

**SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
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**HEALTH WORKER COMPLIANCE WITH INFECTION PREVENTION
AND CONTROL POLICY IN GHANA: A CASE STUDY OF LA GENERAL
HOSPITAL**

BY

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DECLARATION

I, Vincentia Dzigbordi Kondor, declare that this dissertation is the result of my own research work except for references made to the work of other authors which have been duly acknowledged and was undertaken under supervision. This work has not been presented for the award of another degree elsewhere partially or in whole.

Candidate's Signature: _____ Date: _____

Vincentia Dzigbordi Kondor

Supervisor's Signature: _____ Date: _____

Dr. Justice Nonvignon

DEDICATION

This work is dedicated to my husband Mr. Albert Agbesi Wornyo and our three children
Ethan, Alvina and David Wornyo

ACKNOWLEDGEMENT

My first acknowledgement goes to God Almighty who has made it possible for me to carry out this work. I acknowledge my husband Mr. Albert Wornyo for his support which he provided to me throughout this program. Again I acknowledge my supervisor, Dr. Justice Nonvignon, as well as all my lecturers who provided me with the needed guidance in the process of carrying out this work. Acknowledgement also goes to Madam Evelyn, the IPC coordinator of La General Hospital and Mr. Charles Amankwa for their assistance during the data collection process at the hospital. Finally, I acknowledge my family, and Pastor Christian Avornyo for constantly encouraging me to persevere amidst all the challenges I encountered at the time of carrying out this work.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
GHS	Ghana Health Service
HAI	Hospital Acquired Infection
HBV	Hepatitis B Virus
HCAI	Health Care-Associated Infection
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
HS	Healthcare Setting
HW	Health Worker
ICU	Intensive Care Unit
IPC	Infection Prevention and Control
LEKMA	Ledzokuku Krowor Municipal Assembly
LGH	La General Hospital
MOH	Ministry Of Health
NICU	Neonatal Intensive Care Unit
PPE	Personal Protection Equipment
SSI	Surgical Site Infection
WHO	World Health Organization

DEFINITION OF TERMS

Access to IPC equipment: this refers to availability of IPC equipment as well as how conveniently it positioned for personnel to reach and use it

Adequate Knowledge: being well informed about the policy and its content

Aseptic: Is being without contamination caused by microorganisms

Compliance: Means strictly following guidelines.

Decontamination: This is the process of rendering in inanimate objects free from microorganisms in order to make them safe for handling.

Infection: Is the entry of microorganisms into a person to cause disease

Hand hygiene: This is cleaning of hands either by washing with soap and running water or by using sanitizers or alcohol rub

Resources: This are item or materials such as soap, gloves, etc, that are needed to carry out an activity or a precaution.

Sharps: Refers to all objects that are capable of cutting/ piercing through an intact skin

Waste segregation: categorizing waste into various classes

ABSTRACT

Infection prevention and control is an important topic in the delivery of quality health care because it aims at protecting the patient, the health worker as well as the general public. The main objective of the study was to determine if health workers comply with Infection Prevention and Control (IPC) policy guidelines during health care delivery. A cross-sectional design was used in this study to assess the level of compliance with the IPC policy of Ghana by health workers at La General Hospital. The population of the study consisted of health personnel working at the La General Hospital. Stratified sampling method was used to select a sample of 143 participants for the study. The result of the study indicates that knowledge in IPC among health workers in La General Hospital was high, as 97% of participants had adequate knowledge with 64% of this proportion having excellent knowledge. Availability of infection prevention and control resources to health workers always was 31.4%. Noncompliance due to time constraint at work was 66.4%. Compliance of health workers with IPC guidelines was 30.7%. From the results of this study, health worker knowledge on IPC is high. This notwithstanding, regular workshops and in-service training on IPC must be continued to improve the standards of health delivery practice with regards to IPC. Management is encouraged to improve the availability of IPC resources to health workers. Again management is called upon to duly regulate staff workload in order that staff do not get over burdened, and their time constrained for that matter.

KEYWORDS: health worker, compliance, knowledge, infection prevention, standard precautions resource availability, hand hygiene, health care-associated infections.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Health Care-Associated Infections (HCAI) are a major public health problem all over the world. It is estimated that in developing countries, the risk of infection is high and the number of patients who get infected with acute hospital acquired infections can exceed 25% (WHO, 2010). A study in intensive care units from 25 countries reported on device-associated infections (a type of HCAI) that, crude excess mortality in adult patients was 18.5% for catheter related urinary tract infection, 23.6% for catheter related blood stream infection and 29.3% for ventilator associated pneumonia (WHO, 2011).

Hospital acquired infections (HAI) also known as nosocomial infections or health care-associated infections (HCAI) are infections that are acquired during health care delivery. Health care-associated infections are infections that are not manifest at the time of admission to a hospital or a health care facility but are acquired in the clinical setting (Nejad, Allegranzi, Syed, Ellis & Pettet, 2011). Healthcare workers are exposed to microorganisms that are in patients. Without proper infection prevention and control (IPC) practices, these microorganisms can get transferred from one patient to another by healthcare workers. By this process, a patient who comes to the hospital to be attended to may end up acquiring an infection from the hospital setting. There are various means by which infection is spread to susceptible patients during healthcare delivery. Infection may spread to the patient through healthcare staff, contaminated equipment, bed linens or air droplets.

Mathur, (2011) argues that HCAI continue to draw the attention of various stakeholders such as patients, insurers, government and regulatory bodies mainly because of the

recognition that HCAs are preventable. Studies have shown that hand hygiene contributes greatly to the prevention and control of infections in clinical settings (WHO, 2005; WHO, 2012). It is in line with this recognition that governments and regulatory bodies take steps towards the provision of guidelines to help prevent and control infections in hospitals and other healthcare facilities. In Ghana, the Ministry of Health has put in place a policy to help in infection prevention and control. This is the National Policy and Guidelines for Infection Prevention and Control in Health Care Settings in Ghana (IPC Policy).

The IPC Policy is meant to give direction to healthcare personnel and clients for the prevention and control of infection within health care settings in order to ensure patients safety and that of health workers. The policy is based on research findings and recommendations from experts as well as professional judgement indicating the need for strategies to handle infection. Standard precautions, listed in the policy guidelines are based on the principle that all blood, body fluids, secretions, excretions, non-intact skin and mucous membranes may contain transmissible infectious agents. These standard precautions include hand hygiene, the use of appropriate personal protective equipment, the use of aseptic technique to reduce exposure to microorganisms and management of sharps, spills, linen, and waste to maintain a safe environment.

According to Malliarou, Sarafis, Zyga, and Constantinidis (2013), health workers generally have a positive attitude towards infection prevention practices such as hand cleaning, but compliance rates are below 30%. Studies have shown that knowledge, attitude and compliance with IPC guidelines among health workers is low. For example, Stein, Makarawo and Ahmed, (2003) found that in Birmingham Teaching Hospitals, knowledge of health workers regarding blood-borne virus transmission was 44% for hepatitis B virus (HBV) and 54% for HIV. In Hong Kong, a study by Tai, Mok, Ching and Pittet, (2009)

reported that health workers acknowledge that 75% of HCAI can be prevented by hand hygiene.

1.2 Problem Statement

The prevalence of HCAI is high and calls for concerns as to what is not being done right. It is reported by WHO, (2016) that, of every 100 hospital admissions, seven (7) in developed and ten (10) in developing countries, contract at least one HCAI. Studies have shown that, most HCAs are transmitted by health personnel as a result of failure to practice standard precautions such as hand hygiene or to change gloves between client contacts (Delaune, and Ladner, 2010). By failing to wash hands and change gloves between patient contacts, microorganisms can get transferred from one patient to another as well as to other HW and health delivery equipment.

