens have been identified, most occupation related blood borne infections are due to Hepatitis B virus (HBV) and hepatitis C virus (HCV) and HIV (human immunodeficiency virus). Infections with HBV, HCV or HIV can occur when one is stuck with a needle or other sharp objects that have been exposed to blood or bodily fluids of an infected person. These infections can also occur through exposure to other bodily fluids through splash or contact with the mucous membranes or cut (Auta et al., 2017; MedlinePlus Medical Encyclopedia).

Most blood exposures in the hospital settings are preventable. World Health Organization (WHO) placed in strategies to protect health workers. These strategies include use of universal precautions, immunization against hepatitis B and provision of personal protection and management of exposures (World Health Organization [WHO], 2003). Health workers (HWs) are constantly exposed to blood and body fluids (BBFs) as a result of their work putting them at risk of contracting blood-borne infections. Often, HWs tend to improvise methods or approaches instead of using approved preventive measures and these could predispose them to blood borne infections and injuries.

Little is known about global compliance with blood borne infection prevention protocol but it is known that developing countries particularly Africa adherence to standard precautions can be poor (Auta et al., 2017). The right attitude from health personnel, motivation and technical

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knowledge is known to be needed to enable compliance to blood borne infection preventive protocols. This is an efficient way to protect health professionals, patients and the public in order to decrease hospital exposures. Inability to adhere might be seen in the elevation of unintended contact with body fluids and sharps at the workplace (Ferguson, 2009; Roberts, 2000).

Though there is a significant widespread outbreak of Blood Borne Virus (BBV), data regarding the degree of work-related contact of HCWs to blood are hardly accessible locally and nationally (Liu et al., 2014).

Yenesew & Fekadu (2014) indicates that UPs are efficient in forestalling workplace contact with BBFs and their associated infections. In the world at large, occupational surveillance and monitoring are used to estimate health problems of HWs and their conformity with UPs to foreclose and restrain work and its related infections. Results from certain countries have indicated the absence of consistency in conforming to UPs by HWs. For example, (64.0%) of care givers in India, three- quarters in Malaysia, and 38.8% in Nigeria had the accurate know how of the practice of standard precautions. Whereas eastern Ethiopia reported 80.8% of HWs usually following UPs; 20.2% of HWs had exposure with BBF in the previous year and about 44.8% of HWs documented displeasure with the provision of infection-control items.

The use of universal precautions is done partially therefore exposing HWs to unnecessary risk of infection (Yenesew & Fekadu, 2014). Among medical students in Cameroon, vaccination against HBV was low whereas accidental exposure to blood was high. This makes them occupationally prone to HBV infection. (Agyeman, Ofori-Asenso, Mprah, & Ashiagbor, 2016)

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Ghana has also adopted the use of universal precautions in her health institutions but very little studies have been carried out on assessment of the use of these preventive measures in the health institutions.

1.1 Problem Statement

Health facilities are convergence point for several pathogenic microorganism, including blood borne pathogens. The often heavy workloads and working long hours by health workers make them not adhere to the standard universal precautions. Health-care workers are concerned about exposure to contaminated blood and bodily fluids which could lead to the acquisition of infections such as HIV (International Labour Organization, 2010).

Injuries from sharps abound and could predispose health workers to blood borne pathogens. According to the World Health Organisation International Council of Nurses, (2005) about 2 million health workers get infected with blood borne infections each year and out of this, 90% is as a result of needle pricks. In an effort to maintain a healthy workforce, CDC introduced universal precautions as a cautionary and preventive measure to avoid contact between care givers and the mucous membranes, blood, and bodily fluids of patients. Use of personal protective equipment help minimize exposures.

Non adherence with these standard universal precautions will increase risk of exposure to infections. Timilshina, Ansari, & Dayal, (2011) indicated that, low knowledge and inconsistency in the provision of materials, equipment, and instruments prevent basic health workers from accessing infection control measures and when infection control measures are utilized they are not done properly.

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In Nigeria, a study conducted revealed that adherence with precautionary measures by health workers in the course of their duties was unsatisfactory and they expressed that policies were needed to help manage HWs against the risk awareness and practices of HIV/AIDS (Akinboro, Adejumo, Onibokun, Olowokere, & Akinboro, 2012). This shows that some guidelines were unavailable in the facility.

In Ghana, a high seroprevalence of HIV, HBV and HCV was found among blood donors in a study at Bolgatanga (Amidu et al., 2010). This reveals that if health workers are not cautious, there will be an increase in blood borne infections since there is high prevalence of these blood borne infections among the population being cared for. Also, symptomless blood-borne pathogen load was on the increase amongst the mature populace in Akwatia. There is the need to create awareness to reduce the burden especially in the older generation (Lokpo et al., 2017).

Another study done in all the 8 prisons of Ghana, of which Sekondi prison was part revealed that blood borne and infections acquired sexually among the prisoners and officials was great (Adjei et al., 2008). They suggested that certain preventive measures that were adopted at other facilities should be adopted immediately. These infected inmates and officers may report to the hospitals and if health workers are exposed they are likely to get infected with these diseases.

It is therefore ideal to determine compliance with blood borne infection protocol in the Kwesimintim hospital and propose solutions to improve compliance among health workers.

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1.2 Conceptual framework.

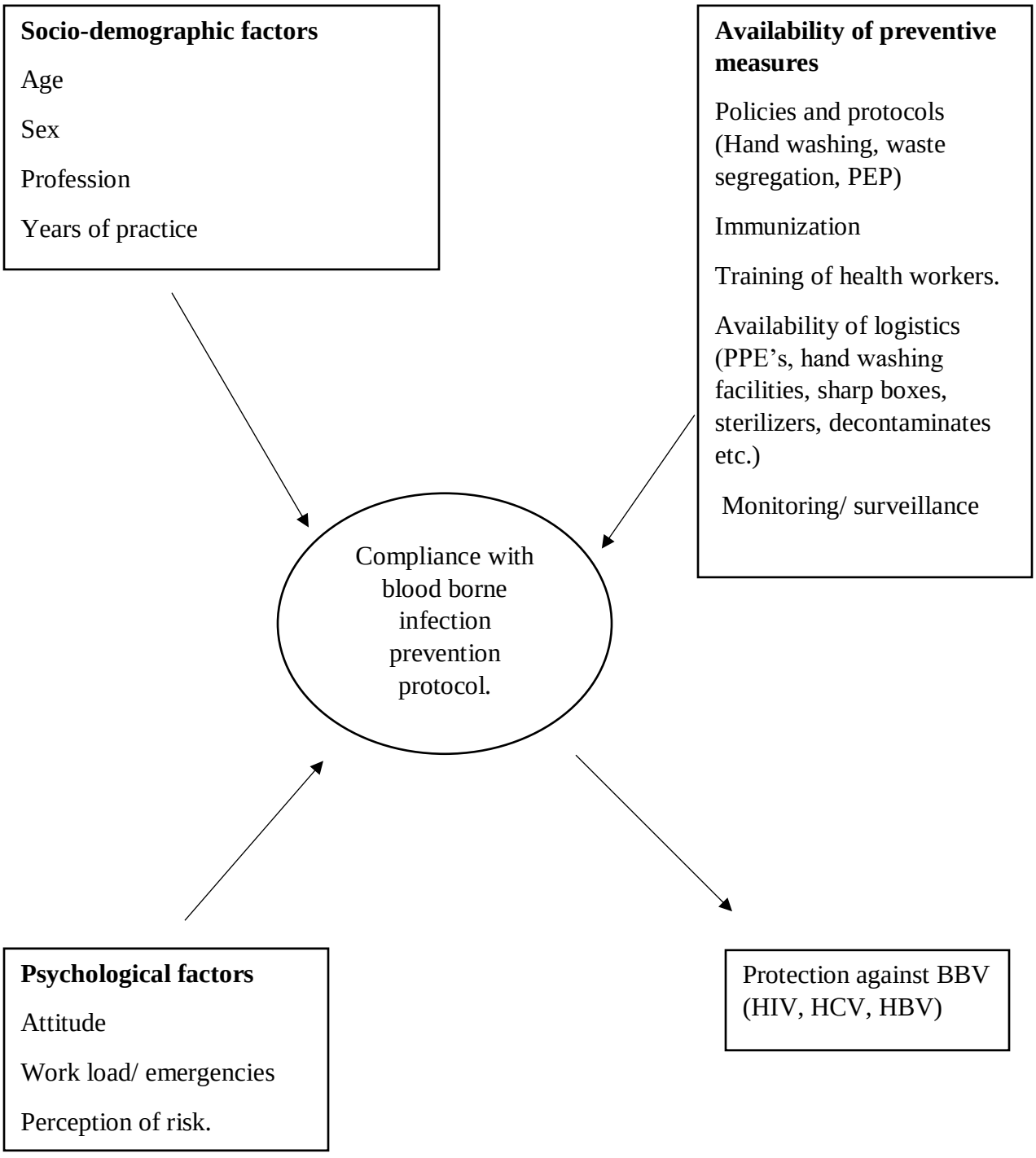

Figure 1: Conceptual framework.

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This framework has been developed to guide this study to look at the factors that may be in the facility to help health workers prevent exposure to blood borne related infections. These factors include availability of protocols and logistics, work pressure on the health workers, motivation of staff, surveillance by the managers and adherence to the international protocols by the staff.

When preventive measures of blood borne infection such as infection prevention protocols, logistics, immunization, monitoring and training of health personnel on infection prevention control is constant in the facility, health workers consult these protocols and stick to them to ensure a drop in contact to these blood borne infections. They also become abreast with current infection prevention techniques and use them adequately. The availability of these preventive measures will enhance use and protect these workers from acquiring these infections even when they are exposed. The unavailability of these preventive measures will lead to infection from patients to health workers and vice versa leading to an unhealthy work force and eventual increase in mortality of the health workers.

Again, demographic factors such as age, sex, education, professional ranks and years of practice can contribute to the use of preventive measures by workers. When individuals think their age can make them overcome all things or because of their age, they are vulnerable, it can inform their decision on the use of preventive measures. Another issue may be one's years of practice, because of the long years of practice they do not perceive BBF's as a threat and vice versa. This will also inform their use of preventive measures against BBV.