It is stated by WHO (2016), that some factors that put patients at risk of HCAs are more specific to settings with limited resources and they include, understaffing, overcrowding, poor knowledge and application of basic IPC measures, poor infrastructure, absence of local and national guidelines and policies etc. All these factors impact directly on compliance with IPC. The prevalence of HCAs therefore suggests that some of these factors are at play and for that matter there may be noncompliance with the existing IPC policy.

Although standard precautions have proved effective in IPC, there are indications that compliance of HW with these measures is low (Garcia-Zapata, Silva, Guimaraes, Tipple, Prado, et al. 1996). In Ghana, a study by Hayeh (2012), conducted at the Ridge Hospital reported that knowledge and compliance with infection prevention and control among the health workers were moderate. This indicates that, there is the need for more efforts to be directed at increasing knowledge and compliance of healthcare workers (HW) with the IPC policy. It also calls for more of such studies to be conducted to find out the knowledge and

compliance with IPC policy guidelines at hospitals and other healthcare facilities in Ghana. In addition, anecdotal reports suggest that, there are several cases of infections in hospitals and healthcare facilities in Ghana. An example is a story that was reported on Joy FM (a radio station in Ghana), of a father who lost two babies (and almost lost a third baby) at the Komfo Anokye Teaching Hospital due to infection.

A major factor for poor compliance is inadequate awareness (Suchitra & Lakshmi, 2007). In the National IPC Policy document, one of the strategies mentioned to help to implement IPC standard practices is to disseminate the policy guidelines to all health care settings. This means that some training in IPC practices is being done though it appears to be inadequate. Another factor for poor compliance with IPC policy is the non-availability of resources/equipment needed to practice in accordance with the guidelines. The need for surveillance and studies to ascertain health worker compliance with the IPC policy in Ghana is therefore vital as this would help to obtain information on HW compliance with IPC as well as information on factors hindering compliance.

1.3 Objectives of the Study

1.3.1 General Objectives

The general objective of the study was to determine health worker compliance with infection prevention and control policy in Ghana.

1.3.2 Specific Objectives:

1. To examine the knowledge level of health personnel about the IPC policy
2. To assess the availability of resources/equipment needed to practice according to IPC standard precautions
3. To ascertain if time constraints at work affect HW practice of standard precautions

1.4 Research Question

- Do health workers in La General Hospital (LGH) have adequate knowledge of IPC standard precautions?
- Are IPC equipment available to HW in LGH
- Does time constraint at work interfere with HW practice of standard precaution

1.5 Justification

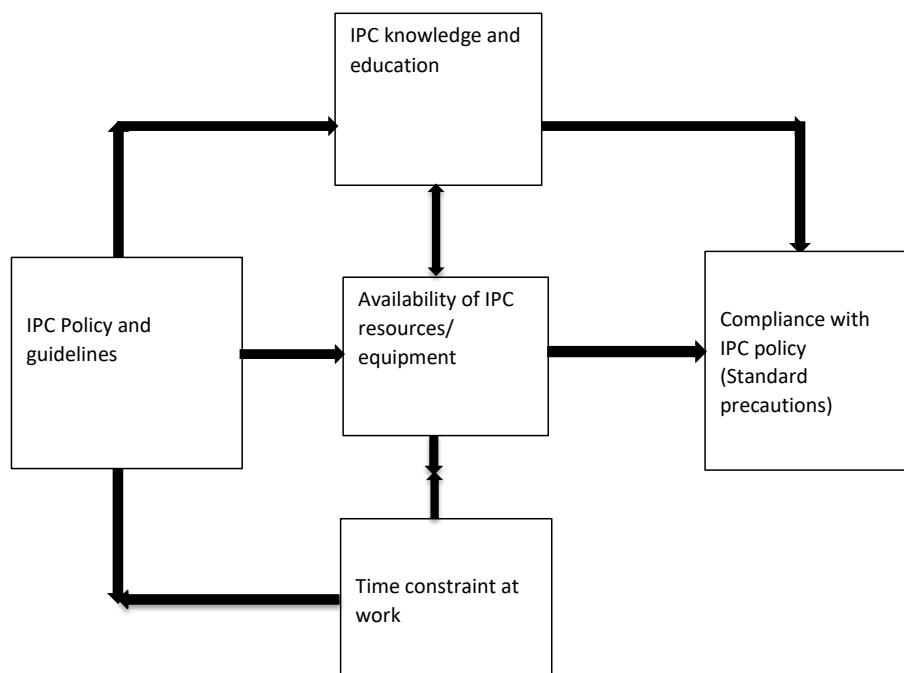
There is a need for studies to ascertain the compliance of HW with IPC policy due to the high prevalence of HCAI. The high prevalence of HCAI is an indication of a missing link to achieving IPC goals. It is when studies and surveillance is carried out that this missing link would be identified hence the need for this research to be carried out.

In addition to finding out what is being done, surveillance has been identified as one of the important ways of enforcing compliance as indicated by Ward, (2012). This is as a result of health workers knowing that their practices as well as its impact is being monitored directly or indirectly.

As indicated in the literature review of HCAs, there was not enough available data on HCAs due to inadequate studies on the topic especially in Africa and other developing countries. As identified, HCAs occur as a result of noncompliance to IPC precautions. This study would therefore also add to available knowledge on compliance with IPC.

1.6 Conceptual Framework of HW compliance with IPC Policy

A framework of infection prevention and control policy and how some factors influence health workers to comply or not comply with the policy. Some reasons given by some HW for failing to follow IPC guidelines include, lack of equipment, inadequate IPC training, and time constraint at work (Malliarou, Sarafis, Zyga, and Constantinidis, 2013).

Figure 1: Some factors that affect HW compliance with IPC Policy.

Source: Author's Conceptualization

The IPC policy stipulates education to create awareness of standard precautions. Education would provide health workers knowledge to practice IPC standard precautions. This would also inform stakeholders to supply IPC resources/equipment and make them available which would facilitate compliance with standard IPC practices.

The IPC policy also requires that IPC equipment be made available in health Settings. Availability of IPC equipment would enable health workers to comply with the IPC policy.

Time constraint at work is a barrier to health workers' ability to comply with the IPC policy. It hinders health workers from adhering to standard precaution practices.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature review chapter studies previous works published by other authors regarding IPC, the knowledge of HW as well as their compliance to IPC standard precautions. This chapter is discussed under the following sections: Infection prevention and control, health worker knowledge and perception about the IPC policy, factors affecting compliance, and effect of noncompliance.

2.2 Infection Prevention and Control (IPC)

2.2.1 Health Care-Associated Infections (HCAI)

Health care-associated infections are infections that are acquired in a healthcare setting; meaning, they were not present before the patient entered the healthcare setting. Health Care-Associated Infections, also known as nosocomial infections, are acquired during healthcare interventions (Public Health England, 2014). These infections can manifest within the healthcare facility or after the patient is discharged from the hospital. Health Care-Associated Infections include occupational infections among healthcare workers (WHO, 2010). This points to the fact that health workers are themselves at risk of contracting infections from patients and the healthcare setting.

Because most patients' immunities are already compromised, they easily contract infections. This is through contact with other patients, healthcare workers, or the environment within the healthcare setting. Patients who are most susceptible to HCAI include, newborns, critically ill patients at intensive care unit (ICU), elderly patients, surgical patients, and immunodeficiency patients.

Though it is difficult to obtain adequate and reliable information on HCAI, results from studies show that hundreds of millions of patients contract HCAI globally. This is because most countries do not have adequate surveillance systems for HCAI and even those who have it struggle with its complexity and lack standardized criteria for making diagnosis (WHO, 2010). A multicenter study in Europe revealed that approximately 30% of patients in ICU are affected by at least one HCAI (WHO, 2016). Urinary tract infection is the most commonly occurring HCAI in developed countries. Surgical site infections (SSI) is the most common in settings having scarce resources, affecting one third of all patients who undergo surgery. This is nine times higher than it is in developed countries. The prevalence of HCAI is between 3.5% and 12% in developed countries while in developing countries, prevalence ranges between 5.7% and 19%.

Prevalence rate of HCAI in Ghana, is not available due to inadequate surveillance and studies in Ghana. However, prevalence of HCAI is estimated to be high though it is hardly addressed (Enemark, Newman, Asante, and Fenny, 2016).

According to WHO, (2016), HCAs are the most commonly occurring adverse healthcare delivery event worldwide. This notwithstanding, HCAs only get public attention when an epidemic occurs. The impact of HCAI includes causing additional trauma and relative disability to patients, increased microbial resistance, prolonged hospital stay, increased cost of treatment to patients and relatives and the worst being death (National Collaborating Center for Women and Children's Health, 2008). The prevalence of HCAI and its burden affects patients, relatives, health institutions, as well as other stakeholders such as insurers, and this calls for infection prevention and control measures and policies to regulate these measures.

2.2.2 The IPC Policy in Ghana

A national IPC policy is essential because the absence of local and national guidelines and policies put patients at risk of contracting HCAs (WHO, 2016). The IPC policy in Ghana was updated in 2015. The policy document of the Ministry Of Health of Ghana (MOH) addresses concerns which arose from unacceptable IPC practices in healthcare settings (HS) in the country. It therefore lays down policies and broad guidelines to direct health delivery practices to meet acceptable IPC standards.

The policy mandates all categories and levels of HW to be aware of and to comply with the IPC policy and guidelines.

The primary purpose of the policy is to give direction to HW in health delivery to prevent and control infections within HS, in order to ensure patients' safety and protect HW. To achieve this purpose, there are standard precaution measures outlined in the policy to guide health delivery practices. The objectives of the policy include, providing acceptable standards for practices of IPC, and outlining strategies that shall make IPC practices routine in all aspects of health care.

Some strategies outlined in the policy document are to disseminate the policy and guidelines to all HS and to implement, monitor, evaluate, and update the policy (Ministry of Health, Ghana, 2015).

2.2.3 IPC Standard Precautions

Standard IPC precautions, also known as standard precautions are a set of measures that reduce the risk of contracting or transmitting infection from known or unknown sources. Standard precautions are based on the principle that all body fluids have the potential of

causing infection (Ministry of Health, Ghana, 2015). Such body fluids include, blood, body fluid, excretions (except sweat), non-intact skin, and mucous membranes.

The standard precautions include hand hygiene, the use of personal protective equipment, blood and fluid spillage management, sharps safety, routine environment cleaning, processing of reusable medical equipment and instrument, respiratory hygiene and cough etiquettes, aseptic non-touch technique, patient placement, textile and laundry, and waste management (Abou and El-Mahdy, 2011). By adhering to these measures, HW would prevent the transfer of microorganisms from one patient to another.

Some factors that put patients at risk of HCAI are insufficient application of standard and isolation precautions, lack of knowledge of injection and blood transfusion safety, inadequate environmental hygienic conditions and waste disposal, etc. (WHO, 2016). According to Garcia-Zapata, Silva e Souza, Guimaraes, Tipple, Prado, and Gracia-Zapata, (2010), although standard precautions have proved effective in IPC, studies show that compliance of HW to these measures is very low. It is for this reason that WHO stated that one of the solutions to the problem of HCAI, is the implementation of standard precautions, especially best hand hygiene practices (WHO, 2009).

2.3 Health worker knowledge and perception on IPC policy

A study by Hayeh (2012), reported that, the knowledge of health workers at Ridge Regional Hospital on IPC was moderate and called for routine training of HW on IPC. Another study by Yakob, Lamar and Henok (2015) in Ethiopia revealed that, majority of health workers did not have favorable, and adequate knowledge, attitude, and perception on IPC standard practices.

It is recommended that education and knowledge are likely to improve practice. In view of this generally accepted recommendation, Ward (2011), carried out a research on the role of education in infection prevention and control. The review revealed that education alone does not play much of a significant role in infection prevention and control especially in the long term.

Jackson, Lowton and Griffiths (2014), reported that most of the practices by HW in health facilities did not always follow laid down procedure and policy. In addition to that, they stated that HW like to present themselves as being knowledgeable though their practices did not always follow policy. This indicates that, even among those HW who are well informed about IPC, not all of them comply with IPC standard precautions all the time. In addition, some HW are of the perception that IPC practices is an extra workload burden, (Ward, 2012).

Though education may increase knowledge, knowledge alone does not necessarily lead to improvement in IPC practices. According to Warren and Kollef (2005), the presence of a dedicated team of IPC experts is needed to provide education, surveillance, data collection, and to oversee the implementation of the IPC policy locally.

2.4 Factors Affecting Compliance

According to Malliarou et al (2013), some reasons given by some HW for failing to follow IPC guidelines include, lack of equipment, impact of other HW, inadequate IPC training, the health of the HW (eg. Allergy to latex gloves), and time constraint at work. This is a worrying situation because one person's non-compliance could go a long way to affect everybody else. The lack of equipment as stated above directly affects compliance to IPC precautions because HW need to use the equipment/ resources to carry out the standard precautions. Availability of IPC resources are sometimes attributed to lack of funds which

could be attributed to the low priority given to IPC in national health budgets (Raka, 2010). These resources include water, soap, gloves, hand towels, disinfectants, dustbins, sharp boxes etc. For instance a HW needs water and soap in order to practice hand washing. Njovu, (2016), also found that inadequate IPC materials affect IPC compliance.

Another important factor affecting compliance is the perception that IPC standard precautions are an extra workload instead of it being a vital part of patient safety and quality care (Ward, 2012). Apart from this perception, there is yet another factor affecting compliance with IPC policy, which is time constraint at work. Health workers' point to the fact that, it is time consuming to wash hands before and after each contact with each patient, change gloves between patient contacts, separate waste into various categories, etc. With an increased workload and / or shortage of staff, it becomes difficult for health workers to adhere to IPC guidelines during health delivery (Njovu, 2016). These notwithstanding, the benefits of these precautions far outweigh the time spent. It would cost more time, money and other resources to diagnose and treat a HCAI than it would cost to just practice IPC precautions such as hand washing. It is in view of this factor that Chipfuwa, Manwere, and Shayamano, (2014), recommended that the nurse patient ratio should be improved to address the problem of insufficient time to practice proper IPC principles.

Warren and Kollef's (2005) assertion that there is the need for surveillance and monitoring of implementation of IPC policies and plans at institutional or local levels, seems to be a major means by which infection prevention and control practices may be enforced. This is based on the fact that, although some training have been done on IPC and some HW are aware of standard precautions, the proportion of HW who comply with IPC guidelines is far below expectation. They are therefore of the view that lack of surveillance and monitoring is also a factor that contributes to non-compliance to the IPC policy.

2.5 Effects of Noncompliance

In their study, Jackson, Lowton and Griffiths (2014) reported that, despite initiatives and strategies to reduce the burden that infection causes, healthcare workers practices is still suboptimal and these infections persist. Failure to comply with IPC standard precautions causes and promotes the incidence and prevalence of HCAI. It would also promote the spread of infections generally within communities since patients and HW would convey microorganisms into the communities where they live. By so doing, the burden of infections would be endless and ever increasing.