Also, psychological factors such as perception of risk, work pressure or emergencies is another indicator of how blood borne infections can be prevented. When pressure at work is low, health workers may systematically use preventive precautions when caring for their patients. In times of emergencies they tend to concentrate on saving lives than protecting themselves. This in turn

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will expose them to these infections. Their perception of risk can influence their use of preventive measures. Where they do not see the patient as one likely to infect them they forgo their PPE's.

Finally, surveillance by management is also relevant in the prevention of infections from blood borne exposures. When managers constantly monitor the workers and the working environment, they make provisions for things that are lacking such as in-service trainings for the workers if preventive measures are not being used, they change protocols that may no longer be in use and also provide logistics that may be unavailable to enhance work and effectively protect the workforce.

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1.3 Justification

Yearly, about three million HWs out of 35 million HWs worldwide are projected to be exposed to blood pathogens. Out of these number of exposures: two million HWs came into contact with HBV; HCV had 0.9 million; and 170,000 to HIV. In the long run, one hundred and fifty thousand (150,000) of HWs exposed had acquired HCV, seventy thousand (70,000) had contracted HBV, and five hundred (500) was diagnosed with HIV. (Yenesew & Fekadu, 2014). This is alarming and not any different from the situation in Ghana. There is therefore the need for our facilities to be monitored for readily available blood borne infection prevention protocols and health workers compliance to them.

According to Bhardwaj, Sivapathasundaram, Yusof, Minghat, Swe, & Sinha, (2014) developing countries and other resource constraint countries including Ghana have high occurrence of HIV/AIDS, hepatitis B and hepatitis C, therefore care givers are at a higher risk of contamination from these diseases. Although the prevalence of these infectious diseases is high in developing countries, documentations of infections as a result of occupational exposure in these countries are scarce. This could be linked to lack of surveillance and low reporting of occupational exposures (Sagoe et al., 2001; Bhardwaj et al., 2014).

Little studies has been made worldwide and Ghana on the compliance of health workers to blood borne infection prevention protocols and specific studies have not been carried out among health workers of the Kwesimintim Hospital

To assess the compliance with preventive measures available at the Kwesimintim Hospital, there is a need to determine the availability of blood borne infection prevention measures in the various units of the hospital, to determine the issues that affect the constant usage of universal

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precautions amongst health care workers in the units and also to assess what is done when health workers gets in contact with blood borne infections in the hospital.

The research would serve as a source of referencing to other related studies. Findings will also serve as a useful guide for program planning formulation and implementation for governments in the region. Recommendations emerging from this study will be useful for improving occupational health and safety in hospitals. Finally, it will contribute to existing academic knowledge and research for future related studies.

1.4 Research Questions

- What preventive measures are in place against blood borne infections at the Kwesimintsim hospital?
- Are universal precautions protocols available at Kwesimintsim hospital?
- What factors influence compliance with universal precautions?
- What measures are taken when exposure to blood borne infections occur?

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1.5 Objectives of the study

1.5.1 General Objectives

- To determine compliance with blood borne infection prevention protocols among health workers in Kwesimintsim Hospital.

1.5.2 Specific objectives

- To determine the availability of universal precautions protocols at the Kwesimintsim Hospital.
- To determine the association between background characteristics and compliance with universal precaution protocols.
- To assess factors influencing the compliance of HWs with universal precaution protocols.
- To determine measures taken by HWs when exposure to blood borne infections occurs.

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The review was guided by the problem statement, justification and objectives for this study. Various reports and studies conducted in different countries were looked at in this section. The review also focuses on availability of universal precautions, factors that influences compliance with universal precautions and measures taken when exposure to blood borne infection occurs.

2.1 Availability of preventive measures

Before the detection of HIV/AIDS, infection prevention measures aimed at protecting patients from acquiring hospital infections upon admission was of little or no concern to the health worker. As the years went by and with the emergence of new infections and the reemergence of some old infections, protocols and guidelines were developed to protect both patient and health workers from infections. Center for Disease Control and prevention (CDC) published the guidelines for infection control in hospital personnel in 1983 which led to the development of system of infection control. Blood borne infection protocols are standards put in place to break the chain of infection. Occupational Safety and Health Administration (OSHA) made it compulsory for health facilities to protect their staff from blood borne pathogens using eight components: exposure control plan (document and policy), universal precautions, engineering controls (devices to remove blood borne pathogens), work practice control (new methods of working to reduce exposure), PPEs, hepatitis b prophylaxis, training and education and finally record keeping.

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Health workers in their delivery of service are more often than not open to blood and bodily fluids, it is therefore the duty of the hospital management to provide preventive measures to curb the occurrence of these blood related infections as the health workers deliver their services. Availability of protective equipment was dependent on finances and because of economic constraints these equipment could not always be bought and made available as indicated by the guidelines (Luo, He, Zhou, & Luo, 2010).

2.1.1 Policies and protocols

Hospital settings are to have the universal guidelines for the prevention of blood borne infections and these include policies and protocols. There is the need to create policies and protocols or steps to emulate prevention and curbing of occupational contact to bodily fluids and blood-borne pathogens (Timilshina et al., 2011).

Nouetchognou, Ateudjieu, Jemea, & Mbanya (2016) in their study found that, increased incidence of accidental exposure to blood was due to the lack of exhibited guidelines or flow charts and poor conduct of caregivers. To curb these they suggested continual training of staff, direction and the presence of exhibited guidelines or flow chart as solutions to be enforced to reduce threat for caregivers.

Again, there was difference in the compliance of clinician to the protocols and the availability of said protocols (Stone et al., 2014). Though policies and protocols for prevention of infection are available in institutions it does not guarantee adherence.

2.1.2 Training of health workers

When HWs have knowledge about ways to protect themselves from blood borne infections, it enhances their services because they feel protected at all times. It is therefore necessary for the

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hospital management to make efforts to provide repetitive trainings to enable the care givers be equipped in current trends of protecting themselves.

In curtailing hospital infections and to shield the health of both the health worker and client, Standard precautions teaching should be reinforced as well as frequent, whilst adequate practical personal protection equipment are supplied (Luo et al., 2010). Also, Naderi, Sheybani, Bojdi, Mostafavi, & Khosravi (2012), stated that due to the increase in contact to blood and body fluids in medical staff, efficacious education about dangerous practices, universal preventive steps, appropriate sharp object discarding, and PEP protocols is essential for all employees.

Also, Bhardwaj et al. (2014), suggested that to preclude occupational hazards there is the need for teaching and echoing occupational safety, which includes sharps handling and disposal. In addition to these, supply of PPEs, presence of safety machinery, Information, Education & Communication materials, showing the guidelines and chart of giving account on exposures and obtaining solutions serves as preventive and protective measures.

Further investigations by Liu et al., (2014) showed that to improve compliance of HWs with UP, there is the need to heighten knowingness and meliorate education on UP.

Gadzama et al., (2014), found in their study that, a long time had elapsed since the last training for health workers on injection safety by hospital management. This training was in July 2009, which involved two-thirds of the hospital staff. Yet repetitive training is required for health workers to enable safety.

Priya, Krishnan, Jayalakshmi, & Vasanthi (2015) also, in their study echoed the need for health care organizations to teach HWs in infection control procedures and the relevance of reporting occupational exposures.

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Another study, identified gaps in knowledge and practice of infection control among doctors and nurses in Nigeria hence, the suggestion by (Iliyasu et al., 2016), that it is essential for all HWs to receive official and frequent refresher trainings. As these trainings are being given periodically, HWs become more equipped and conversant with the use of these preventive measures.

2.1.3 Availability of logistics

Luo et al., (2010), in a survey regarding compliance with universal precautions in China, revealed that majority of the clinical wards had not been equipped with PPEs such as googles, face masks, isolation clothes, and shoe covers. Similar results was reported in Ethiopia where respondents were discontent with the provisions of infection prevention materials, instances of reuse of syringes was documented (Reda, Fisseha, Mengistie, Vandeweerd, & Punnett, 2010).

Results from Timilshina et al., (2011), was also similar to the above study where it revealed lack of knowledge and inconsistent provision of materials, equipment, and instruments as issues that caused noncompliance with infection control steps among HWs. Official teaching in universal precautions was imperative, monitoring of the use of protective equipment as well as its provision was also indicated. Adherence to infection control protocols needed to improve at the primary health care units.

Also, in their study, respondents stated that there were inadequate logistics though they were available throughout the year. Some stated that hand washing facilities were inadequate (Yenesew et al., 2014). Further investigations by Liu et al (2014) helped them conclude that for compliance of HWs with the UPs, PPEs must be sufficiently supplied.

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2.1.4 Vaccination

Although vaccination against HBV is ideal, there is the need to check the antibody titer after this vaccination. It has been found out that this antibody testing is often not done. An antibody titer testing is commended after immunization against Hepatitis B for all health care workers everywhere in the world (Naderi et al., 2012).

Another study by Mueller et al., (2015), indicated that it was essential for Tanzanian health care workers to be vaccinated against HBV infection as chronic HBV infection was common amongst them.

In Botswana, a study on Hepatitis B (HB) immunization among healthcare workers revealed a low vaccination uptake and majority of the health workers had only taken the first dose of vaccination and very few had completed the three doses (Machiya et al., 2015).

Forestalling of HBV spread needs inoculation of HCW through immunization from HBV, this vaccination must be made compulsory for every newly employed HW. All HCWs should be vaccinated against HBV when there is no evidence of previous immunity (from natural infection or prior vaccination), and immunity post-vaccination must be observed by management of the hospital. This is imperative to check and identify HCV exposure though no prophylaxis exist, this is needed to start early anti-viral treatment in case an infection indicated. (Gupta & Gupta, 2016).