The impact of noncompliance to IPC standard practices is the burden of HCAI on patients and other stakeholders. This burden includes, prolonged hospital stay, additional trauma to the patient, increased cost of treatment and so on (WHO, 2010). For direct financial cost only, the annual financial cost of HCAI is estimated at approximately 7million pounds in Europe and about US\$ 6.5 million in USA. Additional cost includes 16 million pounds extra days of hospital stay in Europe. Financial cost of HCAI are poorly and variably reported in low and middle-income countries (WHO, 2016). The worst impact of noncompliance with IPC policy is unnecessary deaths due to HCAI. Every year, HCAs account for 37,000 attributable deaths in Europe and 99,000 deaths in USA (WHO, 2016).

The development of antibiotic resistance is another impact of noncompliance. Noncompliance with IPC standard precautions results in reinfection after treatment of an infection. With the persistence of HCAs, the question comes to whether the right things are being done with regards to IPC policy and guidelines.

2.6 Summary of Literature Review

The existing works have revealed a lot of information about HCAI, IPC, factors affecting compliance and effects of noncompliance. It is established that hand washing can minimize

microorganisms acquired through contact with body fluid and contaminated surfaces and so can other IPC standard precautions. Existing studies have identified some factors that influence compliance with IPC guidelines. Factors identified as influencing compliance have however not been assessed for the extent to which they affect compliance.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter gives a description of how data was collected and analyzed to provide information on HW compliance with the IPC policy. The sections described under this chapter are study design, study location, study population, study variables, sampling method, data collection method and technique, quality control, data processing and analysis, ethical consideration and issues.

3.2 Study Design

A cross-sectional design was used in this study to assess the level of compliance with the IPC Policy of Ghana by health workers.

3.3 Study Location

The study was carried out at La General Hospital. La General Hospital health facility is located in the La Dadekotopon municipality of the Greater Accra Region of Ghana. The hospital was built in 1963 as a polyclinic and was upgraded to a hospital status in 2004.

It is a 161 patient bed-capacity hospital, with staff strength of 421 and has 39 units/ departments. Healthcare workers in La General Hospital (LGH) consist of anesthetists, Midwives, Surgeons, Pharmacists, Physician Assistants, Recorders, etc.

La General Hospital runs specialist clinics including, Neonatal Intensive Care Unit (NICU), diabetic clinics, physiotherapy, child welfare clinics, obstetric and gynecological clinics etc. The average daily OPD attendance in La General Hospital is 200 patient.

3.4 Study Population

The study population consist of health personnel working at the La General Hospital. Healthcare workers in LGH consist of anesthetists, doctors, nurses, pharmacists, laboratory technicians, orderlies, laundry workers, etc.

3.5 Study Variables

Dependent Variables

Health worker compliance with IPC policy in Ghana.

This was measured using a composite score. The participants answered 21 questions in the questionnaires indicating if they always, sometimes or never adhered to specific standard IPC precautions. An answer of always is scored two (2), sometimes is scored one (1) and never is scored zero (0), giving a highest total score of 42. A score of 35 and above is compliant and a score below 35 is noncompliant.

Independent Variables

- HW knowledge of IPC standard precautions
- Availability of IPC resources/equipment
- Time constraint at work

These were measured using a composite score. There were 10 questions measuring health worker knowledge of IPC, to which participants answered yes or no and scored one (1) and zero (0) respectively. This gives a total highest score of 10. Participants who get a total score of 10 have excellent knowledge, six to nine (6-9) have adequate knowledge, and a score below six (6) have poor knowledge of IPC policy guidelines.

There were nine (9) questions that measured availability of IPC resources to which participants answered always available scoring two (2), sometimes available scoring one (1)

or not available scoring zero (0). This gives a total highest score of 18 of which participants who scored above nine (9) were classified as having IPC resources always available and a score below 10 as not always available.

Time constraint at work was measured by one question. In this question, participants to indicate if time constraint was a barrier to their practice of hand washing (hand washing is considered to be the single most effective IPC standard precaution). Participants were to answer by indicating always for a score of zero (0), sometimes for one (1), or never for a score of two (2).

3.6 Sample size and sampling Method

The sample size was obtained using the Cochran's formula (Israel, 1992), which is:

$$n = z^2 (pq) / d^2$$

Where:

n is sample size

z is the z value for confidence level of 95% which is 1.96

p is the prevalence of the condition of interest = 0.096

$$q = 1 - P = 1 - 0.096 = 0.904$$

d is the margin of error = 0.5

Population (healthcare workers at LGH) = 421

Therefore using Cochran's formula, $n = \frac{1.96^2 (0.096 \times 0.904)}{0.05^2}$

$$= 133.36$$

SAMPLE SIZE OBTAINED = 134

3.6.1 Sampling Method

The stratified sampling method was used to select participants for the study. Ten (10) departments of the hospital were selected for the study. The criteria for selecting the ten departments was the level of contact with patients, the category of patients and the risk of infection transmission in the department. Selection of participants from each of these departments was done according to the ratio of staff strength of each department to the hospital population with regards to the obtained sample size. For departments which had a separate duty roster for the different categories of health workers there, selection of participants from each category was done according to the ratio of their number (the category) to the hospital population with regards to the obtained sample size.

Within each department, participants were selected using systematic random sampling. Every Kth person on the duty roster was selected to participate. The number K, which is the sample interval, was obtained by dividing the staff population of the hospital, 421, by the sample size, 134, giving an interval value of 3. The first participant was balloted for, between one and three. Subsequent participants were picked on an interval of three (3). The first participant was selected from the out patients department (OPD). There were 43 health workers attending to both the OPD and the Emergency unit. Of this number there were 12 prescribers, 24 nurses, 3 porters and 4 orderlies. 27 of these HW were females and 16 were males

3.7 Data Collection Method/ Technique.

The nature and purpose of the study was explained to participants and their consent was obtained after which a self-administered questionnaire was given to each participant.

All the participants were given questionnaires to answer and return. The questionnaires were collected from the participants as soon as they finish answering them. Participants who are unable to complete the questionnaire immediately were given time to complete it later. The data collection process covered a period of two weeks.

3.8 Data Collection Instrument

The research instruments that was used to collect data from the participants is a self-administered questionnaire. The questions in the questionnaire were derived from the research question and objectives of the study. The questionnaire covered the following sections: personal information, knowledge of IPC among health workers, availability of IPC resources, and compliance with IPC guidelines and precautions.

The personal information section, was used to collect socio-demographic information about participant. It had questions about participant's sex, age, highest level of education, category of work, rank, duration of working experience as a health worker as well as in La General Hospital and his or her main tasks performed at work.

The knowledge of IPC among health workers section, was used to examine if participants knew about the policy, the policy content and their role as health workers regarding IPC. The questions in this section include, if a health worker can transmit infection to a patient.

The section on availability of IPC resources was to find out if the necessary items that are needed to carry out standard precautions such as soap, water etc. were always available to

health workers. Some questions asked in this section include; are detergents available for hand washing at work?

The section on compliance with IPC guidelines was used to examine if health workers followed the required steps of IPC standard precautions during health delivery practices. Some questions asked in this section include; do you wash your hands as soon as you enter the ward? Do you wash your hands before leaving the ward?

3.9 Data Processing and Analysis

Questionnaires that were completed and returned were reviewed and the response rate calculated by dividing the number of questionnaires responded to, by the number of questionnaires given out to participants, and multiplied by hundred. One hundred and forty three (143) questionnaires were given out to participants but one hundred and forty (140) participants responded giving a response rate of 98%. The data was coded and entered in a data analysis software, stata version 15, for analysis of frequencies.

Knowledge of healthcare workers was analyzed in terms of the number of health workers who have adequate information about IPC policy and guidelines. The knowledge level of HW on IPC includes awareness of the HW of the existence of the IPC policy as well as the content of the policy regarding the expected role of the HW in IPC per the policy. A HW is said to have adequate knowledge when he/ she is aware of the policy, understands the need and importance of the policy, knows the role of the HW in IPC practice per the policy, and is aware of the implications of noncompliance of HW to IPC standard practice. Knowledge was measured using the score the participant obtained from answering the questionnaire.

Availability of IPC resources/equipment was analyzed in terms of the proportion of health workers who always had access to the needed IPC resources/equipment during healthcare delivery.

Health worker compliance was analyzed in terms of the percentage of health workers who always applied standard precaution measures in their health care delivery practices.

3.10 Quality Control

The questionnaire was pre-test to a sample of 6 HW, at LEKMA Hospital. This was done to enable necessary observation and corrections to be made in the questionnaire before it is administered for the study. For instance, pre-testing indicated that respondents understood and answered the questionnaire as they are meant.

All assistants were duly oriented to standardized data collection such as the proper filling of questionnaire. This helped to ensure accuracy in collected data.

All completed questionnaires were assessed to ascertain the accurate filling of the questionnaire.

3.11 Ethical Considerations /Issues

3.11.1 Ethical Approval

Ethical approval was obtained from the Ghana Health Service Ethics Review Committee. The Ghana Health Service Ethical Review Committee number was GHS-ERC033/03/18.

In applying for approval, an official letter was obtained from the University of Ghana, School of Public Health, to support other required documents for submission. The approval served as a legal backing for the research to be carried out.

3.11.2 Permission from Study Site

Permission was also sought from La General Hospital and the Human Resource Directorate of Ghana Health Service to carry out the research in their facility. In applying for permission, an official letter was obtained from the University of Ghana, School of Public Health, and submitted in addition to other required documents.

3.11.3 Description of Subjects Involved in the Study

The study participant was made up of staff of La General Hospital, whose activities/ work actively and directly impacts on infection control or transmission.

3.11.4 Informed Consent

Consent of participants was obtained from participants, after they had been well informed about the study and what is expected of them. Participants were made aware that they could refuse to participate in the study or opt out whenever they want, even though they are encouraged to participate. This is because, participation is not mandatory but voluntary. They were allowed to ask questions or raise concerns which were addressed as necessary.

3.11.5 Privacy/Confidentiality/Anonymity

All information provided by participants have been kept confidential. Questionnaire did not require participant's name hence participant identity is anonymous. Participants completed the questionnaire at their convenient time and place but with an agreed upon time. This served to guarantee participant privacy in answering the questionnaire.

3.11.6 Potential Risks and Benefits

The study population, patients, and the community at large stands to benefit from this study because, the information derived from the study would help to prevent and control infection

and HCAI for that matter. In the long run it would reduce the cost of healthcare delivery and the overall burden of HCAI on both health workers and patients. There were no risks associated with the study.

3.11.7 Data Storage and Usage

The questionnaire were coded and kept in a secure location by researcher. Data collected were coded and entered within 72 hours of collection and saved on a personal computer by researcher. The personal computer was password protected and accessed by researcher only. Data was then be backed up to prevent loss data.

3.11.8 Conflict of Interest

I declare that there is no conflict of interest with regards to this work.

CHAPTER FOUR

RESULTS

The objective of the study was to determine whether health workers comply with the infection prevention and control policy in Ghana. It was conducted amongst health workers at the La General Hospital where a designed questionnaire was used to collect data. This chapter presents the results of the study under the following sections; socio-demographic characteristics of study respondents, distribution of HW knowledge of IPC Guidelines, availability of IPC resources/ equipment to HW, and HW compliance with IPC policy guidelines.

4.1 Socio-demographic characteristics of study respondents.

A total of 140 health workers participated in this study. Females were 64.0% (n=89). The mean age of health workers was 32.1 years (SD = 8.31). About 70% of the health workers had tertiary level of education. Of the 140 health workers, 77 (58.8%) of them were nurses, 17.6% were paramedics and 10.7% are prescribers (doctors and physician assistants).

About 43% of the participants had 1-5 years working experience with nearly two-fifths (38.4%) having 6-10 years working experience. Fifteen percent (15.0%) had 11-20 years of working experience while health workers with 20 – 40 years working experience was 3.8%.

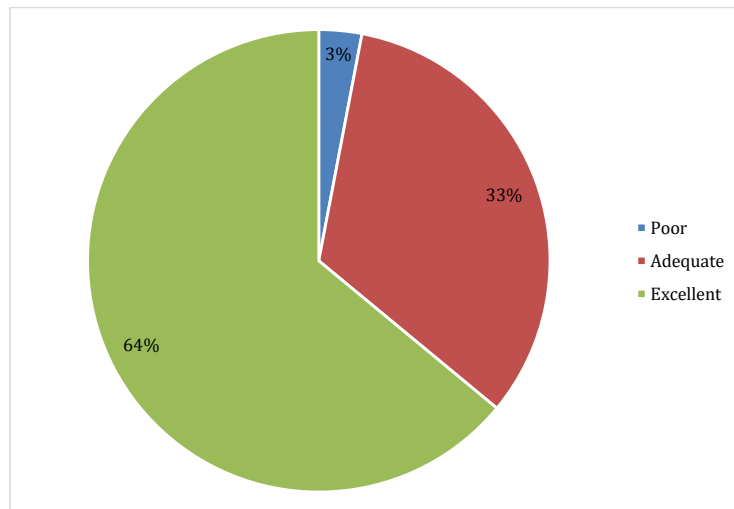
Table 1: Socio-demographic characteristics of respondents.

Characteristics	Frequency	Percentage (%)
Sex (n=139)		
Male	50	35.97
Female	89	64.03
Age (<i>mean, sd</i>)	(32.13, 8.31)	-
Highest level of Education (n=138)		
None	28	20.29
Primary/Basic	0	00.00
Secondary	9	6.52
Post-Secondary	5	3.62
Tertiary	96	69.57
Professional category (n=131)		
Prescribers	14	10.69
Nursing	77	58.78
Laboratory Technician	17	12.98
Paramedical ¹	23	17.56
Years of experience (n=133)		
1-5yrs	57	42.86
6-10yrs	51	38.35
11-20yrs	20	15.04
20-40yrs	5	3.76

4.2 Health worker knowledge of IPC guidelines

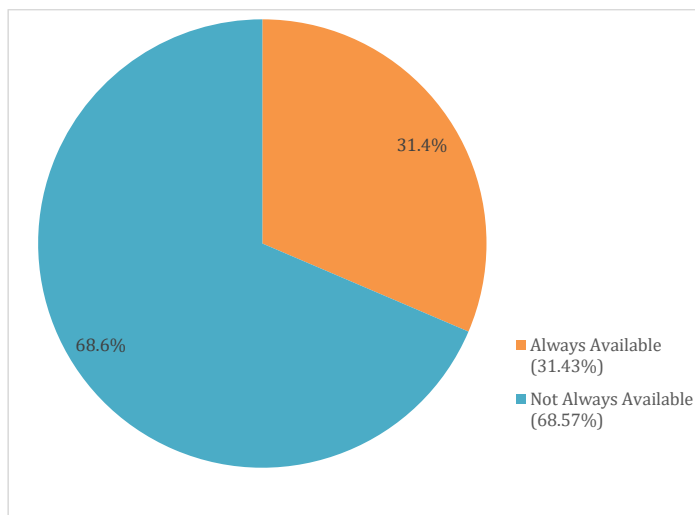
From figure 2 below, 64% of the health workers had excellent knowledge on infection prevention and control. While 46 out of the 140 health workers (33%) had adequate knowledge, the remaining 3% demonstrated poor knowledge on infection prevention and control.