A study conducted in Cameroon supports the previous studies, where they found that vaccination among HWs was low though there was a moderately good awareness about the importance of this vaccination as a way of limiting contamination after unintended contact with blood. Few people had vaccinated against HBV and out of those who had vaccinated none had confirmed

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protection by antibodies. Health organizations are required to build up and supply standard operating procedures aiming at surveillance and monitoring of occupational risks, staff training, and supervision (Nouetchognou et al., 2016).

Another study conducted stated the need to stress on completion of all the three doses of Hepatitis B immunization (Bhardwaj et al., 2014).

Also, Abdela, Woldu, Haile, Mathewos, & Deressa (2016) in their study reasoned out that the risk of contracting HBV infection is high among trainees in the health profession due to the low HBV vaccination rate and high unintended contact with blood during their training.

2.1.5 Surveillance and monitoring.

There's inadequate surveillance and monitoring of the use of preventive measures in the fight against acquisition of blood borne infections among HWs. A study done by Lee, (2009) confirmed this by stating that because of the absence of surveillance in developing countries, it is difficult to realize the effect of individual elements on danger of exposure, and urgency in strategizing to reduce it.

Though several particular protocols aimed at curbing transmission of pathogens within the hospital setting have been made, the upkeep of a surveillance and monitoring system is of utmost importance. A surveillance system is needed for the prevention of infections gotten from the clinical setting and to ameliorate unchangeable usage of preventive materials amidst health caregivers in Nigeria and other countries in Africa (Amoran & Onwube, 2013).

Also, Mbaisi, Ng 'ang 'a, Wanzala, & Omolo (2013), highlighted the need for establishing a surveillance system for dealing with management of occupational injuries and exposures in their study.

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Another study, to analyze gaps in infection control practices in low-middle income countries by Weinshel et al (2015) indicate that compliance with acceptable Infection Control practices is less than the ideal at their study areas, and a contributing factor is the inconsistency in surveillance.

Sustaining a surveillance system can be achieved in a low income country therefore infection prevention and control programs enhancement should be priority (Talaat et al., 2016)

2.2 Compliance with universal precautions.

Universal precautions are a standard set of guidelines aimed at preventing the transmission of blood borne pathogens from exposure to blood and other potentially infectious materials (OPIM).

Adherence with universal/standard precautions were found to be below standard and knowledge on these precaution was partial (Kermode et al., 2005). Jeong, Cho, & Park (2008), in their study with regards to adherence with SP in Korea among operating room nurses, revealed low compliance rate. Also, Foster, Lee, McGaw, & Frankson, (2010), found that healthcare workers had knowledge in transmission of infections but their adherence with precautionary measures were insufficient. They recommended that a HCWs needed to be educated on the importance of adhering with universal precautions.

Again, study by Weinshel et al (2015) indicated that adherence to recommended Infection Control practices was suboptimal at their study areas.

Another study conducted in Ethiopia showed that HCWs indulged in practices which were described as sub-optimal in terms of needle recovering after use by (46.9%) and (30.5%) of them behaved discriminatory toward HIV/AIDS patients (Reda et al., 2010). Health care workers

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reported the daily use of standard precautions and that gloves are necessary for any contact with patients.

Low compliance with acceptable protocols of infection control and aseptic techniques was recorded in Nigeria. (Gadzama et al., 2014).

In Ghana, a study in a teaching hospital showed that compliance with Hand Hygiene (HH) practices after care among doctors and nurses was low (Yawson & Hesse, 2013).

2.3 Factors affecting compliance with universal precautions

Jeong et al., (2008), in their study with regards to compliance with Standard Precautions (SP) among operating room nurses in Korea, considered 2 likely causes for the low compliance rate and these reasons were inadequate time and irregular teaching on SP and partial participation in the policy-making process by the nurses.

Also, in another study in China investigations revealed that, the elements determining conformation with the universal precautions include: training on universal precautions and knowledge, hospital grade, handiness and comfort in the usage of protective equipment, general beliefs, contact with clients, and ward in which the nurse works (Luo et al., 2010).

Another study revealed similar results. It inferred that insufficient workers' knowledge and environment related problems, including the unavailability of protective materials and other equipment and utilities needed to guarantee security of HCWs was a vital subject that needed immediate consideration. They indicated that the unavailability of items for protection and other consumables and equipment were the major cause for not utilizing precautionary measures and is likely to be a main reason in the nonadherence with these precautionary measures (Amoran & Onwube, 2013).

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Also, the use of gloves was the determinant of occupational contact to blood and body fluids and not actual adherence with universal precautions. There was a high exposure rate among HWs in this study and this was ascertained by the handiness of Personal Protective Equipment in the institutions, the frequent use of surgical and examination gloves, and position of health workers in regards to UPs. They recommended teaching in infection prevention as well as UPs and constant supply of PPE for departmental work (Yenesew et al., 2014).

Furthermore, Liu et al., (2014) suggest the need to also include psychosocial issues, such as attitude, belief, and communal norm, to factors that effectively enhance compliance of HWs to the use of PPEs.

In Nigeria, it was revealed that injection providers had good knowledge of injection safety, but most of them were not complying with recommended protocols of infection control and aseptic techniques and this could be attributed to the fact that the infection prevention committee was dormant (Gadzama et al., 2014).

Further studies by Abubakar et al. (2015), identified bad behavior of health workers, partial knowledge, inadequate nursing personnel, unequal stock of infection prevention materials, and behavior of senior colleagues as issues that affect the use of standard precaution.

Again, Cheung et al., (2015) noticed that, SPs compliance among Nursing Students can be improved by amassing knowledge on SPs, frequent SPs teaching, increasing support from management, decreasing known SPs barriers, and enhancing nursing staff adherence to SPs.

Another study, done among nursing students found 5 predictors for standard precaution compliance and these are knowledge of SPs, supposed barriers, sufficient training, management support, and influence of other nursing staff (Cheung et al., 2015).

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Results found in a study conducted in low and middle income countries indicated that conformity with the approved infection control practices was below optimal. Chances for the betterment of infection control practices was available in several areas (Weinshel et al., 2015).

Akagbo (2013), in her study on perception of HIV and perceived barriers to adherence with SP amongst HCWs revealed that adherence to Universal Precautions were due to workload and urgency of care, number of years of practice where those who had practiced for longer years felt reluctant adhering to the universal precautions and also perceived risk and benefits from adhering to UPs.

Availability of guidelines does not necessarily ensure clinician adherence at the patient's side. Adherence by clinicians is necessary to reduce and prevent acquiring infections during exposure. Adherence rates recorded in these hospitals were low and very little training time is given on prevention of infections (Stone, et al., 2014).

The deficient knowledge on the transmittal danger of blood borne pathogens (HIV, HBV, HCV) hint that most of the health workers underrates the transmittal danger and this is likely to put them at danger of infection following exposure. Low compliance with the use of simple PPEs may be due to this factor identified in this study (Iliyasu et al., 2016a).

2.4 Measures taken after exposure to blood borne infections.

It is imperative to have a scheme or an arrangement for regular reportage of blood and other body fluid exposures. This will promote safety and infection prevention (Timilshina et al., 2011). Although the system for reporting exposure may be in place, a study by Mbaisi et al. (2013), revealed that post-exposure management is poorly adhered to and that there was gross underreporting of the exposures.

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In a study by Bhardwaj et al (2014), it was revealed that areas needing further input comprised of non-conformity with before and after exposure measures and rare-reportage of the exposures by the staff. This under reporting of exposure contributes to the scarce data available on infections through blood borne exposures.

A survey among paramedics in the United States of America, revealed underreporting of blood borne exposures. And this underreporting was on account of exposure being insignificant (Preventing Exposures to Bloodborne Pathogens among Paramedics, 2010). All health care organizations should train HWs on the need of reportage of work related exposures. They recommended that reporting of Needle Stick Injuries should be made compulsory and precautionary approaches should be devised (Priya et al., 2015).

Strategies should be put in place to enhance security of HCWs nationally with urgency due to increased risk and limited safety precautions as well as inappropriate reporting of compliance in the tertiary hospitals (Liu et al., 2014). It is important that health care givers are frequently taught on preventive measures as well as the constant supply of precautionary measures through established infection control strategies are made available in health settings. The process of reporting exposure must also be taught as well as frequent updates made when necessary (Naderi et al., 2012)

Education on the dangers of transmission of blood borne pathogens (HIV, HBV, and HCV) and post exposure prophylaxis was found to be limited in their study (Iliyasu et al., 2016a).

In Cameroon, it was also noted that most of the HWs who had been exposed had not formally reported their accidents, but they simply initiated investigations without any formal reporting of the accident to management. It is therefore likely that the frequency of accidents was greater than

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what is known, and also they regarded the accidents as irrelevant and hence did not report them (Nouetchognou et al., 2016).

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CHAPTER 3
METHODS

3.0 Introduction

This chapter presents the general approach and the specific techniques adopted to address the research objectives. It addresses into detail, the study design, the study location and population, methods and techniques used in participant selection as well as data collection. Also there is elaboration on steps put in place to guarantee quality of data collected, the analysis and interpretation of data.

3.1 Study Design

This study was a quantitative cross sectional study which used descriptive methods to answer the objectives of the study. The data collected determined the compliance of blood borne infections protocol among health workers in Kwesimintsim Hospital, the availability of universal precaution materials, factors influencing their compliance and measures taken after exposure to blood borne infections.

3.2 Study Site

The study was conducted at the Kwesimintsim district hospital at the Efia Kwesimintsim sub – metropolitan assembly in the Western Region of Ghana. The hospital is situated at the center of the Kwesimintsim sub-district in an area called Sawmill on the Takoradi – Axim road. The town is bounded to the west by Apremdo to the east by Takoradi to the North by Anaji and south by Airport Ridge.

It has a bed capacity of eighty eight (88). It operates a 24 hour service and refers cases to the Regional Hospital in Sekondi and Korle-Bu Teaching Hospital in Accra. It has a total workforce

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of 304 which consists of Administrative staff, Doctors, Nurses and Midwives, Anaesthetists, laboratory staff, Health Care Assistants and Household staff. The hospital has an Out Patient Department, accident and emergency/ casualty, maternity, male, female, and children's wards. It also has a theatre, a public health unit, dental unit, pharmacy, laboratory and the x-ray departments. The Hospital was built in 1974 as a polyclinic and was handed over to the Ministry of Health in 1975 by the State Construction Corporation and Architectural and Engineering Service Corporation.