Figure 2: Health Worker Level of Knowledge on Infection Prevention and Control



4.3 Assessment of Availability of IPC Resources/ Equipment to HW

Figure 3 below shows that, thirty percent (31.4%) of health workers at La General Hospital had resources such as soap, water and towels always available. Majority (68.6%) did not have these resources always available

Figure 3: Health workers with available resources for compliance to IPC policy

4.4 Health worker compliance with IPC Policy Guidelines.

Results from table 2 showed that majority (69.3%) of the health workers did not comply with the national IPC policy. Less than one third (30.7%) health workers were found to have complied with the standard infection prevention and control policy.

Table 2: Proportion of health workers compliant with IPC policy.

Resource availability (n=140)	Number	Percentage
Noncompliant	97	69.3
Compliant	43	30.7
Total	140	100

4.5 Relationship between predictor variables and IPC compliance.

The Chi square test of association was used as a measure of assessing the relationship between the predictor variables and IPC compliance. Predictor variables included sex, educational level, professional category, years of experience, time constraint at work,

availability of resources and level of knowledge. The outcome variable was HW compliance with IPC policy guidelines. The test was carried out at 95% confidence interval.

Among the predictor variables analyzed, time constraints to IPC practice was found to be significantly associated with compliance ($Chi = 30.43$, $p\text{-value} = 0.001$). All other variables were not significantly associated.

Table 3: Chi square test of association of socio-demographic characteristics of health workers and compliance to IPC

Compliance to IPC						
Variables	Noncompliant		Compliant		χ^2	p – value
	Number	%	Number	%		
Sex	N=97		N=42			
Male	33	66.00	17	34.00	0.53	0.47
Female	64	71.91	25	28.09		
Level of Education	N=95		N=43			
None	22	78.57	6	21.43		
Primary	21	75.00	7	25.00	4.06	0.26
Secondary	44	64.71	24	35.29		
Tertiary	5	55.56	4	44.44		
Vocational/Tech	3	60.00	2	40.00		
Professional Category	N=91		N=40			
Medical	9	64.29	5	35.71	4.06	0.26
Nursing	51	66.23	26	33.77		
Laboratory Technician	11	64.71	6	35.29		
Paramedic	11	9.17	3	13.04		
Years of Experience	N=92		N=41			
1- 5 years	14	71.93	16	28.07	1.20	0.75
6 – 10 years	33	64.71	18	35.29		
11 – 20 years	15	75.00	5	25.00		
20- 40 years	3	60.00	2	40.00		
Time constraint	N=93		N= 41			
Always	27	96.43	1	3.57		
Sometimes	48	78.69	13	21.31	30.43	0.001*
Never	18	40.00	27	60.00		
Knowledge	N=97		N=43			
Poor	4	100.00	0	0.00	2.19	0.33
Adequate	33	71.74	13	28.26		
Excellent	60	66.67	30	33.33		

4.6 Strength of Association

A multivariate logistic regression model was run between independent variables and the outcome variable (compliance with IPC). The Crude as well as the Adjusted Odds Ratios were found and are shown in *table 4 below*;

Table 4: Univariate and multivariate logistic regression analysis for the association between independent variables and compliance to IPC policy.

Variable	Crude OR (95% CI)	p – value	Adjusted OR (95% CI)	p- value
Sex				
Male (reference)	1	-	1	-
Female	0.76(0.36-1.60)	0.467	0.63(0.19-2.15)	0.466
Age	1.01 (0.97-1.06)	0.643	1.08(0.93-1.25)	0.317
Level of Education				
None (reference)	1	-	1	-
Primary	1.22(0.35-4.24)	0.752	0.93(0.13-6.58)	0.945
Secondary	2.00 (0.71-5.61)	0.187	5.29(0.30-10.19)	0.198
Tertiary	2.93 (0.59-14.45)	0.186	12.64(1.08-148.6)	0.044*
Vocational/Technical	2.44 (0.33-18.13)	0.380	5.34(1.10-152.12)	0.226
Professional Category				
Medical (reference)	1	-	1	-
Nursing	0.92 (0.28-3.02)	0.888	1.50(0.22 -10.31)	0.683
Lab. Technician	0.98 (0.22- 4.30)	0.981	2.64(0.26-26.56)	0.409
Paramedic	0.27 (0.12-0.05)	1.38	0.14(0.14 -1.34)	0.088
Years of Experience				
1-5 years (reference)	1	-	1	-
6 – 10 years	1.40 (0.62-3.16)	4.20	0.89(0.28-4.02)	0.881
11 – 20 years	0.85 (0.27-2.74)	0.791	0.13(0.01- 2.64)	0.184
20- 40 years	1.71 (0.26 – 11.20)	0.580	0.04(0.001-7.81)	0.229
Time constraints				
Always	1	-	1	-
Sometimes	7.31(0.91-58.99)	0.062	4.50(0.481-41.81)	0.186
Never	40.5(5.04- 325.20)	0.001*	92.36(8.62-989.8)	0.001*
Knowledge				
Poor (reference)	1	-	1	-
Adequate	0.79(0.36-1.71)	0.548	1.07(0.29-3.93)	0.919
Excellent	1 (omitted)	-	1 (omitted)	-

From table 4, time constraints significantly predicted compliance to IPC policy ($COR = 40.5$ 95% $CI = 5.04- 325.20$, $p\text{-value} = 0.001$). Health workers who never had time constraints were 40.5 times more likely to comply with infection prevention and control policy compared to those who always had time constraints.

However, after controlling for all other variables, time constraints and health workers level of education were significant in predicting compliance with IPC. Health workers who never had time constraints were 92.36 times more likely to comply with the infection prevention and control policy relative to those who always had time constraints ($AOR = 92.36$ 95% $CI = 8.62-989.8$, $p\text{-value} = 0.001$). In addition, health workers who have had tertiary education were 12.94 times more likely to comply with IPC policy relative to those with no formal education ($AOR = 12.64$ 95% $CI = 1.07-148.6$, $p\text{-value} = 0.044$).

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter focuses on discussing the findings of this study with regards to the objectives of the study. The discussion in this chapter is under the following sections; knowledge of IPC guidelines among HW, availability of IPC resources to HW, time constraint at work among HW, and compliance of HW with IPC policy guidelines. Compared with some other studies, health worker knowledge of IPC policy was found to be high. Availability of IPC resources was found to be low. Time constraint at work was high and had a significant impact on health worker compliance.

5.2 Knowledge of IPC Guidelines among HW

This study found that the overall level of knowledge of IPC guidelines among participants was high. Among participants, (136) 97% had adequate knowledge of IPC measures. Of this number, 64% had excellent knowledge, 33% had adequate knowledge and 3% had poor knowledge of IPC guidelines. This level of knowledge is high compared with that found by Njovu, (2016) which was 60.7% and could be due to the increased training and awareness creation about IPC protocols. The number of participants who have had IPC training was 128 (94.1%). This rate is also high compared with 26.5% of participants who have had IPC training in KL5 Hospital in Kenya as found by Maosa (2012) as well as 65.6% of participants who have had IPC training in MAG hospital in Ethiopia, as found by Yakob, Lamar, and Henok, (2015). Among participants, 98.5% knew that infection could be transmitted through contact with blood and body fluids. In addition, 95.5% of participants stated that infection transmission could be prevented by hand washing. About 93.6% (131)

of participants were aware that patients could acquire infections from health facilities they visit for treatment and that HW could transmit infections to patient. Considering the suggestion in some literature that knowledge would improve practice, the high percentage of participants who expressed adequate knowledge of IPC would be expected to reflect in the percentage of participant who comply with IPC standard precautions. Among participants, 125 (89.3%), knew that hand washing was the single most effective infection prevention and control standard precaution. This result of HW knowledge on IPC is contrary to the finding of Yakob, Lamar, and Henok, (2015), that, majority of HW did not have adequate knowledge on IPC standard precautions.

5.3 Availability of IPC Resources to HW

Availability of IPC resources was found to be low. Less than one third (31.4%) of participants always had basic IPC resources like soap, water and hand towel available for use at work. The remaining majority (68.6%), 96 participants, did not always have soap, water and hand towels available. This agrees with the 76.6% rate of inadequate resource supply found by Njovu, (2016). The indication therefore is that, low availability of IPC resources is a widespread problem especially in developing countries, and could be attributed to lack of funds to procure the needed resources as found the literature review. This notwithstanding, the problem needs to be addressed because inadequate IPC resources has been found to be a barrier to IPC practice Njovu, (2016). It is therefore not surprising that HCAs have been found to occur more in settings with limited resources (WHO, 2016). For availability of water for hand washing, 6.5% of participants indicated always available and 93.5% indicated sometimes available. This points to an issue of concern regarding the availability of water since it is a basic and essential resource and required in almost all IPC

standard practices. An always available response rate of 6.5% is therefore of concern. Availability of soap for hand washing was 9.4% for always available, 89.2% for sometimes available and 1.4% for never available. That of alcohol rub was 27.3% for always available and 69.8% for sometimes available. The findings indicate that most of the IPC resources are mostly sometimes available. This does not encourage compliance with IPC guidelines because it creates a situation in which standard precautions get skipped sometimes thereby reinforcing the chain of infection transmission which IPC precautions seek to break.

5.4 Time Constraints at Work among HW

Time constraints at work was found to influence the ability of HW to adhere to IPC guidelines. Among the participants, 89 (66.4%) of them admitted that time constraint at work was a barrier to their practice of hand hygiene. Of this number, 28 (20.8%) of them always had time constraint hindering their adherence to hand hygiene practice while 61 (45.5%) were hindered sometimes. This finding agrees with that of Njovu, (2016), that compliance was influenced by workload and shortage of staff, 47.9% and 38.3% respectively. Similar to this is another study by Chipfuwa, Manwere, and Shayamano, (2014) in which 26% of study participants indicated that lack of time was one of the factors that impede proper infection prevention and control practice. Most HW who had too many patients/ tasks to attend, found IPC practices to be an extra demand on them and their limited time. One of the reasons given by some HW for failing to follow IPC guidelines was, time constraint at work (Malliarou et al, 2013). The number of health workers whose compliance was not hindered by time constraints among the participants was 45 (33.6%). The statistical test indicated that there was an association between time constraint at work, and compliance with IPC policy guidelines. This gives an indication that HW who are overburdened with the tasks of health care delivery itself tend to be noncompliant with IPC policy guidelines.

5.5 Compliance of HW with IPC Policy Guidelines

The results of this study indicates that, compliance rate for IPC guidelines among HW at La General Hospital is low despite the high level of knowledge of IPC among HW. Among the 140 participants, 43 (30.7%) were compliant, while 97 (69.3%) were not compliant with IPC policy guidelines. Compared with the finding of Mukwato, Ngoma, and Maimbolwa, (2007), in which the result for compliance with hand hygiene was 61% and it was said to be moderate, this finding is low. It also confirms the finding of Gracia-Zapata et al, (2010) that, adherence of HW to standard precautions measures is very low. The results of high HW knowledge and low HW compliance from this study goes to agree with the finding of Ward, (2011), that education alone does not bring about infection prevention and control especially in the long term.

In assessing the relationship between knowledge of IPC, availability of IPC resources, time constraint at work and compliance with IPC guidelines, time constraint at work was found to have a significant impact on compliance. The statistical analysis showed that health workers who have time constraint at work, are 92.36 times less likely to comply with IPC policy than those who do not have time constraint at work. This may account for the difference in compliance between departments, since the tasks of health delivery vary among departments. Infection Prevention and Control precautions were also observed to be adhered to more, in some departments like the operating theater than in other departments like the laboratory and emergency units.

Although a high percentage of participants stated that they knew that patients could get infections from healthcare settings and that infection transmission could be prevented through hand washing, only 70 (57%) stated that they wash their hands before touching a patient. This is low compared with the study of Yakob, et al (2015), in which 68.7% of

participants wash hands before examining patients. It is however worth noting that, 107 (84.9%) HW wash their hands after touching patients. This shows that, HW are not as precautions about what they could transfer to patients, as they are about what they could contract from patients. Again, 59.5% of participants stated that they washed their hands first thing on entering the ward, while 80.2% wash their hands before leaving the ward and 69.4% changed their gloves between patient contacts. In addition only 73.1% of participants indicated that they always wear gloves before doing a procedure with a risk of exposure to body fluids. Although this percentage covers majority of participants, it is suboptimal, in view of the fact that it involves a procedure with risk of exposure to body fluids. These results tend to confirm the findings of the Canadian Committee on Antibiotic Resistance, (2007) that, HW practice hand hygiene less than half the time they should, even though they know the importance of hand hygiene.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The conclusion drawn about infection prevention and control practices among health workers in La General Hospital is that level of knowledge is high. This could be attributed to IPC trainings organized by the IPC committee of the hospital as indicated by the number of participants who have attended IPC training. The study however found that availability of IPC resources and HW compliance with IPC policy guidelines were low. Noncompliance due to time constraint at work was found to be high.

6.2 Recommendation

The following are some recommendations made following the results of the study:

1. Regular workshops and in-service training should be sustained to improve health care delivery practices with regards to IPC. Despite the indications of ongoing IPC training and high level of IPC knowledge among health workers, management should continue to update and refresh staff with information on IPC standard precautions.
2. Hospital management should provide the needed IPC resources for HW to practice according to IPC policy guidelines.
3. Through the Human Resource Directorate, management should address the problem of time constraint by duly regulating health worker-to-patient ratio. This is to avoid overburdening HW with the tasks of care delivery at the expense of the safety of both patients and HWs. As much as possible, staffing levels should be appropriate

to patient workload per department. This would improve the compliance with IPC policy guidelines by eliminating noncompliance due to time constraint at work.

4. More studies should be done into IPC and HCAIs in Ghana to provide data especially on HCAIs.

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APPENDICES

Appendix I – Respondent Information Sheet

General information

Project Title: Compliance Of La General Hospital Health Personnel With The National Policy And Guidelines For Infection Prevention And Control In Health Care Settings.

I amVincentia D.

Kondor.....(interviewer), a student of the Department of Health Policy Planning and Management in the School of Public Health, University of GhanaLegon pursuing a Master of Public Health Degree Programme. I am here with my research assistants to carry out a survey to find out how La General Hospital Health Personnel comply with the National Policy And Guidelines For Infection Prevention And Control In Health Care Settings. This is purely for academic purposes and forms part of the requirement for the award of Master of Public Health Degree. The researcher has no conflict of interest in this study.

Procedure

The study will involve answering questions from a questionnaire about compliance of Health Personnel with the Infection Prevention and Control (IPC) Policy. The information you provide will add to knowledge and inform policy about adherence to IPC Policy And Guidelines among health workers and propose some interventions needed.

Benefits and Risks

There will be no monetary or material compensation for the study. There are also no known risks associated with this study and I am always available to assist with any questions. .

Confidentiality

No name will be recorded. Your name and identity are not needed in the study. However the information you are going to provide will be coded and will be treated strictly confidential. You are assured of total confidentiality to the information you will give. Apart from the researcher and supervisor of this research, no one else will have access to information provided whether in part or whole. Data collected will be stored under lock and key then destroyed after a minimum of three years as per research protocol.