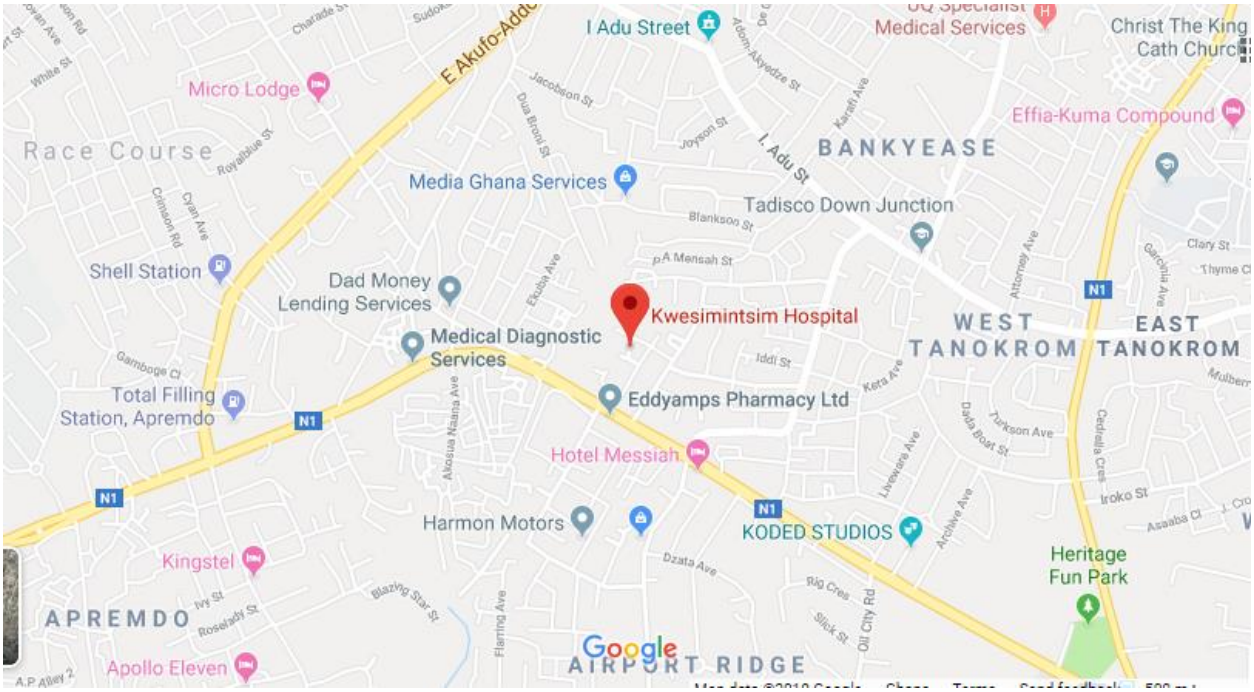

Figure 3.1: Map of study site.

3.3 Study Population

The study population included all nurses and midwives, laboratory technicians and orderlies aged 20 to 60 years who come in contact with patients' body fluids or samples from patients on a daily basis and were likely to get exposed to blood borne infections during their routine work.

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3.4 Variables

Dependent variable

- Compliance with universal precaution or standard precautions: this was assessed using five-point Likert scale.

Independent variables

- Availability of universal precautions: PPEs (gloves, mask, disposable aprons), training on infection prevention.
- Background characteristics: age, sex, profession, years of practice.
- Factors influencing compliance with universal precautions: busy schedules, years of work, availability of precautionary measures.
- Measures taken after exposure: reporting of exposure, washing with soap and water, taking of PEPs

3.5 Sampling

3.5.1 Sample Size

Sample size was derived using Slovin's formula i.e. n = N / (1 + Ne2)

n=sample size

N= total population

e= margin of error

Out of the 304 total workforce, nurses and midwives, laboratory technicians and orderlies was 174. Using the formula n = N / (1 + Ne2)

n = 174 / (1 + 174x0.05x0.05)

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n=121

A sample size of 121 was derived from the formula. Sample size was increased by 10% to 133 for validity.

3.5.2 Sampling Method

The study used a multistage sampling technique to select a sample size of 133. In the first place, a stratified sampling technique was used to divide the hospital into strata. These strata includes nurses, midwives, laboratory technicians and orderlies. Since the various departments differ in population, the proportional allocation method was adopted to assign desired sample sizes to each department. This technique is usually applied when no other information except the stratum size is available. According to this technique, the sample for each stratum (department) was found by;

$$n_h = n\frac{N_h}{N}$$

Where;

n_h represents the sample size for each stratum

n represents the desired sample size (which is 133)

N_h represents the total number of workers in each stratum (department).

N represents the total number of workers in the strata (174 workers)

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Within each department, a random sample of respondents were selected using simple random sampling. Applying this formula yielded the following sample sizes for each department.

Table 1: Summary of Sample Size allocation

Department	Number of workers	Proportional Allocation	Desired sample size
Nurses	100	100/174 *133 = 76	76
Midwives	44	44/174 *133 =33	33
Laboratory technicians	5	5/174 *133 =4	4
Orderlies	26	26/174 *133 =20	20
Total	174	133	133

Source: Fieldwork, 2018

3.6 Inclusion criteria

All nurses and midwives, laboratory technicians and orderlies between the ages of 20 and 60 years and who are full time employees and have worked for at least 3 months were included in the study.

3.7 Exclusion criteria

Nurses and midwives, laboratory technicians and orderlies who were on cover up duties (locum) and had not worked for at least 3 months were excluded.

3.8 Data Collection Techniques and Tools

A structured questionnaire was used to collect data from the sampled study group. Structured questionnaire, which consisted of both open-ended and close-ended questions, was designed to

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gather information. The questionnaires were administered to all respondents who agreed to take part in the study. Trained research assistants were used in the data collection process. The study employed a sample size of 133. Privacy and confidentially of participants in the study was assured throughout the study. Data was collected by the Principal Researcher and two research assistants. These questionnaires were used to measure availability of preventive measures of blood borne infections, compliance with standard precautions, barriers to compliance and management after exposure to blood borne infections. The questionnaire was divided into four sections with section A focusing on socio-demographic characteristics of the respondents, section B contained questions seeking to assess the availability of preventive measures, where respondents were asked to state whether materials or equipment were available (always, sometimes or not available). Questions covered the basic requirements of the universal precautions. Section C touched on factors influencing compliance with Universal Precautions. Participants were also asked to select the best response that best describes the statements using the Likert scale with (strongly agree, agree, not sure, disagree, strongly disagree).Where positive responses were expected, scores ranging from 5 to 1 were assigned for, strongly agree, agree, not sure, disagree and strongly disagree responses respectively. On the other hand, where negative responses were expected, scores from 1 to 5 were also assigned for responses respectively. It also comprised of questions assessing compliance with universal precautions.

Universal precaution measures of interest included hand washing, use of PPE, safe sharps/needle practices, patient care equipment, waste disposal/management, environmental cleaning and respiratory hygiene and cough etiquette; this was determined with the help of the 16 items questions using a five-point Likert scale response (i.e. always, often, sometimes, rarely, never). The participants were required to choose from the five descriptions that best illustrated their

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usual practices. Positive responses were assigned scores of 5, 4, 3, 2 and 1 to correspond to always, often, sometimes, rarely and never responses respectively. A score of 4 and above was rated as high score; that of 3 was rated as medium and a score 2 or less rated as low. On the other hand, negative responses were also assigned scores of 5, 4, 3, 2 and 1 to match with never, rarely, sometimes, often time and always responses respectively. (Low score of 1 and a high score of 5). Finally, section D dealt with questions that determined activities performed after exposure to blood and bodily fluids.

3.9 Data Quality Control

To ensure quality of data collected, well designed structured questionnaires was developed with all the necessary questions to achieve the study objectives. A One-day training was organized for the two research assistants to equip them with the knowledge and skills needed to help them in taking data on the field. All answered questionnaires were checked manually on daily basis by the principal investigator for completeness and consistency.

3.10 Data entry and processing.

Data collected from the field on daily basis were checked for completeness and were entered into Microsoft Excel 2013 version and analyzed using SPSS.

3.11 Data Processing and Analysis.

Data analysis was done based on research objectives and research questions. The analysis of data started with editing and inspecting of data pieces in order to identify mistakes, items that were wrongly responded to and the blank spaces left unfilled by the respondent. All questionnaires were checked for completeness and ID numbers were given to each questionnaire from the field.

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A total of 115 questionnaires were then entered using Statistical Package for Social Science (SPSS) out of 133 administered.

The descriptive analysis was presented using charts, frequencies and percentages. Logistic regression was used to determine those socio-demographic factors that influence compliance with standard precautions. Compliance with standard precautions among health workers was assessed on a five-point Likert scale. Respondents were classified into either low, moderate or high compliance level based on the responses given to the various items on the questionnaire. Respondents who chose "strongly agree" and "agree" were categorized as low, those who chose "not sure" were categorized as moderate while respondents who chose "strongly disagree" and "disagree" were categorized as high. Logistic regression analyzes the relationship between multiple independent variables and a categorical dependent variable. The odds of an event refers to the ratio of the probability that an event will occur to the probability that it will not occur. Factor analysis was also used to determine the factors that influence compliance with universal precautions. The purpose of factor analysis is to reduce many individual items into a fewer number of dimensions. Factor analysis was used to simplify the data that was collected from the field and determine the significant factors influencing compliance with universal precautions. Factor analysis can also be used to construct indices. Factor analysis could be used to justify dropping questions to shorten questionnaires. When the researcher wants to understand the underlying structure of a dataset, factor analysis is often used. In this case, the researcher believes that responses too many different questions are driven by just a few underlying structures called factors, hence the use of factor analysis (Tabachnick & Fidell, 1996).

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3.12 Ethical Issue

Ethical clearance was acquired from Ghana Health Service Ethical Review Board and approval was obtained from the Kwesimintsim hospital. In addition, informed consent was sought after and gotten from individual respondent before the administration of the questionnaire. This, was began with thorough description of the targets and purposes of the study. A guarantee that data collected from the participants will be treated with utmost confidentiality was given as anonymity was maintained.

3.13 Potential risks or benefit

The results of the study will help Hospital Management and other stakeholders in formulating policies to avoid blood borne infections and injuries among healthcare workers. There were no risks involved in this study.

3.14 Anonymity and confidentiality

Information obtained was used purely for the purpose of the research, thus anonymity and confidentiality was strictly adhered to as names of participants was not used for any public report. Questionnaire were designed in such a way that the names of participants were not needed, also, information gathered from one participant was not disclosed to another.

3.15 Voluntary participation

Permission was sought from participants by the use of a consent form. Each participant was required to append their signature before filling the questionnaire. Participants‟ consent to participate in the study was purely voluntary. No participant was forced or coerced to participate in the study.

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3.16 Pretest or Pilot Study

Pre-testing was done at the Shama Hospital to identify errors in the questionnaires, to ensure that questions were clear, and the respondents understood these questions as intended. The pre-test was outside the study area during training of research assistants.

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CHAPTER FOUR

4.0 RESULTS

This chapter presents the findings related to the research objectives. Issues considered include the background characteristics of respondents, availability of universal precautions at the Kwesimintsim hospital, factors influencing compliance with universal precautions at the facility, as well as measures taken when exposure to blood borne infections occur.

4.1 Background Characteristics of Respondents

44.3% of the respondents were aged between 28 and 32 years (Table 1) with the least category of respondents being above 32 years. Females dominated the sample selected, representing 70.4% of the respondents. Moreover, there were more married respondents (49.6%) than single respondents (47.8%) and respondents who were separated (2.6%). Christians represented 80.9% of the respondents. The educational background of respondents indicated that most of them were Diploma holders (61.7%), while respondents who were certificate holders represented the least (16.5%). Laboratory technicians, midwives, nurses and orderlies were the category of respondents who participated in the study. Nurses were the majority (66.1%) while laboratory technicians were the least (3.5%) group of professionals sampled. Respondents from the female, male and the maternity wards dominated the sample while other respondents were from the accident and emergency, children's ward, injection room, laboratory and the theatre. The working experience of respondents indicated that majority (59.1%) of the respondents had been working at the hospital below 5 years, while 9.6% of respondents had been working at the facility for over 10 years. All respondents indicated that they were given training on universal/standard precautions. Moreover, all respondents opined that they had some knowledge about hospital guidelines related to universal/standard precaution for infection control.

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Table 2: Background Characteristics of Respondents

Variables	Frequency n = 115	Percentage (%)
Age (years)		
23 – 27	39	33.9
28 – 32	51	44.3
Above 32	25	21.7
Sex		
Male	34	29.6
Female	81	70.4
Marital Status		
Single	55	47.8
Married	57	49.6
Separated	3	2.6
Religion		
Christian	93	80.9
Muslim	22	19.1
Education		
Bachelor	25	21.7
Diploma	71	61.7
Certificate	19	16.5
Profession		
Laboratory Technician	4	3.5
Midwifery	23	20.0
Nursing	76	66.1
Orderly	12	10.4
Department		
Accident and emergency	14	12.2
Children's ward	7	6.1
Female ward	27	23.5
Injection room	2	1.7
Laboratory	5	4.3
Male ward	26	22.6
Maternity ward	26	22.6
Theatre	8	7.0
Years of experience (years)		
Below 5	68	59.1
6 - 10	36	31.3
Above 10	11	9.6
Previous training		
Yes	115	100
Hospital guidelines knowledge		
Yes	115	100

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4.2 Compliance of Respondents to universal precautions

Majority of the respondents (53%) indicated that they always adhered to universal/standard precautions while (27%) had low compliance and the minority being (20%) who moderately used the precautionary measures. Adherence with some practices such as reporting of needle stick injuries and other exposures, washing hands after removal of gloves, wearing of eye protection and aprons was inadequate.

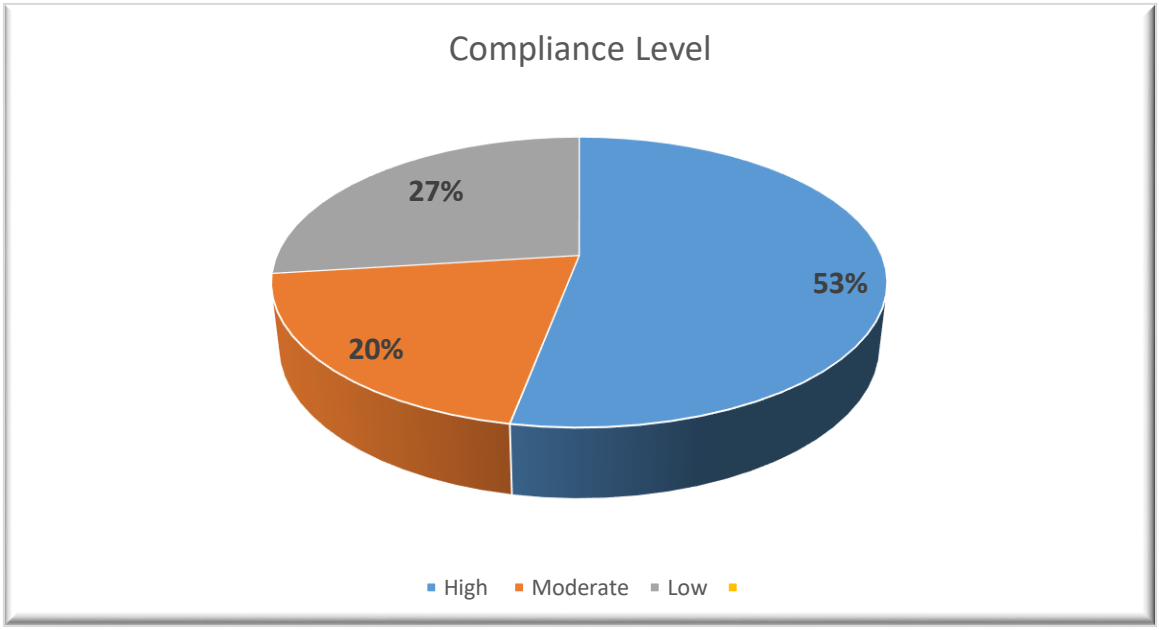

Figure 4.1: Compliance of respondents to universal precautions

4.3 Association between Background Characteristics and Compliance with Standards

The association between the background characteristics and whether or not respondents comply with universal/standard precautions indicate that the age, marital status, religion, education, and department of respondents does not influence respondents' compliance (Table 2). However, compliance with standard precautions is more likely in females than their male counterparts. Moreover, midwives and nurses were more likely to comply with standards compared to laboratory technicians. The years of experience indicated that respondents with higher years of

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working experience are more likely to comply with universal/standard precautions compared with respondents with lesser working experience. Moreover, previous training on universal/standard precautions as well as knowledge of hospital guidelines related to universal/standard precautions influence respondents' compliance with standards.

Table 3: Association between Background Characteristics and Compliance with Standards

Variables	Odds Ratio	(95% C.I.)	p – value
Age (years)			
23 – 27	ref		–
28 – 32	0.24	(0.81, 1.05)	0.65
Above 32	0.31	(1.74, 2.33)	0.87
Sex			
Male	ref		–
Female	1.52	(-1.92, 2.48)	0.03
Marital Status			
Single	ref		–
Married	0.23	(2.17, 5.82)	0.45
Separated	0.19	(3.54, 4.02)	0.09
Religion			
Christian	ref		–
Muslim	0.68	(3.07, 4.89)	0.73
Education			
Bachelor	ref		–
Diploma	0.47	(1.99, 2.43)	0.13
Certificate	0.94	(3.78, 5.22)	0.07
Profession			
Laboratory Technician	ref		–
Midwifery	1.73	(2.44, 5.36)	0.00
Nursing	1.22	(1.27, 3.19)	0.04
Orderly	0.34	(2.42, 6.25)	0.86
Department			
Accident and emergency	ref		–
Children's ward	0.11	(2.21, 3.87)	0.33
Female ward	1.32	(0.35, 4.59)	0.74
Injection room	0.98	(1.22, 3.77)	0.08
Laboratory	0.74	(1.75, 3.48)	0.05
Male ward	0.36	(2.03, 4.96)	0.33
Maternity ward	1.03	(1.44, 2.78)	0.91
Theatre	0.49	(0.46, 2.54)	0.07
Years of experience (years)			

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Below 5	ref		
6 - 10	1.22	(1.32, 3.87)	0.03
Above 10	1.45	(1.63, 3.60)	0.01
Previous training			
Yes	1.25	(-1.42,3.08)	0.04
Hospital guideline knowledge			
Yes	1.34	(-0.98, 2.45)	0.01

4.4 Availability of Universal Precautions

Generally, the study found that universal precautions are available at the Kwesimintsim hospital. There was adequate supply of PPEs. However, the availability of goggles and protective boots appear to be inadequate. Other environmental equipment that were adequately available include with the exception of isolation rooms in each unit. Policies and procedures for exposure prevention to blood and body fluids were found to be available as well as training on infection prevention procedures. Majority (93.0%) of respondents also indicated that they had received vaccination against HBV but antibody testing was not done after vaccination. Surveying and monitoring was done yearly.

Table 4: Availability of Universal Precautions at Kwesimintsim Hospital

	Always (%)	**Sometimes (%)**	**Unavailable (%)**
PPEs			
1. gloves	72 (62.6)	33 (28.7)	10 (8.7)
2. masks	83 (72.2)	29 (25.2)	3 (2.6)
3. disposable aprons and gowns	65 (56.5)	48 (41.7)	2 (1.7)
4. goggles	37 (32.2)	48 (41.7)	30 (26.1)
5. face shields	43 (37.4)	65 (56.5)	7 (6.1)
6. protective boots	31 (27.0)	38 (33.0)	46 (40.0)
Other environmental equipment/materials			

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7. Presence of a sink	83 (72.2)	26 (22.6)	6 (5.2)
8. Presence of running water	82 (71.3)	30 (26.1)	3 (2.6)
9. soap supply	78 (67.8)	29 (25.2)	8 (7.0)
10. disposable hand-towels	45 (39.1)	27 (23.5)	43 (37.4)
11. air-dryer	31 (27.0)	24 (20.9)	60 (52.2)
12. trash container near each sink	86 (74.8)	20 (17.4)	9 (7.8)
13. alcoholic hand rubs	91 (79.1)	11 (9.6)	13 (11.3)
14. safety container for sharps	78 (67.8)	30 (26.1)	7 (6.1)
15. incineration apparatus for sharps	83 (72.2)	21 (18.3)	11 (9.6)
16. isolation room in the unit	45 (39.1)	68 (59.1)	2 (1.7)
17. Infectious waste separated from household waste	52 (45.2)	57 (49.6)	6 (5.2)
18. containers with lids for general waste	82 (71.3)	25 (21.7)	8 (7.0)

4.5 Association between Availability of Universal Precautions and Compliance

Availability of personal protective equipment ($\chi^2 = 22.54$, p – value = 0.02) and other environmental equipment ($\chi^2 = 31.72$, p – value = 0.00) both have a significant association with compliance. This indicates that, when the health professionals are adequately provided with these equipment, it enhances their compliance with universal precautions (Table 4).

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Table 5: Association between Availability of Universal Precautions and Compliance

	Compliance				
	Always (%)	**Sometimes (%)**	**Unavailable (%)**	χ^2	**p – value**
PPEs				22.54	0.02
1. gloves	72 (62.6)	33 (28.7)	10 (8.7)		
2. masks	83 (72.2)	29 (25.2)	3 (2.6)		
3. disposable aprons and gowns	65 (56.5)	48 (41.7)	2 (1.7)		
4. goggles	37 (32.2)	48 (41.7)	30 (26.1)		
5. face shields	43 (37.4)	65 (56.5)	7 (6.1)		
6. protective boots	31 (27.0)	38 (33.0)	46 (40.0)		
Other environmental equipment/materials				31.72	0.00
7. Presence of a sink	83 (72.2)	26 (22.6)	6 (5.2)		
8. Presence of running water	82 (71.3)	30 (26.1)	3 (2.6)		
9. soap supply	78 (67.8)	29 (25.2)	8 (7.0)		
10. disposable hand-towels	45 (39.1)	27 (23.5)	43 (37.4)		
11. air-dryer	31 (27.0)	24 (20.9)	60 (52.2)		
12. trash container near each sink	86 (74.8)	20 (17.4)	9 (7.8)		
13. alcoholic hand rubs	91 (79.1)	11 (9.6)	13 (11.3)		
14. safety container for sharps	78 (67.8)	30 (26.1)	7 (6.1)		
15. incineration apparatus for sharps	83 (72.2)	21 (18.3)	11 (9.6)		
16. isolation room in the unit	45 (39.1)	68 (59.1)	2 (1.7)		
17. Infectious waste separated from household	52 (45.2)	57 (49.6)	6 (5.2)		

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waste			
18. containers with lids for general waste	82 (71.3)	25 (21.7)	8 (7.0)

4.6 Factors Influencing Compliance with Universal Precautions

A principal axis factor analysis was performed on the 20 statements. The Kaiser–Meyer–Olkin measure verified the sampling adequacy for the analysis, KMO = 0.772, which is above the acceptable limit of 0.5 (Field, 2013). The Kaiser-Meyer-Olkin measure of sampling adequacy is a statistic that indicates the proportion of variance in the variables that might be caused by underlying factors. High values (close to 1.0) generally indicate that a factor analysis may be useful with the data. If the value is less than 0.50, the results of the factor analysis probably won't be very useful (Cerny & Kaiser, 1977). Bartlett's test of Sphericity tests the hypothesis that the correlation matrix of the data is an identity matrix, which indicate that the variables are unrelated and therefore unsuitable for structure detection. Values (less than 0.05) of the significance level indicate that a factor analysis may be useful. The value of the Bartlett's test for this data was 0.000 below the 0.05 significance level, therefore apt for the conduct of factor analysis. To obtain eigen values for each factor in the data an initial analysis was run. Three factors had eigen values over Kaiser's criterion of 1, cumulatively accounting for about 42.854% of the total variance in the sample data. Table 5 shows the factor loadings after rotation. Factor 1 represents the individual or work related items that influence compliance with universal precautions. Factor 2 represents hospital/facility-based factors that influence compliance with universal precautions.

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Table 6: Rotated component matrix

Statement	Factors	
	Individual Factors	Hospital/Facility-based Support
Too busy	0.177	
Colleagues don't use them.	0.264	
Patients offended if I use.	0.209	
Pose no risk	**0.575**	
Exposure anticipation	**0.747**	
Not possible in emergencies.	**0.640**	
PPEs are uncomfortable.	**0.715**	
Difficult to work in.	**0.511**	
Unavailability of equipment.	0.341	
Strictness of senior staff on the use of recommended precautions.		**0.541**
Protection of staff from BBVs is a priority.		**0.576**
Infection control policy / committee.		**0.471**
Infection prevention training upon hire		**0.714**
Annual infection prevention training		0.023
Availability of incidence book		**0.800**
Availability of PEP		**0.614**
Hepatitis B vaccination at no cost.		0.397
Needle safety is stressed		**0.597**

Note: Factor loadings over 0.4 appear in bold

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4.7 Exposure to Blood borne Infections Occur

Figure 4.2 presents a pie-chart of exposure of respondents to needle prick or bodily fluid from patients. Majority (56.0%) of respondents had been exposed to needle prick injury or had experienced fluid splash from patients. Over a third (31%) had experienced needle prick only while 13% had experienced fluid splash from patients.

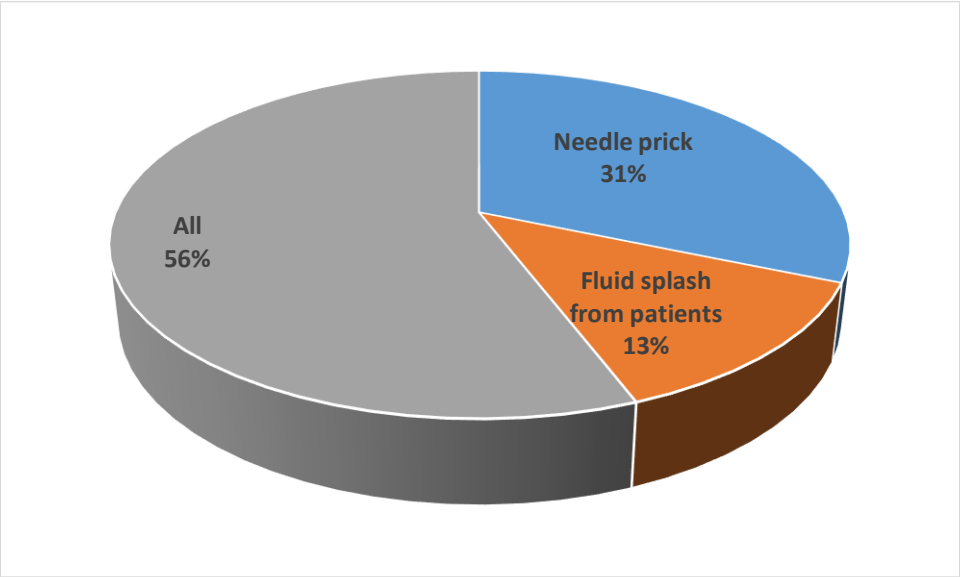

Figure 4.2: Exposure experienced during work

4.8 Measures taken when Exposure Occurs

When exposure to blood borne infection occurs, 97% of respondents indicated that they wash their hands with soap and water and others (3%) report the incident to the appropriate authority (Figure 4.3).

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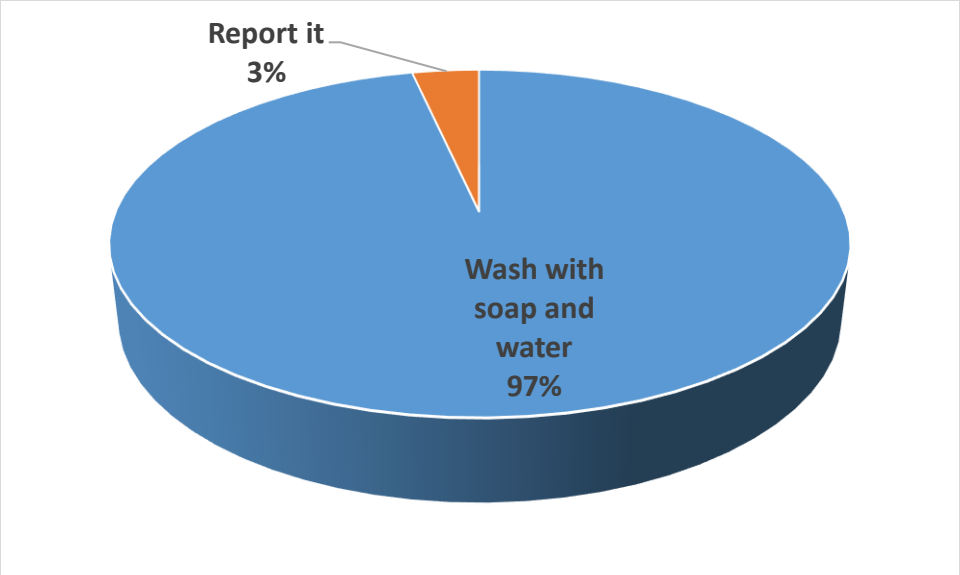

Figure 4.3: Measures taken when exposure to Infection Occurs

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CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter is in two sections, it presents the discussion in relation to the objective of the study and limitations of the study.

5.2 Sociodemographic characteristics

The findings of the study revealed that majority of the HWs were aged between 28 and 32 years and most were females. Nurses formed the major profession whereas Christians were majority of the respondents and many were single. Majority were diploma holders. Most of the respondents have been in their job for less than 5years. This is similar to a study by Naderi et al., (2012) where majority of their respondents were females, aged between 21 to 48 years, with the highest respondents being young nurses with 3 years and below work experience. The association between background characteristics and compliance with universal/standard precautions indicated that age, marital status, religion, education, as well as hospital department of respondents does not influence respondents' compliance. However, females had the tendency of adhering to standard precautions than their male counterparts. Moreover, midwives and nurses were more likely to adhere with standards compared to laboratory technicians. The years of experience indicated that respondents with higher years of working experience are more likely to comply with universal/standard precautions compared with respondents with lesser working experience. This is similar to the study by (Naderi et al., 2012) which indicated that exposure to blood and bodily fluids was more in health workers with less than 3 years of working experience. Moreover, previous training on universal/standard precautions as well as knowledge of hospital

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guidelines related to universal/standard precautions influence respondents' compliance with standards.

5.3 Respondents Compliance with standard precautions

Compliance with standard precaution is key in health care practice because it prevents acquisition of various infections. The findings of this study revealed high compliance with universal precautions among health workers. Majority of the HCWs reported being compliant. This is at variance with the findings of a study conducted by (Yawson & Hesse, 2013) that showed that Hand Hygiene (HH) compliance among doctors and nurses was low. It is again at variance with the outcome of low compliance with approved guideline of infection control and aseptic techniques that was recorded in Nigeria. (Gadzama et al., 2014). Majority of the respondents had moderate compliance with some aspects such as protecting themselves against body fluids of all patients regardless of their diagnosis; putting used needles into designated sharp container; taking extra care when using sharp objects, not recapping used needles and also disposing of used tissues and masks and performance of hand hygiene after contact with respiratory secretions. Compliance was however insufficient/low with procedures such as wearing waterproof aprons; use of eye protections and mask; and reporting of needle stick injury as well as other exposures. This confirms the study by Weinshel et al (2015) which showed that adherence to recommended Infection Control practices was suboptimal.

5.4 Availability of preventive measures

Generally, the study found that universal precautions and measures for prevention of blood borne infections were available at the Kwesimintsim hospital. These measures include the presence of policies and protocols for preventing exposure to blood and body fluids, training on infection prevention procedures, availability of PPEs, vaccination of staff, and surveillance and monitoring

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of staff by management. Though majority of the respondents indicated that these materials were always available, others indicated that they were sometimes unavailable. This situation agrees with findings by Luo et al, (2010) among nurses in China who iterates that protective gear cannot constantly be bought and delivered as mandated by the protocols due to economic constraints.

Also, this study found that protocols were always available in the facility including the various departments. However this result is contrary to that reported by (Nouetchognou et al., 2016; Timilshina et al., 2011) which attributed increased incidence of accidental exposure to blood to the absence of displayed protocols and inadequate behavior of caregivers. Again, it was found that training of staff on infection prevention measures as well as vaccination against HBV was priority in the facility although antibody testing after vaccination is not done. Similar results were found in India and Cameroon where training and vaccination were done but no antibody protection analysis was done. (Gupta et al., 2016; Nouetchognou et al., 2016)

Majority of respondents stated that materials or logistics for prevention of blood borne infections were always available, on a few occasions some of these materials were unavailable. This is similar to reports in Ethiopia where HWs expressed dissatisfaction with the provision of infection prevention materials (Reda et al., 2010). However, reuse of syringes is not indicated in this study. Also, though hand washing areas were in all units of the facility it was inadequate since it was not at each patient care room. Lack of this is also echoed in a study where respondents stated that there were inadequate logistics though they were available throughout the year. Some stated that hand washing facilities were inadequate (Yenesew et al., 2014).

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Again, findings from the study also indicated that done quarterly or yearly. This showed some level of inconsistency as reported by Weinshel et al (2015) where adherence to recommended Infection Control practices was suboptimal due to inconsistency in surveillance.

Finally, an association was found between availability of PPEs and other structures and compliance with universal precautions indicating that, when the health professionals are adequately provided with these equipment, it enhances their compliance with universal precautions. This finding is at par with that of Liu et al (2014) where they concluded that for compliance of HWs with the UPs, PPEs must be sufficiently supplied.

5.4 Factors influencing compliance with preventive measures

The individual or work related factors that influence compliance with universal precautions indicated that respondents underestimate the risk of being infected if standard precautions are not adhered to. For instance, some respondents believe that patients do not pose a risk to them while others indicated that they do not anticipate exposure. This reveals their attitude towards complying with universal or standard precautions. Similar findings were made in a study conducted by Iliyasu et al. (2016), which found deficient know how on the transmittal danger of blood borne pathogens (HIV, HBV, HCV) which hints that most of the health workers underrate the transmittal danger and this is likely to put them at danger of infection following exposure. As a result their study noted that low compliance with the use of simple PPEs may be due to this factor. Other individual or work related factors in this study such as; inability of health workers to prevent exposure with patients' blood in emergency situations, uncomfortable feelings when wearing protective equipment (goggles, gloves, masks, and boots), and difficulty in working properly when wearing protective equipment (goggles, gloves, masks, and boots) further confirms the finding of Liu et al., (2014) which suggested the need to also include psychosocial

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factors, such as attitude, belief, and social norm, to factors that effectively enhance compliance of HWs to the use of PPEs.

The second factor which represents facility based factors influencing compliance with universal precautions reiterates the significant role it plays in enhancing compliance among health workers at the hospital. The attitude of senior staff as well as the management of the hospital indicated that staff protection from exposure to blood borne pathogens (HIV/AIDS or hepatitis B) was of great importance. Moreover, the presence of an infection control policy/committee in this hospital also contradicts the findings of Weinshel et al. (2015) which indicated that chances for advancement of infection control activities are available in various places, including clinical institutional infection control programs and monitoring, flow chart on various issues, surgical instrument sterilization procedures, and improved hand hygiene.

The items that confirm the role of hospital support in ensuring adherence with standard precautions amidst care givers include the provision of training on infection prevention upon hire, availability of sticks injuries and other exposure events, availability of post-exposure follow-up & prophylaxis and the relevance of needle safety is emphasized in all hospital departments. In a similar study conducted by Luo et al. (2010), they found that some issues affecting adherence with the standard precautions include: teaching and understanding, presence and comfort in the usage of protective equipment, over-all self-efficacy, contact with the sick, and unit of the care giver(Luo et al., 2010).

5.5 Measures taken when exposure occurs

This study found that a system for reporting exposure is in place but majority of the HWs exposed do not use this system. It found that majority of the respondents do not report these

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exposures and since these exposures were not reported post exposure management was poor. This is in line with the findings of Bhardwaj et al., (2014); Mbaisi et al., (2013) which revealed that post-exposure management was poorly adhered to and that there was gross underreporting of the exposures. These also accounted for the scarce data available on infections through blood borne exposures. This finding is again similar to a study in Cameroon which revealed that HWs had not officially reported their accidents (Nouetchognou et al., 2016).

5.6 Limitations of a Study

The findings of this study are somehow limited because it did not collect direct observational data on compliance with preventive measures among HWs, but is reliant on individual account. This may cause discrepancy, where little or over reporting of adherence with precautions is stated. Social desirability bias may also be a potential limitation in self-reported studies like this one in the sense that HWs might report socially acceptable responses than what they actually do.

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CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

In conclusion, compliance with these preventive materials was high though compliance was low with regards to some measures such as reporting of needle stick injuries and other exposures, use of googles and face mask.

Overall, availability of preventive materials and equipment was adequate and a significant association was seen between availability and compliance. Policies and protocols on infection prevention were in all departments, staff training and vaccinations was also available.

Yearly survey and monitoring on the use of preventive measures was available at the facility. Factors such as the belief that patients do not pose a risk; unanticipated exposure; PPE impeding work performance; UP/SP not possible in emergency situations; discomfort when using UP/SP and usually being too busy to use the recommended precautions were reported to have influenced compliance.

Reporting of injuries from needles and exposure to blood and bodily fluids was low. The measure often taken after exposure to needle prick and other blood and bodily fluid was washing with soap and water.

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6.2 Recommendations

- The Hospital Management should regularly train HWs on the use of standard precaution and its relevance in everyday practice.
- The need for antibody testing after hepatitis B vaccination is essential to know if protection has been acquired.
- Surveillance and monitoring on the use of these infection prevention must be regular and consistent.
- Also, management must ensure constant and continuous supply of equipment and materials for infection prevention.
- The importance of the practice of non-recapping needles must always be emphasized since sharp needles are key exposure to transmission of blood borne infections.
- Health workers should be encouraged to report exposure to blood and bodily fluids, as well as injuries from needle pricks and other sharp objects.
- Further studies should employ a qualitative method as this would help explore factors which are difficult to quantify and also solve the problem of respondents' overestimation of the level of compliance with SP practice.

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APPENDICES

Appendix I: Informed consent form for respondents.

General information

This study seeks to assess Blood Borne Infections Prevention among Health Workers at Kwesimintsim Hospital. The study is quantitative and study participants will include nurses and midwives, laboratory technicians and orderlies. They will help find out the availability of preventive measures of blood borne infections, the level of conformity with preventive measures and also to identify the factors that may hinder the use of these preventive measures.

Duration of study.

The study is expected to start in May 2018 with data collection, processing and coding, data analysis, report writing and dissemination of findings to the hospital in August 2018.

Risk and benefits

This study is non-invasive and will not cause any form of discomfort to participating clients. The results will be used to inform policy on quality of care and maintaining safety standards to staffs which will lead to the improvement of services provided by hospital.

Right to refuse

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Participation in this study is voluntary and declining to answer any question or discontinue answering questions has no negative consequence on respondents.

Anonymity and confidentiality

All data collected will be handled with strict confidentiality and will be used purely for research purposes. Your responses will not be shared with parties not involved with the study. Data analysis will be done at the aggregate level to ensure anonymity.

Background

The principal investigator is Magdalene Esenam Boamah, a student of the School of Public Health, University of Ghana, Legon, undertaking a study on Assessment of Blood Borne Infections Prevention among Health Workers at Kwesimintsim Hospital. This study is solely for academic purposes and requirement for the award of Master of Public Health. The project is under the supervision of Dr. Dzodzomenyo of the School of Public Health, University of Ghana, Legon.

Institutional Affiliation

Department of Biological, Environmental, Occupational Health Sciences (BEOH), School of Public Health, College of Health Sciences, University of Ghana, Legon.

Costs and/or Payments to Subject for Participation in Research

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There will be no costs for participating in this research and there will be no payments awarded for participating in this research.

For further clarification concerning the research, you may contact Dr. Dzodzomenyo (+233208376845) of the Department of Biological, Environmental and Occupational Health Sciences; School of Public Health, University of Ghana and Hannah Frimpong, (0243235225/0507041223) the chairperson of GHS- Institutional Review Committee.

Appendix II: Participant Informed Consent

I have been adequately informed about the purpose, procedures, potential risks and benefits of this study. I have had the opportunity to ask questions which have been answered to my satisfaction. I know that I can refuse to participate in this study without any loss or benefit to which I would have otherwise been entitled. Having gone through the consent form thoroughly, I agree to enroll in this study.

Name of participant……..

Signature or thumb print: ……. Date……

Interviewer's Statement:

Interviewer's statement

I have explained the procedure to be followed in this study to the participant in the language that he or she understands best and he/she has agreed to participate in the study.

Signature of interviewer…….

Date……

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Appendix III: Structured Questionnaires

This is a confidential assessment tool to be used to assess prevention of blood borne infections among health workers at Kwesimintsim Hospital. Information given is solely confidential and will be used for academic purposes only.

SECTION A: SOCIO DEMOGRAPHIC DATA

1. Age: 20 – 30 years [ ] 31 - 40 years [ ] 41 - 50 years [ ] above 50 years [ ] others [ ]

2. Sex: Male [ ] Female [ ]

3. Marital status: Single [ ] Separated [ ] Married [ ] Cohabitating [ ] Divorced [ ] Widowed [ ]

4. Religion: Christian [ ] Islam [ ] Traditional religion [ ] Hinduism [ ] others (specify).....

5. Profession: Nursing [ ] Laboratory technician [ ] Midwifery [ ] orderlies [ ] others (specify) ……

6. Educational Level: Certificate [ ] Diploma [ ] Post Basic [ ] Degree [ ] Master [ ] others (please specify).....

7. Department/unit: Male ward [ ] female ward [ ] children's ward [ ] maternity ward [ ] theatre [ ] laboratory [ ] accident and emergency [ ] others (specify)…….

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8. Years of practice: Less than 5 years [ ] 5-10 years [ ] 11-15 years [ ] 16-20 years [ ] Greater than 20 years [ ]

9. Any previous training program on universal/standard precautions? No [ ] Yes [ ]

10. Do you know of any hospital guidelines related to universal/standard precaution for infection control? No [ ] Yes [ ]

SECTION B; AVAILABILITY OF PREVENTIVE MEASURES (UNIVERSAL PRECAUTION MATERIALS)

8. Are there policies and protocols for preventing exposure to blood and body fluids in your department? No [ ] Yes [ ]

9. Have you being trained on infection prevention procedures? a) Yes b) No

10. Is there a hand washing area in your department? a) Yes b) No

11. Are hand towels readily available to be used after hand washing? a) Yes b) No

12. Do you always have a puncture-resistant sharps container in your facility? a) Yes b) No c) sometimes

13. Do you always have personal protective equipment in your facility? a) Yes b) No c) sometimes

14. Do you encounter shortage of resources pertaining universal precautions in this facility? a) Yes b) No

15. If Yes, How often. a) Very often b) Sometimes c) Always d) Never

16. Are staffs vaccinated against HBV in this facility? a) Yes b) No

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17. Have you been vaccinated against HBV? a) Yes b) No

18. If Yes, Was antibody testing done after vaccination? a) Yes b) No

19. Do you always use universal precautions? a) Yes b) No

20. If No, Why? a) Have not being trained on the use of universal precautions b) heavy workload does not allow for use c) universal precautions are not available in this facility d) forgets to use in emergency situation.

Others specify……

21. How often does management survey and monitor the use of preventive measures in your facility? A) Yearly b) twice a year c) quarterly d) monthly e) never

22. Are you well staffed in this facility? a) Yes b) No

For each of the questions below, **tick [√]** your response in the spaces provided. Please use these keys- (**always; sometimes; and not available**) to provide the most appropriate responses.

Availability of personal protective equipment (PPE)	**Always 3**	**Sometimes 2**	**Not available 1**
1. Is there available gloves?			
2. Is there available masks?			
3. Is there available disposable aprons and gowns?			
4. Is there available goggles?			
5. Is there available face shields?			
6. Is there available protective boots?			

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Other environmental equipment/materials			
7. Presence of a sink in each patients care room			
8. Presence of running water			
9. Presence of soap supply			
10. Availability of disposable hand-towels			
11. Availability of air-dryer			
12. Presence of trash container near each sink			
13. Availability of alcoholic hand rubs			
14. Presence of safety container for sharps in each room			
15. Presence of incineration apparatus for sharps in the unit			
16. Availability of an isolation room in the unit			
17. Infectious waste separated from household waste			
18. Presence of containers with lids for general waste			

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SECTION C FACTORS INFLUENCING COMPLIANCE WITH UNIVERSAL PRECAUTIONS

For each of the questions below, **circle** [**O**] your response in the spaces provided. Please use 3these keys–Strongly Agree-[SA]; Agree-[A]; Not Sure-[NS]; Disagree-[D] and Strongly Disagree-[SD] to provide the appropriate response.

Individual / work related factors	**Strongly agree**	**Agree**	**Not sure**	**Disagree**	**Strongly disagree**
1. I am usually too busy to follow the recommended precautions to protect myself against contact with patients' blood.	5	4	3	2	1
2. I don't always use the recommended precautions to protect myself against contact with patients' blood because my colleagues don't use them.	5	4	3	2	1
3. Patients may get offended if I use the recommended precautions to protect myself against contact with patients' blood.	5	4	3	2	1
4. I believe that patients do not pose a risk	5	4	3	2	1
5. I do not anticipated any exposure	5	4	3	2	1
6. It is not possible for health workers to protect themselves against contact with patients' blood in an emergency situations; because the patients' needs come first.	5	4	3	2	1

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7. I feel uncomfortable wearing protective equipment (goggles, gloves, masks, and boots).	5	4	3	2	1
8. It is difficult to get work done properly when wearing protective equipment (goggles, gloves, masks, and boots).					
Facility-based factors					
9. There is unavailability of equipment for work	5	4	3	2	1
10. The management in this hospital care about my safety at work.	5	4	3	2	1
11. In this hospital, the senior staff are very strict about following the recommended precautions to protect against exposure to patients' blood.	5	4	3	2	1
12. The protection of staff from exposure to blood borne viruses (such as HIV/AIDS or hepatitis B) is a high priority with management in this hospital.	5	4	3	2	1
13. In this facility, all the equipment necessary to protect staff from exposure to blood borne viruses (such as hepatitis B and HIV/AIDS) is provided.	5	4	3	2	1
14. There is an infection control policy / committee in this hospital.	5	4	3	2	1
Hospital support role					
15. Hospital provide training on infection prevention upon hire	5	4	3	2	1
16. Availability of annual training on infection prevention	5	4	3	2	1
17. Availability of log of sticks injuries & other exposure events	5	4	3	2	1

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18. Availability of post-exposure follow-up & prophylaxis	5	4	3	2	1
19. Availability of Hepatitis B vaccination to all Hospital workers at no cost.	5	4	3	2	1
20. Importance of needle safety is stressed in all hospital units					

COMPLIANCE WITH STANDARD PRECAUTIONS AMONG HEALTH WORKERS

For each of the questions below, circle [O] your response in the spaces provided. Please use these keys (Always; often; rarely; sometimes; and never) to provide the most appropriate responses.

No.		Always	Often	Sometimes	Rarely	Never
1.	I protect myself against the blood and body fluids of all patients, regardless of their diagnosis.	5	4	3	2	1
2.	I put used needles and other sharp objects into the designated sharps container.	5	4	3	2	1
3.	I wear gloves whenever there is a possibility of exposure to blood or other body fluids.	5	4	3	2	1
4.	I wash my hands after removing disposable gloves.	5	4	3	2	1
5.	I wear a waterproof apron whenever there is a possibility of blood or other body fluids splashing on my clothes.	5	4	3	2	1
6.	I wear eye protection (goggles/glasses) whenever there is a possibility of blood or other body fluids splashing	5	4	3	2	1
7.	I wear a mask whenever there is a possibility of blood or other body fluids splashing in my face.	5	4	3	2	1
8.	I do not recap needles that have been contaminated with blood.	5	4	3	2	1

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9.	I dispose of all blood-contaminated items into the bag or bucket designated for disposal.	5	4	3	2	1
10.	I take extra care when using scalpels, needles, razors, or other sharp objects.	5	4	3	2	1
11.	I promptly wipe up all spills of blood and other body fluids.	5	4	3	2	1
12.	I cover my broken skin before coming to work.	5	4	3	2	1
13.	I report needle stick injury as well as other exposures.	5	4	3	2	1
14.	I dispose of used tissues and masks, and perform hand hygiene after contact with respiratory secretions.	5	4	3	2	1
15.	I treat waste contaminated with blood, body fluids, secretions and excretions as clinical waste, in accordance with local regulations.	5	4	3	2	1
16.	I clean, disinfect, and reprocess reusable equipment appropriately before use with another patient.	5	4	3	2	1

SECTION D MEASURES TAKEN AFTER EXPOSURE

1. Which of the following have you experienced while working? a) Needle Prick b) Fluid splash from patient

Others……

2. What did you do after exposure? a) Wash with soap and water b) report it c) treat it as normal others ……..

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