Right to refuse

Participation in this study is voluntary. You are free to answer part or the entire questionnaire. You can choose to withdraw from the study or stop the interview at any time you want. You can also choose not to answer any question(s) you find uncomfortable about. Should you choose not to participate, it will not affect you or your clinic in any way. However you are encouraged to participate fully in this study to help improve compliance with IPC Policy and Guidelines in Accra, Ghana and beyond.

Dissemination of results

Findings and recommendations would be available at the School of Public Health and it will also be disseminated through a meeting with different stakeholders at the end of the study.

Before Taking Consent

Do you have any questions you wish to ask about the study? Yes/No

If yes, please indicate the questions below

.....
.....
.....
.....

If you have any question(s) or further clarification concerning this study and/or the conduct of the researcher and research assistants, please do not hesitate to contact the following; Vincentia D. Kondor, School of Public Health, University of Ghana, vinkon755@gmail.com. Tel: 0244115586;

Dr. Justice Nonvignon, School of Public Health, University of Ghana, Legon, justicenonvignon@gmail.com, Tel: 0249832313

Dr. Reuben Esena, School of Public Health, University of Ghana, Legon, rkesena@outlook.com Tel: 0277220276

Mrs. Hannah Frimpong (Administrator), Ghana Health Service Ethical Review Committee Secretariat, Accra. Tel: 0507041223/0243235225

Appendix II: Informed Consent

I have read the information given above, and I understand. I have been given a chance to ask questions concerning this study and questions have been answered to my satisfaction. I now voluntarily agree to participate in this study knowing that I have the right to withdraw at any time without it affecting my current or future use of health care services.

Signature/Thumb print:Date:.....

Contact detail:

I, the undersigned, have explained this consent to the respondent in English and that she/he understands the purpose of the study, procedures to be followed as well as the risks and benefits of the study. The participant has fully agreed to participate in the study.

Signature of interviewer:..... Date:

Contact detail:

APPENDIX III: QUESTIONNAIRE

Commented [JN1]: Is this appendix, state

Assessment for Health Worker Compliance with Infection Prevention and Control policy.

Thank you for participating in this research.

We want to find out if your health delivery practices conform to Infection Prevention and Control standards. We also want to find out what IPC equipment are available to health workers, to facilitate compliance to IPC standard practices. The information you provide would help us identify what challenges may be hindering IPC standard practices. This study is anonymous, hence there is no need to provide your name. Thank you.

Instruction: Tick where appropriate and provide answers where necessary.

Date

Section I: Personal Information

1. Sex
 - A. Male ☐
 - B. Female ☐
2. Age
3. What is your level of education/ training?
 - A. Post Graduate ☐
 - B. Undergraduate ☐
 - C. Post-secondary (eg: Polytechnic, Training College etc) ☐
 - D. Secondary ☐
 - E. Basic school ☐
 - F. No Formal Education ☐

4. What category of health worker do you belong to?
- A. Medical ☐
- B. Nursing ☐
- C. Laboratory Technician ☐
- D. Paramedical ☐
5. What is your current rank?
6. How long have you been working as a health worker?
- A. 1-5 years ☐
- B. 6-10 years ☐
- C. 11-20 years ☐
- D. 20-40 years ☐
7. How long have you been working in this facility?
8. What are the main tasks that you perform at work?
- A. Clinical care ☐
- B. Disease control ☐
- C. RCH ☐

Section II: Knowledge of IPC among Health Workers.

We want to find out what you know about IPC

9. Have you ever heard of infection prevention and control?
- A. Yes ☐
- B. No ☐
10. Are you aware of an IPC committee in the hospital where you work?
- A. Yes

B. No

11. Do you have access to the IPC policy guidelines in your facility?

A. Yes

B. No

12. Have you ever had any IPC training?

A. Yes []

B. No []

13. What is the single most effective infection prevention practice?

14. Can a health worker transmit infections to a patient within the hospital?

A. Yes []

B. No []

15. How do infections get transmitted within the hospital?

A. Through contact with blood and body fluids []

B. By needle prick and cuts from sharps []

C. By contaminated hands []

D. Contact with contaminated instruments and surfaces []

16. How can Health Care-Associated Infection (HCAI) be prevented?

A. Proper hand washing []

B. Use of personal protective equipment (PPE) []

C. Proper processing of used instruments []

D. Proper disposal of waste and sharps []

17. What are some items you need to practice the single most effective IPC precaution?

Name two

.....

Section III: Access to IPC equipment

18. Are these items available to you for IPC practices at work?

- A. Always available ☐
- B. Sometimes available ☐
- C. Some items are available ☐
- D. Never available ☐

19. Are the available items easily accessible for use at work?

- A. Easily accessible ☐
- B. Sometimes accessible ☐
- C. Some items are accessible ☐
- D. Not easily accessible ☐

20. Are PPEs (eg. gloves) accessible for your use at work?

- A. Easily accessible ☐
- B. Not easily accessible ☐
- C. Sometimes available ☐
- D. Not available ☐

21. Do you easily get access to water for IPC practices (eg hand washing) at work?

- A. Easily accessible ☐
- B. Not easily accessible ☐
- C. Sometimes available ☐
- D. Not available ☐

22. Are detergents easily accessible for hand washing?

- A. Easily accessible ☐
- B. Not easily accessible ☐
- C. Sometimes available ☐

D. Not available ☐

23. Do you have easy access to non-water hand hygiene materials (alcohol rub)?

A. Easily accessible ☐

B. Not easily accessible ☐

C. Sometimes available ☐

D. Not available ☐

24. Are safety boxes accessible to you for disposal of used sharps (eg. blades, needles) on the ward?

A. Easily accessible ☐

B. Not easily accessible ☐

C. Sometimes available ☐

D. Not available ☐

25. Do you have access to detergents for decontamination of used instruments?

A. Easily accessible ☐

B. Not easily accessible ☐

C. Sometimes available ☐

D. Not available ☐

Section IV: compliance with IPC Guidelines and precautions

	Always	Sometimes	Never
26. How often do you wash your hands at work?			
A. First thing on entering the ward	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Before touching a patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. After touching a patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Before a clean / aseptic procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. After body fluid exposure risk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- | | | | |
|-----------------------------|--------------------------|--------------------------|--------------------------|
| F. After using the washroom | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| G. Before leaving the ward | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| H. Before eating | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

27. What are the barriers you face with regards to appropriate hand washing?

- | | | | |
|--|--------------------------|--------------------------|--------------------------|
| | Always | Sometimes | |
| Never | | | |
| A. Time constraint at work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| B. Lack of water | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| C. Lack of detergent | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D. Lack of hand towels | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| E. Difficulty in accessing sink/ veronica bucket | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| F. Lack of hand sanitizers/ alcohol rub | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| G. Skin irritation/ dryness and allergy to detergent | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

28. When do you wear gloves at work?

- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| | Always | Sometimes | Never |
| A. Before procedures that involve a risk of contact with body fluid | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| B. Before giving an injection | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| C. Between patient contacts | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

29. How do you dispose used sharps and needles?

- | | | | |
|-------------------------------------|--------------------------|--------------------------|--------------------------|
| | Always | Sometimes | Never |
| A. Putting them in the safety boxes | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

30. How do you dispose waste generated in the hospital?

- | | | | |
|---|--------|-----------|-------|
| | Always | Sometimes | Never |
| A. Color coding all waste bins according to the | | | |

- | | | | |
|--|--------------------------|--------------------------|--------------------------|
| waste generated in the ward | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| B. Separately putting waste materials into | | | |
| the appropriate bin | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |