

**NURSES' COMPLIANCE TO ENHANCED INFECTION PREVENTION AND  
CONTROL PROTOCOLS FOR COVID-19 IN THE CRITICAL CARE UNIT  
AT KENYATTA NATIONAL HOSPITAL**

**PRISCILLA LILY KIDAYU**

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## DECLARATION

### DECLARATION

I Priscilla Lily Kidayu declare that the thesis proposal is my original work and it does not include any material previously published or presented in any institution of higher learning scientific conference. The source literature used has been acknowledged and thoroughly researched.

Signature.....

Date.....1/12/2022

## SUPERVISORS' APPROVAL

This thesis has been approved by the following supervisors and will be submitted as a requirement for examination.

1. Samuel Kimani, PhD

Senior Lecturer

Department of Nursing Sciences,

Faculty of Health Sciences,

University of Nairobi.

Signature.....

Date.....24/11/2022

2. Theresa Odero, PhD

Senior Lecturer,

SUPERVISORS' APPROVAL

Department of Nursing Sciences,

Faculty of Health Sciences,

University of Nairobi.

Signature.....

Date.....24/11/2022

**CHAIRMAN, DEPARTMENT OF NURSING SCIENCES**

Dr. Emmah Matheka

PhD, MSc, BScN

Department of Nursing Sciences

Faculty of Health Sciences

The University of Nairobi

Signature: .....



Date: .....

28/11/2022

## DEDICATION

I dedicate this thesis to God and to my family, for your affirming , inspiring words ,and your endless love that kept me going throughout this journey.

To all critical care nurses - for their efforts, love and dedication in their work.

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## TABLE OF CONTENTS

DECLARATION .....	ii
SUPERVISORS' APPROVAL .....	iii
DEDICATION .....	iv
ACKNOWLEDGEMENT .....	vi
TABLE OF CONTENTS .....	vii
LIST OF TABLES .....	xi
LIST OF FIGURES .....	xii
LIST OF ABBREVIATIONS AND ACRONYMS .....	xiii
OPERATIONAL DEFINITIONS .....	xiv
ABSTRACT .....	x
CHAPTER ONE: INTRODUCTION .....	1
1.1 Background information .....	1
1.2 Problem statement .....	3
1.3 Research questions .....	4
1.4 Broad objective .....	4
1.5 Specific objectives .....	4
1.6 Study justification .....	5
1.7 Study variables .....	5
1.8 Conceptual framework .....	6
Nurses .....	6
CHAPTER TWO: LITERATURE REVIEW .....	7
2.1 Introduction .....	7
2.2 Epidemiology .....	9
2.3 Health care workers and COVID 19 infection .....	10
2.4 Compliance to Infection prevention and control measures .....	11

2.5 Knowledge on compliance of COVID 19 IPC measures .....	15
2.6 Factors influencing compliance to COVID 19 IPC guidelines .....	16
CHAPTER THREE: STUDY METHODOLOGY .....	19
3.1 Study design .....	19
3.2 Study Site .....	19
3.3 Study population .....	19
3.4 Eligibility criteria .....	20
3.5 Sample size determination .....	20
3.6 Sampling procedures .....	22
3.7 Participant’s recruitment procedures.....	22
3.8 Participant consenting procedure .....	22
3.9 Data Collection.....	23
3.9.1 Study instrument.....	23
3.9.2 Data collection procedure .....	23
3.10 Data Management Plan .....	23
3.10.1 Data cleaning and entry .....	23
3.10.2 Data storage .....	24
3.10.3 Data analysis, presentation and measurement .....	24
3.11 Ethical considerations .....	24
3.12 COVID-19 prevention considerations.....	24
3.13 Study limitations .....	25
CHAPTER FOUR: RESULTS .....	26
4.1 Introduction .....	26
4.2 Demographic characteristics of the respondents.....	26
4.3 Enhanced IPC protocols occasioned by emergence of COVID-19 infection ....	29
4.4 Compliance level to the enhanced IPC protocols among the nurses.....	31



4.4.1 Compliance to recommended hand hygiene protocols.....	31
4.4.2 Compliance to protocols on use of surgical masks.....	32
4.4.3 Compliance to protocols on use and disposal of disposable gloves.....	32
4.4.4 Compliance to protocols on use and disposal of head gear.....	32
4.4.5 Compliance to protocols on use and disposal of gowns.....	32
4.4.6 Compliance to protocols on patients' social distancing rule.....	33
4.4.7 Compliance to protocols on use of pedal operated coded bins for proper waste management.....	33
4.4.8 Compliance to protocols on proper segregation/separation of clean and dirty linen in linen cribs.....	33
4.4.9 Compliance to protocols on submerging of instruments in decontaminants.....	33
4.4.10 Compliance to protocols on proper storage of sterile instruments.....	34
4.5 Factors that influenced compliance to enhanced IPC protocols among the critical care unit nurses.....	35
<b>CHAPTER FIVE: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS</b> .....	<b>38</b>
5.1 Introduction.....	38
5.2 Discussion of Findings.....	38
5.2.1 Enhanced IPC protocols occasioned by emergence of COVID-19 infection.....	38
5.2.2 Compliance level to the enhanced IPC protocols among the nurses.....	40
5.2.3 Factors that influenced compliance to enhanced IPC protocols among the critical care unit nurses.....	42
5.3 Conclusions.....	43
5.4 Recommendations.....	44
5.5 Suggested Areas for Further Studies.....	44
<b>REFERENCES</b> .....	<b>45</b>
<b>APPENDICES</b> .....	<b>50</b>
Appendix 1: Letter to Ethics Committee.....	50

Appendix 2: Letter to the institution (Department).....	52
Appendix 3: Participants information sheet .....	53
Appendix 4: Consent form .....	55
Appendix 5: Questionnaire.....	57
Appendix 6: Budget .....	65
Appendix 7: Time frame .....	66

## LIST OF TABLES

Table 4.1: Respondents' demographic characteristics .....	28
Table 4.2: Enhanced IPC protocols at KNH's CCU .....	30
Table 4.3: Compliance to recommended hand hygiene protocols among the respondents .....	31
Table 4.4: Factors that influenced compliance to enhanced IPC protocols among the critical care unit nurses (n = 151) .....	36
Table 4.5: Association of the identified factors with the critical care nurses' compliance to the enhanced IPC protocols .....	37

LIST OF FIGURES

Figure 2.1: Conceptual framework .....6

## LIST OF ABBREVIATIONS AND ACRONYMS

AAIs	Amino acid interaction networks
CCU	Critical care unit
COVID-19	Corona virus disease
ERC	Ethics and Research Committee
HAIs	Health care associated infections
HBC	Home based care
HCW	Health care worker
HHC	Hand hygiene compliance
IPC	Infection Prevention and Control
KNH	Kenyatta National Hospital
NICU	Neonatal intensive care unit
PICU	Pediatric intensive care unit
PPE	Personal protective equipment
SARS-CoV 2	A severe form of acute respiratory syndrome corona virus 2
ARDS	Acute respiratory distress syndrome
SOP	Standard operational procedures
CDC	Center of disease prevention and control

## OPERATIONAL DEFINITIONS

**Compliance:** A process of following the prescribed orders and dispensed regime as intended by the institution. In this case the focus will be on nurses' compliance.

**Infection prevention control guidelines:** Guidelines that aid in protecting the health care workers and patients from being harmed by avoidable infection and as a result of antimicrobial resistance

**Enhanced infection prevention guidelines:** A further improvement of the quality of infection prevention and control guidelines.

**Nurses:** A part of the health team who are qualified and trained in the provision of nursing services to patients.

**Corona virus disease 2019:** It is a transmissible disease caused by the novel SARS-CoV 2.

**Critical care unit:** A unit designated specifically in offering comprehensive care to the critically ill patients.

**Critical care nurses:** A cohort of highly skilled professionals who are trained in critical care nursing.

## ABSTRACT

**Background:** The health care system has been adversely affected by corona virus infection and as a result nurses have been tasked with the burden of caring for an increased number of patients. Health care workers are at a higher risk of contracting infection of corona virus and so it is important that the nurses comply to the infection prevention and control protocols. Compliance of nurses to IPC protocols has become a challenge in some institutions, yet it is very vital in the control and prevention of infections. The main approach to COVID-19 infections is mainly adhering to infection prevention and control measures. Although IPC practices were in place before COVID 19, there was need to enhance these measures after the emergence of the corona virus and therefore implementation strategies of adhering to IPC measures should be put in place.

**Objective:** Assessing nurses' compliance to enhanced IPC protocols for COVID-19 in the critical care units at the Kenyatta National Hospital.

**Methods:** The study population were nurses working in the critical care unit at Kenyatta National Hospital. Descriptive cross sectional study was used. A sample size of 151 critical care nurses working in the different critical care units at Kenyatta National Hospital were recruited and provided with self-administered questionnaires. Structured observational checklists were used to assess for compliance of nurses to IPC COVID -19 enhanced protocols. In order to sample nurses who participated in the study, I used proportionate stratified random sampling so that each stratum had the same sampling fraction. Simple random sampling method was then used within each stratum, where the researcher randomly selected participants using random number method and data was collected. The data collected was entered, coded and managed. Analysis of data was done using quantitative data in descriptive and inferential statistics in STATA statistical software version 26 and data was presented using tables.

**Results:** 151 nurses took part in the study. Most of the nurses complied with the protocols on proper hand hygiene though with a few exceptions in regards to application of moments of hand hygiene method and steps of hand hygiene. There was compliance in use and disposal of personal protective equipments (PPEs) including surgical masks, gloves, head gear and gowns. All (100%) of the nurses also ensured that patients observed the 1.5m social distance spacing rule. All (100%) of the nurses were also found to be compliant with protocols on use of pedal operated coded bins for proper waste management, proper segregation/separation of clean and dirty linen and proper storage of sterile instruments. Availability of quality and adequate PPEs (72.8%,  $p = .000$ ) and Proper training on COVID-19 enhanced IPC protocols (29.1%,  $p = .000$ ) significantly influenced the nurses' compliance to the enhanced IPC protocols.

**Conclusion:** Nurses working in the critical care units at KNH were highly compliant with the enhanced IPC protocols for COVID-19. Availability of quality and adequate PPEs, their knowledge of the COVID-19 enhanced IPC protocols and proper training on these protocols influenced their compliance with the enhanced IPC protocols.

**Recommendations:** KNH should ensure that each critical care unit has the enhanced IPC guidelines for COVID-19 as standards of operations for its critical care nurse

## CHAPTER ONE: INTRODUCTION

### 1.1 Background information

The global emergence of COVID-19 has brought a sudden disruption and instability of economy worldwide, with restricted movement resulting to loss of job. There has been increased morbidity and mortality rates associated with this infection(Ashinyo et al., 2021b). Recently, there has been emergence of a new COVID-19 variant, termed as “Omicron”. Omicron has sparked global concerns due to the possibility of enhanced transmissibility and escape from vaccines and therapeutic(NI et al., 2021). There has been increases in the number of mutations genetically and proteins of SARS-CoV-2 (Badua et al., 2021).

According to the Kenya COVID-19 situation, the COVID-19 numbers were increasing as noted in the month of March, 2020 and in which corona virus was declared national disaster. The ministry of health through the government of Kenya had to initiate COVID -19 guidelines in order to control the spread of infections. The situation continued until early 2021 when vaccines were made available. The Kenyan population was sensitized on the importance of adhering to COVID-19 IPC protocols and the need to be vaccinated which was attributed to a drop in corona virus infections.

Health-care workers are at high risk of corona virus infection. COVID-19 has severely affected the health care system due to an increasing number of patients admitted in the hospital and this has an impact on provision of care. The main approach to this infectious disease is mainly adhering to preventive measures such as wearing of masks, social distancing, wearing of PPEs, training on IPC measures, environmental hygiene. (Wilson et al., 2020).

Globally, it has been suggested that with direct droplet transmission, then it is likely to generate airborne transmission from aerosol generating procedures. (Wilson et al., 2020). This is why undertaking a precautionary measure to prevent infections is important for HCWs especially in countries faced with a shortage of PPEs. Hence the need to protect and monitor health-care providers to reduce transmission of infections to colleagues, hospitalized patients and even family members. The impact of increase



of infection rates can result in a collapse of the health care system and a further worsening of the pandemic.(Barranco& Ventura, 2020)

Compliance with infection prevention and control guidelines is usually facilitated by educating HCWs on IPC measures, providing of the necessary resources for IPC and conducting IPC practices audits. Strategies of IPC that minimize the spread of COVID-19 infections, that have been put in place include early recognition, source control, physical distancing, proper use of PPEs, minimizing of movement, environmental hygiene by cleaning and disinfecting equipment and surfaces and supporting of health workers in general.

In summary, there is a challenge of compliance to IPC protocols in institutions all over the world, yet it is a very vital means for health-care workers to use in reducing and controlling further infection of COVID-19(Sharma et al., 2020a). A study conducted revealed that there is no establishment of IPC protocols among Ugandan health care workers. There were treatment sites which were designated for COVID 19 patients where IPC measures were vigorously implemented but some of the asymptomatic patients sought health care services from non-designated hospital settings where IPC protocols are not well implemented. There are recommendations from the CDC ,that in order for health care delivery to be effective it is important to put in place additional standard operational precautions on IPC.(Amanya et al., 2020).With the emergence of corona virus disease and its high infectivity rates especially in the hospital setup and more so among health care workers, there is need for carefully designed and maximizing the use of staff resources, practicing infection and prevention measures, maintaining a clean environment by use of disinfectants, collection of samples meticulously and ensuring staff quarantine and proper staffing. Another way of controlling infection during the COVID 19 pandemic in the critical care unit, is to consistently assess the staff periodically and the infection control committee in the institution should look into guidelines that allow for isolation periods and institute ways of return to work protocols based on standard recommendations in the hospital.(Sharma et al., 2020b).

## **1.2 Problem statement**

COVID-19 generated global attention since the first cases were reported. Globally, the emergence of SARS-CoV 2 has led to increased number of persons who are infected and deaths. Front-line workers were most affected since they handle many patients who were admitted in the clinical settings. One critical approach to reducing infection in the critical care setting is compliance to COVID-19 IPC guidelines (Lai et al., 2020).IPC protocols have been present in the hospital setting in time memorial, even before the emergence of COVID-19 virus. Some of the precautionary measures used in combating infection are hand hygiene practices, environmental sanitation, waste segregation, use of PPEs. After the global pandemic of COVID-19 arose, some of these precautionary measures of IPC had to be enhanced for effective IPC. For instance, the modification of surgical masks, in attempt to reduce cross infection from one person to another. Gowns were improved and made in such a way they could be donned and doffed off easily. Other IPC measures that had to be modified during the pandemic era of COVID-19 is maintaining a social distance of up to 1.5m, training of HCWs on the enhanced IPC practices. Some countries restructured and redesigned the critical care unit in order to allow for the different entry and exit points. As a result, concerted efforts were undertaken to ensure additional resources were in place for effective delivery of IPC protocols.

The goal of this study was to investigate whether nurses were complying with the enhanced IPC COVID 19 protocols in the critical care units at KNH. Studies had shown that there was limited compliance of the protocols among HCWs. There were some factors highlighted by HCWs that influenced compliance to IPC COVID-19 measures such as lack of sufficient space to isolate patients, lack of sufficient isolating rooms with showering facilities. Other important practical measures described by health care workers that influenced compliance to IPC COVID 19 protocols included control of overcrowding, minimizing visitors and providing access to hand hygiene facilities. Insufficiency and substandard quality of PPEs and equipments were a serious concern of HCWs and the management in the clinical settings. This lack of compliance as a result of these factors had led to increase in spread of the corona virus and subsequent morbidity and mortality rates all over the world. With the enhancement and

modification of IPC standard precaution measures that were currently put in place, nurses were expected to consistently and strictly adhere to them in the fight against COVID-19 infections.

This would actually reduce infections in the clinical setting and prevent transmission of the corona virus. IPC protocols need to be periodically reviewed and revised in order to improve adherence to IPC measures. Evaluation of implementation of IPC standard measures during the COVID-19 infections would aid in measuring effectiveness and thereafter identify gaps that could be present thereof. Identifiable factors that influence non compliance of nurses to enhanced IPC practices should be addressed accordingly.

### **1.3 Research questions**

- 1) In what ways have the IPC protocols which were occasioned by the emergence of COVID-19 infections, enhanced in CCU at KNH?
- 2) What are the compliance levels among nurses in using enhanced IPC protocols in the critical care unit at KNH?
- 3) What factors influence compliance of nurses to enhanced IPC protocols in the critical care unit at KNH?

### **1.4 Broad objective**

To assess the nurses' compliance to enhanced IPC protocols for COVID-19 in the critical care unit at KNH.

### **1.5 Specific objectives**

- 1.) To identify the enhanced IPC guidelines occasioned by the emergence of COVID-19 in the CCU at KNH.
- 2.) To assess compliance levels of nurses to enhanced IPC protocols, in the critical care unit at KNH.
- 3.) To assess factors that influence compliance of nurses' to enhanced IPC protocols in the critical care unit at KNH.

## **1.6 Study justification**

It is important to assess nurses in complying to the enhanced IPC COVID-19 protocols in order to minimize the spread of infections from one person to another. This disease has brought about devastation and instability in the global economy in the recent past. COVID-19 infections could be drastically minimized when institutional guidelines were implemented effectively. The nurses are the key front-liners when caring for patients in the clinical setting yet on the other hand, are to be fully supported with adequate resources that would aid in minimizing COVID-19 infections. Therefore, consistency in ensuring that enhanced IPC protocols were adhered to in order to ensure effectiveness of compliance was the mandate of nurses. With the enhanced COVID-19 IPC protocols, infections would be controlled and this would reduce the burden of care for nurses.

This study may aid in setting up of standards of care with a clear focus on enhanced IPC protocols especially in this era of COVID-19 pandemic. One of the ways of creating awareness and placing an emphasis was to train and retrain HCWs on enhanced IPC protocols..

## **1.7 Study variables**

### **Independent variables**

Nurses

- Experience
- Attitude

Institutional based

- Organizational standards operating procedures
- Institutional policies
- Availability of resources

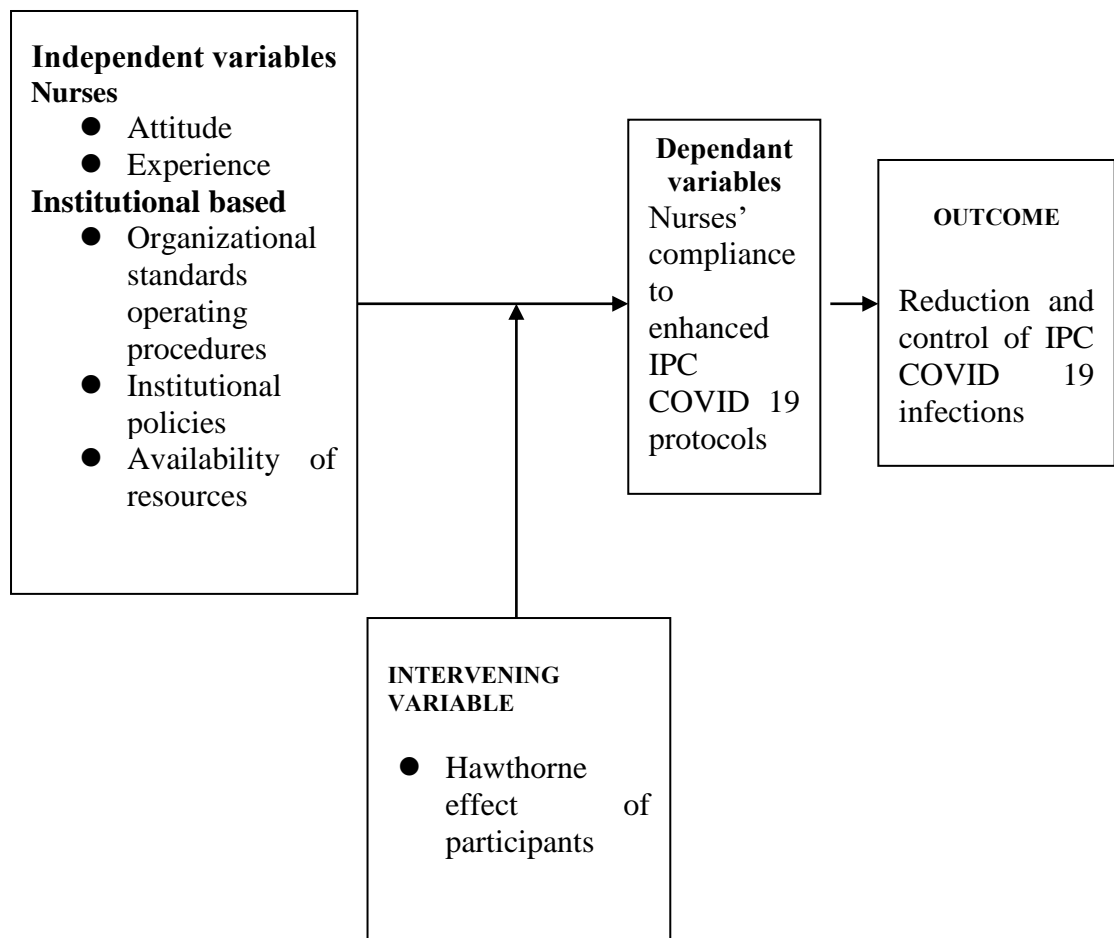
### **Dependent variable**

Nurses compliance to enhanced IPC COVID -19 protocols or guidelines

### **Intervening variable**

Hawthorne effect of participants under study

### **1.8 Conceptual framework**



**Figure 2.1: Conceptual framework**

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 Introduction

#### 2.1.1 Corona Virus

The origin of corona virus, SARS-CoV2 was discovered in Wuhan city, Hubei province in China in the month of December 2019. Patients who were at the seafood market were discovered to be having corona virus with the etiological agent confirmed to be as a novel corona virus and thought to have originated from zoonotic animals. (Ahn et al., 2020).The COVID 19 virus was officially named corona virus and categorized by WHO as a pandemic in the month of March 11<sup>th</sup> 2020 and it became a public health concern due to its infectious nature resulting from SARS-CoV 2(WHO 2020). The origin of COVID-19 from Wuhan, China brought about devastation to the global community which eventually led to economic instability, limitation of movement and job reduction with increased morbidity and mortality rates.(Ashinyo et al., 2021b).In the month of January20th, 2020, the Chinese adopted preventive and containment measures followed by concerted efforts to combat the corona virus in China. There was adherence to important measures which included sourcing for etiology of infectious agents and the focus to break the mode of transmission. Steps undertaken were as follows: The first measure was to close the sea food market which was taught to be the source of the corona virus during the initial outbreak and all transactions involving wild animals were prohibited to prevent the further spread of the infection. The second measure was to restructure the institutional buildings such as hospitals to establish quarantine and other medical resources. The third step was to identify all potentially infected persons and their contacts then initiate rigorous screening.(Wilson et al., 2020).

Corona virus is a highly infectious disease that has presentation of various clinical features that typically include a febrile state, a non-productive cough, a feeling of general malaise, pharyngalgia, myalgia, headache with pulmonary complications. There is also a report which describes persons with gastrointestinal tract symptoms such as abdominal features with passage of loose stools. (Xu Z et al., 2020).

Additionally, there has been some reports of asymptomatic patients, though statistically the studies are not yet exhaustive. Complications of COVID-19 include ARDS, a collapse of the respiratory system, hepatic injury, acute myocardial conditions, AKI, septic shock and multiple organ failing. (Shi et al., 2020).The disease is usually transmitted through droplet person to person contact. Other potential route of transmission are from aerosol generating procedures and fecal to oral route (Shi et al., 2020).

The major threat of COVID 19 infections worldwide is the epidemicsity of the disease due to its mode of transmission from human to human and for that reason, some studies have put more emphasis on epidemiology, clinical manifestations, diagnostic studies and therapeutic management and clinical trials of drugs and vaccine development(Shi et al., 2020).

### **2.1.2 Mode of transmission**

The mode of transmission of SARS-CoV-2 is by droplet infection via the respiratory system when an infected person coughs ,talks and sneezes. The modes of transmission of COVID 19 can be in two forms that is, direct and indirect mode of transmission. The direct mode 1.)Aerosol transmission when performing procedures such as surgical and dental in droplet form through the respiratory system. (2) Transmission can also be through body effluent such as nasal secretions, endotracheal aspirate, bronchial alveolar lavage and body fluids and (3) mother-to-child transmission. Indirect mode of transmission may occur via (1) surfaces and fomites in environments of a person who is infected and (4) medical equipment used on an infected person .(Karia et al., 2020).In terms of epidemiological patterns .there is no adequate data supporting long range aerosol transmission of SARS-CoV as it cannot be differentiated from droplet transmission. (Karia et al., 2020).It is important to maintain a social distance of up-to 1.5m apart and wear surgical masks,N95 or mask respirator, protect eyes by wearing goggles in order to prevent droplet infection transmission.(Azap& Erdinç, 2020).There is inadequate studies concerning transmission of infection via aerosol generating procedures since it was not quantified, though it is proposed that transmission can occur in reference to time in severe acute respiratory syndrome corona virus patients with respiratory conditions and not as a result of procedures.(Wilson et al., 2020). In

summary, studies concerning mode of transmission are still ongoing to include its mechanisms and risk factors. (Islam et al., n.d.).

According to some studies, patients who are infected with the corona virus and are coughing with difficulty in breathing and have a structural change in the respiratory system are at a higher chance of transmitting the infectious agent. It has also been proposed that SARS-CoV 2 has an incubation period of at least 96 hours in body secretions such as serum and sputum and the virus is able to survive on top surfaces for up to 9 days. Hence the need to broaden mitigation strategies in order to control the modes of transmission.(Islam et al., n.d.).

### **2.1.3 Mutation**

Latest studies concerning the relationship between Omicron variant and SARS-CoV 2 variants have shown that the novel corona-virus have high risk of mutational transformation, The Omicron variant(B.1.1.529) has mutated from the corona virus and it has been shown to have high transmission rates as compared to the previous COVID-19 variants(Kandeel et al., 2021). There is now a challenge in terms of controlling the spread of the corona virus infections and its management course. (Kandeel et al., 2021).

### **2.2 Epidemiology**

Globally in the month of March 15<sup>th</sup> 2020, COVID-19 has so far been reported in 144 countries. In the month of February 8<sup>th</sup> 2021, there were 2,312,278 reported cases of corona virus. The latest statistics show there are 122,822,505 confirmed cases with 2,709,041 deaths reported by WHO.(World Health Organization, 2020). Globally, sstatistics are changing from a day to day basis as new reports trickle in, regarding incidence and prevalence of the disease.(WHO 2020).

With the evolution of new mutational variants of the corona virus, like the current one recently termed as “Omicron”, global confirmed corona virus cases are at 281,808,270 with 5,411,759 confirmed deaths. In Africa, the numbers are at 7,164,485 confirmed corona virus cases. In Kenya, confirmed COVID-19 cases were at 285,654 with 5,364 deaths, as of 29<sup>th</sup> December 2021.After the scientific invention of the corona virus



vaccine, a total of 10,099,664 vaccines were administered to the Kenyan population. (WHO 2021).

Currently COVID-19 is reducing in Kenya with 53 new infections being reported on a daily basis. The highest number being reported in the month of December 27<sup>th</sup> 2021 with a 2% of the peak. In February 2022, there are 7 people admitted in the CCUs, who required ventilator support, 270 who are admitted in hospitals, 3946 people on HBC, and a death toll of 5631, since the pandemic began, a total of 15,236,200 vaccine for corona virus have been administered. (WHO 2022).

Patients who were noted to be having corona virus infection were admitted in institutions like the hospital setting and they were isolated depending on the seriousness of the disease presentation and if the condition worsened, timely transfer of patients to specialized units was initiated.(Wilson et al., 2020).These followed other instructions to curb the infection through taking rigorous protocols such as wearing of face masks, frequent hand hygiene and social distance of up to 1.5 m apart.

### **2.3 Health care workers and COVID 19 infection**

Health-care providers who take care of patients, who are infected with corona virus, are at a greater risk of contracting the infection compared to the general community. Its mode of transmission being droplet infection and aerosol transmission, has heighten the possibility of infection in this cohort.(Wilson et al., 2020). This is why infection prevention measures are very crucial in combating the COVID-19 pandemic, and the safety of health-care worker follows these presumptions. HCWs should continue appraising the current evidence and apply ways of breaking the transmission chain in the local infection prevalence. As studies on COVID 19 remain ongoing. Intense measures to control transmission of the infections is required in order to ensure the safety of the health care fraternity is guaranteed.(Wilson et al., 2020).Due to increases in the COVID 19 infections in most countries, the health care system has been overwhelmed to include the critical care units. This is coupled with insufficiency of PPEs further worsening the situation. This can lead to a collapse of the health care system and a further worsening of the pandemic. That is why there is need to protect and monitor health-care workers to ensure their safety.(Barranco& Ventura, 2020).

Statistically COVID 19 infections have been showed to increase globally and so the need to control these infections by initiating measures such as correct wearing of masks, hand washing and utilization of PPEs. (Amanya et al., 2020) At the health care system, the infections have been noted to amplify resulting to high numbers of infections and therefore measures to reduce and control the infections have to be taken seriously and this has led to a sudden shortage of health care workers due to the COVID-19 pandemic as reported in the month of February 2020, in Wuhan, China. Measures undertaken to control the spread of the infection include wearing PPEs appropriately especially when performing procedures that generate aerosols.(Peres et al., 2020).There is limited evidence in terms of the comparison between using respirator mask (which are considered providing better protection) and surgical masks in the protection of the respiratory through use of respirator mask is recommended in cases of aerosol generating procedures. The use of eye goggles is also important for eye protection in order to limit splashes droplet and aerosol transmission. In general, there should be adequacy of PPEs,training and re-training of HCPs in regards to proper usage in order to ensure their safety.(Peres et al., 2020)

#### **2.4 Compliance to Infection prevention and control measures**

Strengthening infection prevention and control practices is crucial in the controlling transmission of COVID-19.(WHO, 2020). As front line workers, nurses play a crucial role in fighting the COVID-19 pandemic and are at a greater risk of contracting COVID-19 infections than the general community.(Lai et al., 2020).

Compliance of infection prevention and control guidelines is usually facilitated by re training of health workers on IPC, provision of the necessary resources for IPC and conducting IPC practices audits. Strategies of IPC minimize the spread of COVID-19 infections, that have been put in place include early recognition, source control, maintaining social distancing, appropriate use of PPEs, limitation of physical movement,environmental hygiene and use of disinfectants and generally provision of support to the HCWs. In summary, compliance of IPC protocols is very vital for health-care workers in the reduction and controlling further infection of COVID-19 though it has become a setback in some institutions. (Ye et al. 2020).

A study done in Ghana to assess compliance of health-care workers IPC COVID-19 treatment centers revealed that HCWs complied with infection prevention control though the term compliance differed in terms of meaning among health care professionals in different health centers. It was concluded that in order to minimize the risk of contracting corona-virus in the various health centers, there is need to avail sufficient IPC resources and the health care professionals should maintain a positive attitude coupled with behavioral change and also a focus on the non clinical staff.(Ashinyo et al., 2021a).

Compliance of IPC protocols has been a challenge in most hospital institutions, yet ,it is very vital for health-care workers in the reduction and controlling further infection of COVID-19(Sharma et al., 2020a). A study done by Amany et al reveals that there is no establishment of IPC protocols among Ugandan health care workers. Although there were hospital settings within the premises of Uganda, where rigorous COVID -19 were being put in place, some of the asymptomatic patients with COVID -19sought treatment in non designated health facilities where there were inadequate IPC measures being implemented.A study done in Tanzania to assess on IPC compliance among nurses in the outpatients revealed inadequacy of compliance to the IPC guidelines particularly for hand hygiene and disinfection domains. It was concluded that improvements in provision of medical supplies and change of attitude of health care behaviors had to be initiated. (Powell-Jackson et al., 2020).

A study done by Amany et al, revealed that HCWs in Uganda were infected with the corona virus due to failure to comply with COVID 19 measures and the high risk of infections were attributable to the fact that undiagnosed patients who were suspected to be havingCOVID-19 and were asymptomatic were also seeking health services from the same centers and so the HCWs may not have felt compelled to adhere to strict COVID 19 protocols. (Amany et al., 2020).

According to the CDC recommendations, it is appropriate to have additional IPC protocols in line with hospital SOPs as part of any health institution, for health care delivery to all the clients. With the emergence of corona-virus disease and its high infectivity rates especially in the hospital setup and more so among health care workers, there is need for restructuring the CCUs, ensuring hospital resources are in good quality

and adequately supplied, IPC protocols should be in place and practiced, environmental hygiene, use of appropriate disinfectants, collection of samples, adequate personnel, a formula for quarantine of staff and the need to train staff. (Sharma et al., 2020a). Another way of controlling infection during the COVID-19 pandemic in the critical care unit, is to consistently assess the staff systematically, and the hospital institution should provide directives in regards to staff isolation, duration of isolation and return to work formula based on policies that govern the hospital. (Sharma et al., 2020a).

Adherence of HCWs to enhanced IPC guidelines in an institution cannot be overemphasized especially during this era of COVID 19 pandemic and some of the measures instituted include wearing of appropriate PPEs, isolation of patients with respiratory infections, and maintain a clean environment (Houghton et al., 2020). Compliance to IPC measures has a direct impact to HCWs in terms of safeguarding their safety, patient safety and the environment in general. (Alhumaid et al., 2021a).

To ensure effective IPC measures are implemented in order to control the spread of SARS-CoV-2, the virus that causes COVID-19, it is important that HCWs, become part of this important program. A study done in Canada at the critical care emergency department on evaluation of Canadian nurses to adhere to IPC guidelines and to assess the level of preparedness, means of communication and risk of infection assessment, revealed that the Canadian nurses were ready to comply to IPC guidelines and there was some degree of trust of managerial and leadership, there was adequate supply of hospital resources such as PPEs. The level of trust was mostly observed in the older generation and those who had a longer duration of work experience despite reports of anxiety of contracting the COVID 19. (Silverberg et al., 2021)

Strengthening IPC is crucial in the fight against the spread of corona virus. (WHO, 2020). A study done in the department of Epidemiology by a number of professionals on hand hygiene in 2021, revealed that HCWs complied to hand hygiene practices before and during the COVID 19 period although once such improvement initiatives stopped from the management report, HCWs ceased to maintain HH practices and they slipped back to old ways. (Stangerup et al., 2021). **In a recent** study that was conducted, HCWs wore their face masks properly, though a lot of emphasis was to be put on Hand

hygiene practices before, during and after wearing of masks and the choice of the appropriate mask, techniques of wearing face masks and disposal of the masks were also to be considered. (Tan et al., 2021).

According to a study that was conducted in Mozambique, where there were 5 scoring parameters used to assess adherence to COVID 19 IPC guidelines, which included, social distance, wearing of face mask, maintaining of hand washing, cough etiquette, limiting of touch of the face, revealed that there was compliance to these strategies though a concern was brought up in regards to whether the positive behavioral practices resulted to a reduced number of COVID-19 infection. They felt there was no association of IPC practices and a reduction in the number of COVID 19 infection transmission and a further studies have to be conducted..(Tan et al., 2021).

It was noted in one of the health institution ,in the USA the number of persons infected with COVID-19 exceeded the resources in one of the health institution and this resulted to creation of a crisis intervention ,where it was mandatory to initiate strict standard structural IPC measures to curb the situation. Hence compliance to IPC COVID 19 measures was hampered by lack of sufficient resources in the hospital. It was concluded that high quality respiratory protection for HCPs was needed in the USA despite the shortage of PPEs which threatened the health care system and the safety of HCWs. (Cr et al., 2020). There was need to enhance facial masks by invention of N95 respiratory masks and creation of reusable decontaminated elastomeric respirator. Studies have shown that use of homemade masks lacked benefit for the HCWs Additional measures that were taken such as initiation of protective equipment in a long term intervention, basis, re-modifying structural infrastructure, preparedness intervention in case of future incidences or pandemics. (Cr et al., 2020). In conclusion, it is important that there is integration of international support and National coordination and unity in finding ways of safeguarding the safety of HCWs to overcome challenges encountered in implementation of COVID 19 IPC protocols.(Chersich et al., 2020).

There is a concern of the need to pay more attention to matters pertaining IPC especially in health facilities. It has been noted that there is underscoring of IPC issues yet it is a vital tool and the need to use indicators that can be used to measure variables

in the control of transmission of infections is equally important hence sensitization for its implementation is required.(Amanya et al., 2020).To ensure HCWs are well protected in their work station, there is need for instilling knowledge in order to ensure compliance of IPC COVID-19 guidelines.

It was concluded that, it is essential to embrace a multifaceted approach towards improving IPC - intervention strategies with the ultimate goal being to improve compliance among HCWs in health care facilities where IPC measures are likely to be implemented.(Alhumaid et al., 2021a)

## **2.5 Knowledge on compliance of COVID 19 IPC measures**

It has been noted that with sufficient information and knowledge on COVID 19, HCWs develop some confidence and a positive attitude towards improving compliance to enhanced IPC COVID 19 guidelines. (Amanya et al., 2020). Therefore in the light of instilling knowledge, measures such as training of HCWs during COVID 19 pandemic, should be taken with a lot of seriousness. Having looked at this study, the author felt the need to integrate strategies geared to training HCWs with a focus on knowledge gaps by age, gender, qualifications, professional cadres and duration of work experience. (Amanya et al., 2020)

In conclusion, knowledge on IPC measures are important for the health care fraternity for effectiveness of IPC guidelines implementation. According to the antimicrobial resistance and infection control, HCWs were noted to be having sufficient knowledge concerning IPC measures for certain diseases including COVID-19. However, gaps were identified on knowledge of HCWs concerning occupational vaccinations, lack of awareness on the modes of transmission of infectious diseases, and the risk of infection from needle stick and sharps injuries.(Alhumaid et al., 2021a).

Statistics show that there is no relationship between knowledge and implementation of IPC protocols. It was observed that despite nurses having adequate knowledge on IPC that did not translate to proper IPC practices. For instance, on compliance to HHP ,it was observed in certain health care centers that despite of availability of well established COVID 19 protocols, there was lack of compliance in the institution .(Alhumaid et al., 2021a)

A study done in Uganda on knowledge and compliance with COVID-19 IPC measures has revealed that knowledge and compliance on COVID-19 IPC guidelines have not yet been established to its optimal level. There is no significant association between knowledge and compliance on IPC guidelines with a p-value noted at 0.007. Regardless of this gap, it is still important to ensure supplies such as PPEs in controlling the spread of the infection, are available. The WHO has developed international strategies or measures to contain the COVID 19 pandemic by instituting measures such as applications of SOP to all patients, early recognition of isolated cases and triaging of the same, and utilization of PPEs.(World Health Organization, 2020c).

In Australia, it was discovered that there is lack of knowledge regarding newly emerging and re emerging infections and this poses a challenge to the health care givers and therefore the need to take the matters serious in regards to IPC measures ,may be lacking thus increasing the risk of infection transmission due to dynamics of the pathogens that are emerging.(Islam et al., n.d.).

Inadequate knowledge on IPC guidelines such as appropriate use of PPEs, its efficiency and utilization of IPC measures coupled with lack of awareness of preventive indications and the potential risk of cross infection of microorganisms, constitute barriers to IPC compliance.(Alhumaid et al., 2021b)

## **2.6 Factors influencing compliance to COVID 19 IPC guidelines**

Factors that influence compliance to IPC COVID 19 protocols were observed and taken note of in order to place appropriate mitigation in addressing them.. It is vital to instill knowledge and provide training to HCWs in order to improve IPC practices. Other IPC measures that need to be implemented were hand washing techniques, proper usage of PPEs COVID-19 vaccinations, hospital equipment decontamination and sterilization options, isolation of patients who are infected with the disease and their assessment, waste segregation, injection safety policies. Having all these measures put into perspective, there is no doubt that compliance will be effective. Despite the emphasis to comply with IPC guidelines, it has been noted that there are variations in terms of IPC practices in the hospital setting. (Alhumaid et al., 2021a)

According to a study done by Cochrane database for systematic review, factors that contributed to barriers and HCWs adherence to COVID 19 IPC guidelines revealed that HCWs were not certain on how to adhere to IPC guidelines and some of the guidelines were lengthy and hard to follow through and some of the guidelines were perceived as not reflecting on National and international guidelines. The HCWs felt over burdened with the guidelines and this increased their workloads and the guidelines kept changing from time to time. This was alluded to have been the cause of burnouts in the clinical setting.(Houghton et al., 2020)

Some of the factors that influenced compliance to COVID 19 IPC guidelines by HCWs is the level of support received from the managerial levels, where there were clear communication from top to bottom level. Other factors that influenced compliance were the need for training on IPC protocols such as proper use of PPEs and other IPC measures. Since it was noted that some health institution did not put enough emphasis on the need to strictly adhere to these measures. There was insufficient space and beds for isolating patients, lack of amenities such as showering facilities. (Houghton et al., 2020)

HCWs also alluded to other factors that influenced compliance to IPC measures such as limiting overcrowded places, screening and tracking down persons who are infected, limitation and control of visitors, provision of easy accessibility of hand hygiene facilities, insufficient PPEs which were of substandard quality was a serious concern, large volumes of supplies were viewed as amplifiers of infections. IPC measures were less valued by the HCWs due to a concern of feeling anxious by some of the HCWs, in regards to fear of infecting themselves, family members, patients so the need to observe IPC guidelines. There was a feeling of stigmatization on the use of face masks and the fact that the patients felt fearful and isolated which was aggravated by workforce cultural background. This led to non compliance to IPC guidelines. There was also a concern that multidisciplinary task-force were not included in the implementation of IPC measures. (Houghton et al., 2020)

It was concluded that HCWs working in critical care setting or with contact of confirmed cases were likely to comply with IPC recommendations. There was some evidence that anxiety and concern about the risk of infection were more associated with



compliance, and that monitoring from superiors could improve compliance. (Alhumaid et al., 2021a)

Other barriers that influenced compliance to IPC guidelines are related to availability, adequacy and quality of PPEs. There was also concerns in regards to means of communication and knowledge on IPC guidelines.(Alhumaid et al., 2021a)

In conclusion, provision of information and training of HCWs and other non clinical staff and managerial staff within the health-care setting is important. It is also important to facilitate proper use of resources for the implementation of IPC guidelines, timely provision of guidelines that are evidenced based in line with hospital policies. This should be the cornerstone to compliance of enhanced IPC COVID-19 protocols. (Alhumaid et al., 2021a).

## CHAPTER THREE: STUDY METHODOLOGY

### **3.1 Study design**

Descriptive cross sectional study design was used. This study was cross sectional because the outcome and exposures were measured in the study participants, at the same time. (Setia, 2016). It was a quantitative study, where the subjects under study were the nurses, who were assessed on compliance to enhanced IPC COVID 19 protocols in the critical care unit at KNH.

### **3.2 Study Site**

Kenyatta National Hospital is a level 6 referral facility in Nairobi County that serves Kenya and its neighboring countries. It was established in 1901 and it became a State Corporation in 1987. It occupies 45.7 hectares of land. KNH is surrounded by neighboring buildings such as College of Health Sciences (University of Nairobi); the Kenya Medical Training College; Kenya Medical Research Institute and National Laboratory Service. KNH has 50 wards, 22 out-patient clinics, 24 theaters (16 specialized) and Accident & Emergency Department. (Kenyatta National Hospital, 2017)

Among the services offered in KNH are intensive care services. There is one main CCU and specialty CCUs. The main CCU has 21 bed capacity, medical CCU has a 8 bed capacity, pediatric CCU has a 5 bed capacity, cardiothoracic CCU has a 4 bed capacity, maternity CCU has 2 bed capacity, neonatal CCU has 5 bed capacity, neurology CCU has a 5 bed capacity, infectious disease (IDU) unit CCU has a 7 bed capacity. Critically ill patients may be admitted in any of the wards and are screened for COVID-19.

In each critical care unit, there are critical care nurses. Main CCU has 98 nurses, Neonatal CCU has 12 nurses, Pediatric CCU has 30 nurses, Cardiothoracic CCU has 19 nurses, Neurological CCU has 19 nurses, Medical CCUs in both level 7 and 8 has 39 nurses, Infectious disease unit has 21 nurses and Maternity CCU has 10 nurses.

### **3.3 Study population**

The population of study comprised of nurses working in different ICUs (248 nurses) because they were a group of people in the health care cohort who formed part of the

health care professionals, and were expected therefore to comply with the infection prevention control protocols and more lately the COVID-19 enhanced protocols. Nurses working in the CCU offered specialized services to patients. In all these units of specialty, we had IPC guidelines that had been stipulated as standard of care in the standard operational procedures guidelines as per the hospital policy and they acted as a reference point in regards to tracking down implementation of IPCs in the hospital.

### **3.4 Eligibility criteria**

#### **Inclusion criteria**

Nurses who consented and were working in the CCUs at the KNH where guidelines for enhanced IPC COVID-19 protocols were in place

Nurses who had worked in the CCUs for more than 2 months

#### **Exclusion criteria**

- Nurses working in CCUs who have not been selected to participate in the study
- Nurses who had worked in CCU less than 2 months

### **3.5 Sample size determination**

The study utilized Fishers et al., (1998) formula which was also cited by Mugenda and Mugenda (2003).

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

Z was the value for the corresponding confidence level (i.e., 1.96 for 95% confidence);

d was the margin of error (i.e., 0.05 = ± 5%) and

p was the proportion which was of study interest.

P= 50% (the most conservative estimate) = 0.5

$$n = \frac{1.96^2 \times p (1-p)}{d^2} \quad n = \frac{3.8416 \times 0.5 (1-0.5)}{0.05^2} \quad n = 384$$

$$0.05 \times 0.05$$

$$0.025$$

The sample size was adjusted using finite population of less than 10,000 using Yamane's (1967) formula of the sample population less than 10,000 respondents.

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

nf= was the sample size that was desired

n= was the sample size that was already calculated

N= Number of nurses working in different ICUs within the hospital

$$nf = \frac{384}{1 + \frac{384}{248}} = 151$$

Total sample size = 151 nurses working in ICU

### Presentations of proportionate population from the selected CCUs

Unit	Population	
	Nurses	Number to be sampled
Main CCU	98	98/248x151= 59
Neonatal CCU	12	12/248x151= 7
Pediatric CCU	30	30/248x151= 18
Cardiothoracic CCU	19	19/248x151=12
Neurological CCU	19	19/248x151=12
Medical CCU	39	39/248x151=24
IDU CCU	21	21/248x151=13
Maternity	10	10/248x151=6
<b>Total</b>	<b>248</b>	<b>151</b>

### **3.6 Sampling procedures**

In order to sample nurses who participated in the study, the researcher used proportionate stratified random sampling in which each stratum sample size was directly proportional to the population size of the entire population of strata so that each strata had the same sampling fraction. Simple random sampling method was used within each stratum. This was where every participant in the target population had an equal chance of being selected. The researcher randomly selected the nurses then used random number method to assign numbers to the participants. The nurses selected were then provided with self-administered questionnaires so as to provide information regarding factors that influenced their compliance to enhanced IPC COVID-19 protocols.

In order to obtain information on compliance of enhanced IPC COVID 19 protocols information was obtained by observing nurses compliance to guidelines. A structured observational checklist was used by the researcher to collect information on compliance levels of nurse working in the CCUs. The participants were observed repeatedly, at least 3 times as they performed the procedures to ascertain compliance. Research assistants were trained on how to collect information on IPC compliance, by use of structured observational checklists and questionnaires.

### **3.7 Participant's recruitment procedures**

Permission was sort from the research department at KNH, the departmental manager, unit manager and from the nurses working in the critical care units. Notifications were send via memos and notice board. The memos contained the title of the study, eligibility of participants, data collection period and the researcher's name and address. Participants were recruited during each data collection sessions. All critical care units qualified to be in the eligibility criteria.

### **3.8 Participant consenting procedure**

The researcher sought permission from the participants by taking them through the participant's information sheet and consent form (Appendix 1). Pertinent information

was discussed with the participants and clarifications done in cases of inquiries. Once the process was done, the participants were issued with the consent form to sign.

### **3.9 Data Collection**

#### **3.9.1 Study instrument**

The researcher used questionnaires, which had a set of open and close ended questions prepared for the participants, on enhanced COVID-19 protocols. Respondents were provided for questionnaires and they filled in answers to questions asked. Structured observational checklists were used to collect data on enhanced IPC. The checklist contained COVID 19 protocols with a 2 point scale indicating whether the guidelines were observed or not.

#### **3.9.2 Data collection procedure**

Once the participants had consented, they were issued the serialized questionnaires. Once they completed filling the questionnaires, the forms were collected and placed in a lockable cupboard. Confidentiality and anonymity was highly upheld. Voluntariness for participation was also emphasized.

In order to gather data in regards to IPC enhanced guidelines that were being implemented in the unit, the researcher used the structured observational checklist to collect data. The participants were observed as they repeatedly performed the procedures in order to control Hawthorne effect. The serialized checklist was then stored in a separate cupboard for analysis later.

### **3.10 Data Management Plan**

#### **3.10.1 Data cleaning and entry**

After data collection, all questionnaires and observational checklists which had serials were sorted and fed into software STATA 14.2, thus they were coded and prepared for data analysis. At the end of data collection, checklists and questionnaires were coded, entered and managed in a pre-designed Microsoft Access database. Data cleaning and analysis were done using STATA 14.2 statistical software. Both descriptive and inferential statistics will be used for analysis.

### **3.10.2 Data storage**

Data were stored in a safe place. The printouts were stored in a lockable cupboard and only accessed by the researcher. The data was coded and password protected for confidentiality purposes.

### **3.10.3 Data analysis, presentation and measurement**

Once data had been collected ,entered ,coded and analysis of data was done using descriptive statistics analysis. Inferential statistics will be, done using pearson correlation coefficient, specifically for factors influencing compliance to enhanced IPC protocols .Data were presented in tabulation form and frequency tables.

### **3.11 Ethical considerations**

Approval to carry out the research was sought from the KNH–UON ERC and the KNH research department, on presenting the research proposal. The researcher also sought for permission from the head of department of anesthesia and the unit managers of critical care units. Informed consent was sought from the research participants and confidentiality and anonymity was assured at all stages of the research. There was no coercion or incentives for the participants. Contacts of the researcher and research assistants were provided on the consent forms. The researcher also provided feedback and recommendations after the study for assurance of benefits from the study. The participants were assured that there was no conflict of interest from the researcher's part. Withdrawal of participants from the study was permitted at any point in time, without any form of coercion of the participants. All ethical principles were upheld and the participant's interest and concerns were addressed appropriately.

### **3.12 COVID-19 prevention considerations**

COVID-19 protocols were strictly observed in all CCUs where the study was carried out, whereas all nurses were required to have their surgical masks on, and hand hygiene was emphasized especially when they were ready to fill the questionnaires. Social distance at 1.5m was maintained. The unit was well aerated and was clean with proper waste segregation. IPC guidelines were highly observed at all times.

### **3.13 Study limitations**

Limited resources monetary wise



## CHAPTER FOUR: RESULTS

### 4.1 Introduction

This chapter presents the study results as set out in the research methodology. The results were presented on the nurses' compliance to enhanced infection prevention and control (IPC) protocols for COVID-19 in the critical care unit at Kenyatta National Hospital. The chapter contains the following: the response rate, demographic characteristics of the respondents and study findings in line with the study objectives.

#### 4.1.1 Response rate

The study targeted 151 nurses working in critical care units of Kenyatta National Hospital as respondents. From the questionnaires administered, the researcher was able to obtain adequate responses from 151 of the respondents translating into a response rate of 100%. This response rate was considered sufficient and representative and conforms to Mugenda and Mugenda (2003) stipulation that a response rate of 50% is adequate for analysis and reporting, a rate of 60% is good while a response rate of 70% and over is excellent.

### 4.2 Demographic characteristics of the respondents

The demographic profile of the respondents was evaluated. The demographic attributes considered were gender, age, education level, and work experience, duration worked in critical care unit and whether they had received COVID-19 vaccination.

Regarding the respondents' gender distribution, most (68.9%,  $n = 104$ ) of the respondents were female while 31.1% ( $n = 47$ ) were male. This showed that the study respondents were both male and female nurses working in critical care units at KNH, though more female nurses took part than their male counterparts.

Regarding the respondents' age distribution, majority of the respondents were aged below 50 years, with 30.5% ( $n = 46$ ) indicating that they were aged 20 - 29 years, 28.5% ( $n = 43$ ) said they were aged 30 - 39 years with a similar number (28.5%,  $n = 43$ ) indicating that they were aged 40 - 49 years. This denoted that most of the respondents were relatively young critical care nurses.

Regarding the respondents' education level, slightly above half (53% n = 80) were Higher Diploma holders, 29.1% (n = 44) had a degree while 17.2% (n = 26) were Diploma holders. This illustrated that most of the respondents had a sound educational background.

Regarding the respondents' work experience, 43% (n = 65) of the respondents had a work experience of 0 - 9 years while slightly over half (52.3%, n = 79) had a work experience of 10 to 29 years. This showed that the study respondents had vast work experience.

Regarding duration worked in critical care unit (CCU), a significant proportion (44.4% n = 67) of the respondents indicated that they had worked in CCU for 1 - 3 years while 29.1% (n = 44) indicated that they had worked in CCU for more than 3 years. The remaining had worked in CCU for less than 1 year. This implied that most of the respondents had worked in CCU for a considerable duration and so had sufficient experience in the units.

As to whether the respondents had received COVID-19 vaccine, majority (94%, n = 142) of the respondents answered to the affirmative that they had received COVID-19 vaccination. Of these, most (59.2%, n = 84) were on the second dose, 23.9% (n = 34) were on the booster dose while 16.9% (n = 24) were on the first dose.

Of the 9 respondents that had not been vaccinated against COVID-19, two-thirds (66.7% n = 6) failed to offer a reason for not taking the COVID-19 vaccine while the remaining three cited fear of COVID-19 vaccine side effects, knowledge of friends that had died even after receiving COVID 19 vaccine and personal reasons as to why they had not been vaccinated against COVID-19 infection. The results are presented in Table 4.1.

**Table 4.1: Respondents' demographic characteristics**

		<b>Frequency</b>	<b>Percent</b>
Gender	Male	47	31.1
	Female	104	68.9
	<b>Total</b>	<b>151</b>	<b>100.0</b>
Age	20 - 29 years	46	30.5
	30 - 39 years	43	28.5
	40 - 49 years	43	28.5
	50 years & above	19	12.6
	<b>Total</b>	<b>151</b>	<b>100.0</b>
Education level	Certificate	1	0.7
	Diploma	26	17.2
	Higher Diploma	80	53.0
	Degree	44	29.1
	<b>Total</b>	<b>151</b>	<b>100.0</b>
Work experience	0 - 9 years	65	43.0
	10 - 19 years	43	28.5
	20 - 29 years	36	23.8
	Above 29 years	7	4.6
	<b>Total</b>	<b>151</b>	<b>100.0</b>
Duration worked in CCU	Below 1 year	40	26.5
	1 - 3 years	67	44.4
	More than 3 years	44	29.1
	<b>Total</b>	<b>151</b>	<b>100.0</b>
Received COVID-19 vaccination	Yes	142	94.0
	No	9	6.0
	<b>Total</b>	<b>151</b>	<b>100.0</b>
If yes, which dose?	First dose	24	16.9
	Second dose	84	59.2
	Booster dose	34	23.9
	<b>Total</b>	<b>142</b>	<b>100.0</b>

### **4.3 Enhanced IPC protocols occasioned by emergence of COVID-19 infection**

The first objective of the study sought to identify the enhanced IPC protocols occasioned by the emergence of COVID-19 in the CCU at Kenyatta National Hospital.

To achieve this objective, the researcher documented the infection prevention and control guidelines that were available or present in the critical care units at KNH. From the findings, the enhanced IPC protocols were categorized into 2 -nurse based IPC protocols and institutional based IPC protocols.

According to the findings, the nurse based enhanced IPC protocols identified as present in KNH's CCU included posters demonstrating hand washing procedures using the five moments of hand hygiene, steps of hand washing with soap and running water or use of sanitizers; continuous professional development on demonstrations of proper use of surgical masks; proper use and disposal after use of disposable gloves, head gear and gowns. Other nurse based enhanced IPC protocols present included posters demonstrating proper segregation/separation of clean and dirty linen in linen cabinets and cribs; continuous professional development on demonstration of submerging of instruments in decontaminants and proper storage of sterile instruments.

The institutional based enhanced IPC protocols identified as present in KNH's CCU included posters promoting hand hygiene; waste bins colour coded, posters available illustrating proper waste segregation and floors kept clean and surfaces well dusted.. Guidelines showing work instruction and decontamination ,checklists displayed (seen in 6 of the 8 assessed CCUs) .

However, a documentation of the enhanced IPC guidelines in form of a single file or record for reference purposes was found not to be available in KNH's CCUs. In addition, work instruction and decontamination checklist displayed was found to be missing in 2 (neurological and maternity CCUs) of the 8 assessed CCUs. The results are as outlined in Table 4.2.

**Table 4.2: Enhanced IPC protocols at KNH's CCU**

Enhanced IPC protocols	Available/Present	
	Yes	No
<i>Nurse based IPC protocols</i>		
Posters of 5 moments offhand hygiene hand washing with soap and running water or use of sanitizers	✓	
Proper use of surgical masks	✓	
Proper use and disposal after use of disposable gloves	✓	
Proper use and disposal after use of the head gear	✓	
Proper use and disposal after use of the gowns	✓	
Posters of coded bins for proper waste management	✓	
Proper segregation/separation of clean and dirty linen in linen cribs	✓	
Submerging of instruments in decontaminants	✓	
Proper storage of sterile instruments	✓	
<i>Institutional based IPC protocols</i>		
Posters of hand washing facilities and running water	✓	
Posters promoting hand hygiene	✓	
Coded waste bins available	✓	
Posters available illustrating proper waste segregation	✓	
Proper preparation of detergents and disinfectants	✓	
Designated area for pre soaking used instruments	✓	
Work instruction and decontamination checklists displayed		✓
Documentation in form of a single file or record of the enhanced IPC guidelines		✓

#### 4.4 Compliance level to the enhanced IPC protocols among the nurses

The second objective of the study sought to assess the compliance levels to the enhanced IPC protocols among the nurses working in the critical care units at Kenyatta National Hospital. The results appear as presented in the subsequent subsections.

##### 4.4.1 Compliance to recommended hand hygiene protocols

From the findings, all (100%, n = 151) of the respondents were observed as washing their hands with soap and running water or utilized hand sanitizers. However application of 5 moments of hand hygiene and adherence to steps of hand hygiene were not observed in some CCUs.

As observed, nurses working in the cardiothoracic, neurological, infectious disease unit and the main CCUs were observed as being able to perform at least 50% of the five moments of hand hygiene and at least 50% of the steps in hand hygiene. However, nurses working in the medical, pediatric, neonatal and maternity CCUs were observed as not able to perform at least 50% of the five moments of hand hygiene and also at least 50% of the steps in hand hygiene. This showed that there were discrepancies in levels of compliance to the recommended hand hygiene protocols among the nurses on the basis of the CCU in which they worked. Results are indicated in Table 4.3.

**Table 4.3: Compliance to recommended hand hygiene protocols among the respondents**

<b>Hand hygiene protocols</b>	<b>Freq.</b>	<b>%</b>
Washed hands with soap & running water or used sanitizers	151	100.0
	0	0.0
<b>CCUs in which the nurses were observed (Hand hygiene moments and steps of hand hygiene.)</b>	<b>Hand hygiene score</b>	
Cardiothoracic	1(50%)	
Neurology	1(50%)	
Infectious disease unit	1(50%)	
Main	1(50%)	
Medical	0	
Pediatric	0	
Neonatal	0	

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Key: 1-Able to perform at least 50 % of the five moments of hand hygiene and also 50% of the steps in hand hygiene  
0 -Not able to perform at least 50 % of the five moments of hand hygiene and also 50% of the steps in hand hygiene

#### **4.4.2 Compliance to protocols on use of surgical masks**

An observation of the respondents' wearing of the surgical masks was done. From the findings, all (100%, n = 151) of the respondents were observed as properly donning the surgical masks. This showed that there was high compliance with protocol on use of surgical masks among the nurses working in the critical care unit at Kenyatta National Hospital.

#### **4.4.3 Compliance to protocols on use and disposal of disposable gloves**

An observation of the respondents' use and disposal of disposable gloves was done. The researcher observed that all (100%, n = 151) of the respondents wore the disposable gloves properly and disposed them off properly after use. This showed that there was high compliance with protocols on use and disposal of disposable gloves among the nurses working in the critical care unit at Kenyatta National Hospital.

#### **4.4.4 Compliance to protocols on use and disposal of head gear**

An observation of the respondents' use and disposal of the head gear was done. From the findings, all (100%, n = 151) of the respondents were observed as properly wearing the head gear and did dispose it off properly after use. This denoted that there was high compliance with protocols on use and disposal of the head gear among the nurses working in the critical care unit at Kenyatta National Hospital.

#### **4.4.5 Compliance to protocols on use and disposal of gowns**

The respondents were observed to ascertain their compliance to protocols on use and disposal of gowns. Results indicated that all (100%, n = 151) of the respondents were seen as properly donning the gowns. All were also observed as properly disposing off the gown after use. This showed that there was high level of compliance with protocols on use and disposal of gowns among the nurses working in the critical care units at Kenyatta National Hospital.

#### **4.4.6 Compliance to protocols on patients' social distancing rule**

The study assessed whether the respondents ensured that patients maintained a distance of at least 1.5 metres from each other as was recommended during the COVID-19 pandemic. From the findings, all (100%, n = 151) of the respondents were observed as ensuring that the recommended distance of 1.5 metres between patients was observed. Hence, there was high compliance level with protocols on patients' social distancing among the nurses working in the critical care units at Kenyatta National Hospital.

#### **4.4.7 Compliance to protocols on use of pedal operated coded bins for proper waste management**

The respondents were observed to ascertain whether they complied with the protocols on use of pedal operated coded bins for proper waste management. Results of the study showed that all (100%, n = 151) of the respondents were properly compliant with protocols on the use of pedal operated coded bins for proper waste management. This denoted that there was high compliance level to protocols on use of pedal operated coded bins for proper waste management among the nurses working in the critical care units at KNH.

#### **4.4.8 Compliance to protocols on proper segregation/separation of clean and dirty linen in linen cribs**

The respondents were observed to assess whether they were compliant to protocols on proper segregation/separation of clean and dirty linen in linen cribs. All (100%, n = 151) of the respondents were observed as complying with the IPC protocols on proper segregation/separation of clean and dirty linen in linen cribs. Hence, there was a high compliance level to protocols on proper segregation/separation of clean and dirty linen in linen cribs among the nurses working in the CCUs at KNH.

#### **4.4.9 Compliance to protocols on submerging of instruments in decontaminants**

The respondents were observed to assess whether they were compliant to protocols on submerging of instruments in decontaminants. All (100%, n = 151) of the respondents were observed as being compliant with the IPC protocols on submerging of instruments in decontaminants. Hence, there was a high compliance level to protocols on



submerging of instruments in decontaminants among the nurses working in the critical care units at Kenyatta National Hospital.

#### 4.4.10 Compliance to protocols on proper storage of sterile instruments

The respondents were observed to assess whether they were compliant to protocols on proper storage of sterile instruments. The study observed that all (100%, n = 151) of the respondents ensured that all sterile instruments were well cleaned, dried and properly stored. This denotes that there was a high compliance level to protocols on proper storage of sterile instruments among the nurses working in the critical care units at Kenyatta National Hospital.

**Table 4.4: Compliance of Nurses to Enhanced IPC protocols**

Enhanced IPC protocols	Available/Present	
	Yes	No
<i>Nurse based IPC protocols</i>		
Hand washing with soap and running water or use of sanitizers	✓	
Proper use of surgical masks	✓	
Proper use and disposal after use of disposable gloves	✓	
Proper use and disposal after use of the head gear	✓	
Proper use and disposal after use of the gowns	✓	
Observing 1.5m of social distancing of patients	✓	
Use of pedal operated coded bins for proper waste management	✓	
Proper segregation/separation of clean and dirty linen in linen cribs	✓	
Submerging of instruments in decontaminants	✓	
Proper storage of sterile instruments	✓	
<i>Institutional based IPC protocols</i>		
Hand washing facilities and running water	✓	
Availability of transfer trolleys specifically for waste	✓	
Adequate PPEs available in stock		✓
Posters promoting hand hygiene	✓	
Waste bin available	✓	

Posters available illustrating proper waste segregation	✓	
Floor clean and surfaces well dusted	✓	
Patient equipments kept clean	✓	
Proper preparation of detergents and disinfectants	✓	
Designated area for pre soaking used instruments	✓	
Work instruction and decontamination checklists displayed		✓
Documentation in form of a single file or record of the enhanced IPC guidelines		✓
Unit not overcrowded	✓	

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**4.5 Factors that influenced compliance to enhanced IPC protocols among the critical care unit nurses**

The third objective of the study sought to assess the factors that influenced compliance to enhanced IPC protocols among the nurses working in the critical care units at Kenyatta National Hospital.

To achieve this objective, the respondents were requested to cite the various factors that influenced their compliance to the enhanced IPC protocols in the critical care units of Kenyatta National Hospital.

From the findings, the respondents identified various factors that influenced their compliance to the enhanced IPC protocols in the critical care units of Kenyatta National Hospital. These included availability of quality and adequate personal protective equipments including surgical masks, gloves, sanitizers, hand towels, gowns among others as cited by 72.8% (n = 110) of the respondents; continuous sensitization of current trends of the COVID-19 enhanced IPC protocols as cited by 19.2% (n = 29) of the respondents; proper training on COVID-19 enhanced IPC protocols as cited by 29.1% (n = 44) of the respondents; acquisition of adequate knowledge on the COVID-19 enhanced IPC protocols as cited by 12.6% (n = 19) of the respondents; better support systems from the management as cited by 2% (n = 3) of the respondents; adequate staffing ratios in the critical care units as cited by 17.2% (n = 26) of the respondents and consistent review of health policy guidelines and standard operative

procedures in the critical care setting as cited by 4% (n = 6) of the respondents. Results are shown in Table 4.4.

**Table 4.5: Factors that influenced compliance to enhanced IPC protocols among the critical care unit nurses (n = 151)**

<b>Factors identified</b>	<b>Frequency</b>	<b>Percent</b>
Availability of quality and adequate PPEs including surgical masks, gloves, sanitizers, hand towels, gowns among others	110	72.8
Continuous sensitization of current trends of the COVID-19 enhanced IPC protocols	29	19.2
Proper training on COVID-19 enhanced IPC protocols	44	29.1
Acquisition of adequate knowledge on the COVID-19 enhanced IPC protocols	19	12.6
Better support systems from the management	3	2.0
Adequate staffing ratios in the critical care units	26	17.2
Consistent review of health policy guidelines and standard operative procedures in the critical care setting	6	4.0

The study also evaluated the association of these factors with the nurses' compliance to the enhanced IPC protocols at KNH's critical care units. This was evaluated using Pearson's correlation coefficient at 95% confidence interval.

Based on the results of the Pearson's correlation analysis, the factors established to have a significant influence on compliance to enhanced IPC protocols for COVID-19 among the nurses working in the critical care units at KNH were: availability of quality and adequate PPEs including surgical masks, gloves, sanitizers, hand towels, gowns among others as denoted by a correlation coefficient of .903 and  $p = .000$ ; continuous sensitization of current trends of the COVID-19 enhanced IPC protocols as denoted by a correlation coefficient of .781 and  $p = .000$ ; proper training on COVID-19 enhanced IPC protocols as denoted by a correlation coefficient of .764 and  $p = .000$ ; acquisition of adequate knowledge on the COVID-19 enhanced IPC protocols as denoted by a

correlation coefficient of .688 and  $p = .009$ ; better support systems from the management as denoted by a correlation coefficient of .316 and  $p = 0.023$ ; adequate staffing ratios in the critical care units as denoted by a correlation coefficient of .656 and  $p = 0.011$  and consistent review of health policy guidelines and standard operative procedures in the critical care setting as denoted by a correlation coefficient of .729 and  $p = 0.002$ . This showed that these factors had a significant influence on compliance to enhanced IPC protocols for COVID-19 among nurses working in the critical care units at Kenyatta National Hospital. Results are outlined in Table 4.5.

**Table 4.6: Association of the identified factors with the critical care nurses' compliance to the enhanced IPC protocols**

Identified factors	Pearson's correlation analysis	
	Correlation coefficient (r) at 95% CI	p value
Availability of quality and adequate PPEs including surgical masks, gloves, sanitizers, hand towels, gowns among others	.903	.000*
Continuous sensitization of current trends of the COVID-19 enhanced IPC protocols	.781	.000*
Proper training on COVID-19 enhanced IPC protocols	.764	.000*
Acquisition of adequate knowledge on the COVID-19 enhanced IPC protocols	.688	.009*
Better support systems from the management	.316	.023*
Adequate staffing ratios in the critical care units	.656	.011*
Consistent review of health policy guidelines and standard operative procedures in the critical care setting	.729	.002*

\* Statistically significant at 95% CI

## CHAPTER FIVE: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

### **5.1 Introduction**

This chapter presents discussion of findings, conclusions and recommendations of the study in line with the study objectives. The study assessed the compliance to enhanced infection prevention and control protocols for COVID-19 among nurses working in the critical care units at Kenyatta National Hospital.

### **5.2 Discussion of Findings**

#### **5.2.1 Enhanced IPC protocols occasioned by emergence of COVID-19 infection**

From the findings, the nurse based enhanced IPC protocols identified as present in KNH's CCU included hand washing with soap and running water or use of sanitizers; proper use of surgical masks; proper use and disposal after use of disposable gloves; proper use and disposal after use of the head gear; proper use and disposal after use of the gowns and observing 1.5m of social distancing of patients. Other nurse based enhanced IPC protocols present included use of pedal operated coded bins for proper waste management; proper segregation/separation of clean and dirty linen in linen cribs; submerging of instruments in decontaminants and proper storage of sterile instruments. On the other hand, the institutional based enhanced IPC protocols identified as present in KNH's CCU included availability of transfer trolleys for waste; adequate PPEs available in stock (were available in 6 of the 8 assessed CCUs); posters promoting hand hygiene; waste bin available; posters available illustrating proper waste segregation and floors kept clean and surfaces well dusted. Others included patient equipments kept clean; proper preparation of detergents and disinfectants; designated area for pre soaking used instruments; work instruction and decontamination checklists displayed (seen in 6 of the 8 assessed CCUs) and the CCUs being not overcrowded.

This showed that most of the enhanced IPC protocols for COVID-19 in the critical care units at KNH touched on core standard operation procedures whose aim was infection prevention and control during nurses delivery of care services to patients admitted in the hospital's CCU. This study argues that the enhanced IPC protocols were

particularly important in critical care settings owing to the increased vulnerability of critically ill patients to infections; emerging and reemerging infections including COVID-19 which may in turn worsen their prognosis. Similar findings were reported by Silverberg et al. (2021) who in a review of COVID-19 infection prevention and control measures in intensive care departments in Canada identified proper hand hygiene, use of surgical face masks and other PPEs such as gowns, gloves and head gear, proper waste management and social distancing as some of the core IPC measures in application in the country. Similar observations were made by Wilson et al. (2020) who noted that IPC enhanced following the emergence of COVID-19 included proper hand washing with soap and running water or use of sanitizers, ensuring observance of recommended social distance of 1.5 metres and greater emphasis on use of PPEs including gowns, head gears, face masks and gloves. On their part, Powell-Jackson et al. (2020) in a study conducted in Tanzania also cited observance of the 1.5 metre social distancing rule, strict application of PPEs including face masks, gowns, gloves and head gears, observance of proper hand hygiene using running water and soap or alcohol based sanitizers and proper waste management as leading IPC protocols during the Covid-19 pandemic period.

Chersichet al. (2020) in a review of protection and care of health care workers in the front line against COVID-19 also identified provision of adequate hand hygiene facilities, provision of sufficient personal protective equipments to the HCWs, ensuring a clean care environment, provision of adequate waste management facilities and cleaning materials and providing posters outlining the various IPC guidelines were part of the institutional responsibility in the fight against infections including COVID-19 in the critical care settings. Similar views were expressed by Lai et al. (2020) who argued that provision of adequate hand hygiene facilities, provision of adequate PPEs, effective sterilization and storage of surgical care equipments and effective waste management were central to effective infection prevention and control in critical care unit in the global picture. Peres et al. (2020) and Ashinyo et al. (2021a) also echoed these sentiments. These studies, as is with the current study, argued that these enhanced IPC measures were crucial for combating the COVID-19 pandemic and enhancing the safety and wellbeing of both patients and the health care providers and should therefore be emphasized.

### **5.2.2 Compliance level to the enhanced IPC protocols among the nurses**

In this study, a high compliance level to the enhanced IPC protocols for COVID-19 was established among the nurses working in the critical care units of Kenyatta National Hospital.

The study established that all of the surveyed nurses were compliant to the protocols on hand hygiene. According to the results, all of the nurses were observed as washing their hands with soap and running water or utilized hand sanitizers. However, a significant proportion of the nurses were seen not to observe the five moments of hand washing (prior to and after every patient contact, before and after every procedure and after coming into contact with contaminated surfaces) as well as not following properly the recommended steps in hand washing. This therefore showed that though hand hygiene was applied by majority of the nurses, there were gaps in the manner in which the nurses executed the hand hygiene protocol. Similar observations were made Barranco and Ventura (2020), Houghton et al. (2020 ) and Sharma, et al. (2020a) who also observed high rates of compliance with the hand hygiene protocol among surveyed critical care nurses though gaps were evident in some not doing hand washing as it should be done.

The study also established that all the surveyed critical care nurses at KNH had a high level of compliance to protocols on use of personal protective equipments including surgical masks, disposable gloves, head gear and gowns. This study established that all of the surveyed nurses who were working in CCU at KNH properly wore the gowns, properly donned the surgical masks, properly used the disposable gloves and properly wore the head gear. The nurses were also observed as disposing off each of these PPEs in the right way after their use. This implied that critical care nurses at KNH had high compliance with protocols on the use and disposal of various PPEs. Similarly, in studies by Sharma et al. (2020b), Wilson et al. (2020) and Silverberg et al. (2021), most of the surveyed nurses working in intensive care settings were also found to be fully compliant with enhanced IPC guidelines on use and disposal of the various PPEs. Similar observations were also made by Amany et al. (2020) and Powell-Jackson et al. (2020) who also noted high compliance rates on PPE based IPC protocols among surveyed critical care nurses. The current study shares similar views with these studies

that the high compliance with the enhanced IPC protocols on PPEs usage and disposal could be due to intense and regular trainings conducted among the nurses on COVID-19 IPC protocols.

Regarding compliance to COVID-19 protocols on patients' social distancing rule, this study observed that all of the surveyed nurses were seen to ensure that the recommended distance of 1.5 metres between patients was observed. As such there was high compliance rate to the protocols on recommended patients' social distancing among the nurses working in the critical care units at Kenyatta National Hospital. This was critical in helping reduce COVID-19 transmission among the patients admitted in KNH's CCUs. Similar findings were reported by Sharma (2020a) and Silverberg et al. (2021) who reported that most nurses working in ICUs were keen in ensuring that patients remained apart within the recommended social distancing rule in critical care settings. Lai et al. (2020) and Karia et al. (2020) also noted that nurses were keen on observance of the recommended social distancing guidelines as it was essential in prevention of infections transmission especially with the emergence of COVID-19.

The study also established that nurses working in critical care units at KNH were also compliant with the various protocols on proper waste management and on proper segregation/separation of clean and dirty linen in linen cribs. The study established that all of the nurses working in critical care units at KNH properly utilized pedal operated coded bins for proper waste management. The nurses were also found as properly complying with the IPC protocols on proper segregation/separation of clean and dirty linen in linen cribs. Hence, the nurses were highly compliant with protocols on use of pedal operated coded bins for proper waste management as well as with protocols on proper segregation/separation of clean and dirty linen in linen cribs. High levels of compliance with IPC protocols on proper waste management and proper segregation/separation of clean and dirty linen within critical care settings were also reported by Powell-Jackson et al. (2020) and Alhumaid et al. (2021a). however, suboptimal rates of compliance with the IPC guidelines on proper waste management and proper segregation/separation of clean and dirty linen were espoused by Amany et al. (2020) and Ashinyo et al. (2021a).



In this study, the surveyed nurses who worked in KNH's critical care unit were also found to highly compliant with enhanced IPC protocols on proper sterilization of instruments and their storage. In this study, All of the participating nurses were observed as being compliant with the IPC protocols on submerging of instruments in decontaminants. They also ensured that all sterile instruments were well cleaned, dried and properly stored. This denoted a high level of compliance to IPC protocols on proper sterilization of instruments as well as on proper storage of sterile instruments among the nurses. In studies by Barranco and Ventura (2020), Alhumaid et al. (2021a) and Islam et al. (n.d.), surveyed nurses were also found to properly comply with the recommended IPC protocols on instruments sterilization as well as on proper storage of the sterilized instruments, sentiments also echoed by Ashinyo et al. (2021b).

### **5.2.3 Factors that influenced compliance to enhanced IPC protocols among the critical care unit nurses**

The factors found to have a statistically significant association with compliance level to enhanced IPC protocols for COVID-19 among the nurses working in the critical care unit at Kenyatta National Hospital included availability of quality and adequate PPEs including surgical masks, gloves, sanitizers, hand towels, gowns among others; continuous sensitization of current trends of the COVID-19 enhanced IPC protocols; proper training on COVID-19 enhanced IPC protocols; acquisition of adequate knowledge on the COVID-19 enhanced IPC protocols; better support systems from the management; adequate staffing ratios in the critical care units and consistent review of health policy guidelines and standard operative procedures in the critical care setting. This showed that these factors had a significant influence on compliance to enhanced IPC protocols for COVID-19 among nurses working in the critical care units at Kenyatta National Hospital. These results agreed with those of Alhumaid et al. (2021a), Lai et al. (2020) and Sharma et al. (2020b) who also cited availability of quality and adequate personal protective equipments, frequent sensitization of nurses on current trends of the COVID-19 enhanced IPC protocols and proper training of nurses on COVID-19 enhanced IPC protocols as leading factors that had notable effect on their compliance with the enhanced COVID-19 based IPC guidelines. The results also concurred with those of Houghton et al. (2020) and Wee et al. (2021) who added nurses' adequate knowledge on the COVID-19 enhanced IPC protocols, adequate

nursing staffing ratios in health care settings and regular review of IPC guidelines and standard operative procedures as significant predictors of the compliance level to COVID-19 related IPC protocols among the health care providers. Wilson et al. (2020) also identified better support systems from the management as a critical element that enhanced health care providers' compliance with the IPC guidelines for COVID-19.

### **5.3 Conclusions**

Based on the study findings, the following conclusions were drawn:

The enhanced IPC guidelines occasioned by COVID-19 were both nurse and institutional based. Nurse based enhanced IPC protocols for COVID-19 included hand washing with soap and running water or use of sanitizers, proper use and disposal of PPEs including surgical masks, gloves, head gears and gowns, observing 1.5m of social distancing of patients, proper segregation of clean and dirty linen, proper waste management and sterilization and proper storage of sterile instruments.

The institutional based enhanced IPC protocols for COVID-19 at KNH's CCU included availability of adequate PPEs in stock; availability of hand hygiene facilities and posters promoting hand hygiene; availability of waste management facilities and posters illustrating proper waste segregation; keeping the floors and surfaces clean and well dusted; availability of facilities to disinfect patient equipments and ensuring that the CCUs were not overcrowded.

A high level of compliance to enhanced IPC protocols for COVID-19 was observed among nurses working in the critical care unit at KNH.

Availability of quality and adequate personal protective equipments, continuous sensitization of current trends of the COVID-19 enhanced IPC protocols; proper training on COVID-19 enhanced IPC protocols; acquisition of adequate knowledge on the COVID-19 enhanced IPC protocols; better support systems from the management; adequate staffing ratios in the critical care units and consistent review of health policy guidelines and standard operative procedures in the critical care setting were the factors found to influence the nurses' compliance to the enhanced the enhanced IPC protocols for COVID-19.

#### **5.4 Recommendations**

1. The enhanced IPC guidelines occasioned by the COVID-19 should be regularly reviewed and updated to ensure they remain robust, effective and sensitive/relevant to the needs of KNH's critical care units. The institution should ensure that each CCU has the stipulated guidelines as SOPs to act as reference and for audit purposes.
2. The high level of compliance to enhanced IPC protocols for COVID-19 among nurses working in the critical care units at KNH should be maintained well beyond the COVID-19 pandemic especially for emerging and re emerging infections which will spearhead compliance and enhancement of the IPC protocols. Therefore audits, re sensitization on updated trends about infections and consistent training on the protocols are key components.
3. Efforts are required to ensure that nurses working in critical care units at KNH remain adequately supported with appropriate tools in form of PPEs, review of policy and training regarding the enhanced IPC protocols, sufficient support from the management in order to address factors that influence compliance to enhanced IPC protocols.

#### **5.5 Suggested Areas for Further Studies**

1. This was a single hospital study that assessed the nurses' compliance to enhanced IPC protocols for COVID-19 in the critical care unit at KNH. A wider study involving other hospitals in the country is hereby recommended. This would facilitate a broader comparison and generalization of the study findings.
2. Further, an investigation of the experiences and perspectives of critical care nurses with respect to COVID-19 at KNH and how COVID-19 affected their work output would equally be informative.

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## APPENDICES

### **Appendix 1: Letter to Ethics Committee**

Priscilla Lily Kidayu

School of Nursing Sciences

University of Nairobi

P.O Box 20723

Nairobi.

Admission No: H56/36401/2019

30<sup>th</sup> April 2022

To

The Chairman

Kenyatta National Hospital Ethics and Research Committee

P.O Box 20723

Nairobi.

Dear Sir/Madam,

#### **RE: REQUEST FOR PERMISSION TO CONDUCT A RESEARCH AT KENYATTA NATIONAL HOSPITAL**

I am a second-year student at the University of Nairobi, School of Nursing Sciences pursuing a Master of Science degree in Nursing (Critical care Nursing).

I hereby request approval to conduct a research study as an academic requirement for the above course. My study is on **Nurses' compliance to Enhanced IPC protocols for COVID-19 in the critical care unit at Kenyatta National Hospital**. Attached is the Research project proposal for the study, your assistance will be highly appreciated.

Yours Faithfully,

Priscilla Lily Kidayu

H56/36401/2019

Email Address:kidayu@students.uonbi.ac.ke

Mobile No: 0723295855

**Appendix 2: Letter to the institution (Department)**

Priscilla Lily Kidayu

Admission No: H56/34601/2019

School of Nursing Sciences

University of Nairobi

P.O Box 20723

Nairobi.

11<sup>th</sup> October 2022

To

The Head of Department,

Department of Anesthesia

Kenyatta National Hospital

Dear Sir/Madam,

**RE: REQUEST FOR PERMISSION TO CONDUCT A RESEARCH AT KENYATTA NATIONAL HOSPITAL**

I am a second-year student at the University of Nairobi, School of Nursing Sciences pursuing a Master of Science degree in Nursing (Critical care Nursing).

I hereby request approval to conduct a research study as an academic requirement for the above course. My study is on **Nurses' compliance to Enhanced IPC protocols for COVID-19 in the critical care unit at Kenyatta National Hospital**. Attached is the Research project proposal for the study, your assistance will be highly appreciated.

Yours Faithfully,

Priscilla Lily Kidayu

H56/34601/2019

Email Address: kidayu @students .uonbi.ac.ke Mobile No: 0723295855

### **Appendix 3: Participants information sheet**

#### STUDY TOPIC

Nurses' compliance to enhanced IPC Protocols for COVID-19, in the critical care unit at Kenyatta National Hospital.

#### INVESTIGATOR'S STATEMENT

My name is Priscilla Lily Kidayu. I am conducting a study on "Nurses compliance to enhanced IPC protocols for COVID-19 in the critical care unit at the Kenyatta National Hospital. The study is intended to help nurses comply with the enhanced IPC guidelines.

#### PURPOSE OF THE STUDY

The purpose of this study is to assess Nurses compliance to COVID-19 IPC protocols in the critical care unit and to identify any factors that influence compliance of nurses to enhanced IPC guidelines. This study will aid nurses to be more aware of protocols in the prevention and control of infections and ensure adherence to the protocols, which will in turn minimize infections and transmission rates of especially COVID-19 infections.

#### PARTICIPANT'S RIGHTS

Participants have a right to refuse or withdraw from participating in the study. Voluntary participation will be enforced.

#### Procedure

No physical manipulation will be employed on the participants. The nurses will be required to fill the questionnaires and submit them for analysis. Observational Checklists will be used by the investigator to gather data on compliance to IPC COVID-19 protocols.

#### Risks

No risks or manipulation will be experienced by the participants, except for a certain amount of time that will be required to complete the questionnaires.

### Confidentiality

Participants will be assured of confidentiality and anonymity during the study. Documents will be stored safely and access to them will only be done by authorized personnel.

### Conflict of interest

There is no conflict of interest between the researcher and the supervisors

In case of any inquiries, the following person can be contacted:

Name: Priscilla Lily Kidayu; Phone number: 0723295855

## **Appendix 4: Consent form**

### **Study topic**

Nurses' compliance to enhanced IPC COVID-19 Associated protocols in the critical care unit at Kenyatta National Hospital.

### **Investigator's statement**

My name is Priscilla Lily Kidayu. I am conducting a study on compliance of Nurses' to enhanced IPC protocols for COVID-19. This study will look at the guidelines for IPC and the enhanced IPC protocols put in place during the COVID-19 era. In order to minimize infections and more so infections that are associated with COVID-19, it is important to understand the means of breaking the entry points of the infections and consistent adherence to enhanced. IPC guidelines and seal any gaps that would prevent or slow down its effectiveness.

By signing this document, you have read and understood the particulars in the participant information sheet, questions are satisfactory answered and voluntary participation embraced.

Participants' signature.....

Date.....

I confirm that I have clearly explained to the participant the nature of the study and the contents of this consent form in detail and the participant has decided to participate voluntarily without any coercion or undue pressure.

Research assistant signature.....

Date.....

### **For any Clarification, please contact**

Priscilla Lily Kidayu.

Mobile No: 0723295855

School of Nursing Sciences

University of Nairobi

P.O Box 20723, Nairobi

Or

Dr. Samuel Kimani

PhD

Lecturer School of Nursing

University of Nairobi

Or

The Chairman

Kenyatta National Hospital Ethics and Research Committee

P.O Box 20723

Nairobi

## Appendix 5: Questionnaire

Date;

**Bio demographic data**

**Ward/Unit:**

### 1. Gender:

- 1) Male
- 2) Female
- 3) Others.....

### 2. Age

- 1) 20-29
- 2) 30-39
- 3) 40-49
- 4) 50-59

### 3. Educational Background

- 1) Certificate
- 2) Diploma
- 3) Higher Diploma
- 4) Degree

### 4. Work experience

- 1) 0-9yrs
- 2) 9-19yrs
- 3) 20-29yrs
- 4) 29yrs and above

### 5. For how long have you worked in CCU?

- 1) Less than 2 months
- 2) 3months-12months
- 3) 13months-24months



- 4) 25-36 months
- 5) 37-48months
- 6) 49months and over

**6. Have you received COVID-19 vaccination?**

- a) Yes
- b.)No

If yes, which dose? First dose, second dose, booster dose

If No, why.....

**7. Have you been trained on IPC COVID-19 protocols?**

- a) Yesb.)No

If yes when were you trained last?

.....

**8.) How were you trained?**

- 1) In a workshop
- 2) Online through webinar
- 3) On job training and
- 4) Demonstration,
- 5) Continuous professional development

**9. Have you been supported with job aids to support compliance with IPC eg.manual, guidelines, posters, online job aids etc**

- 1) Yes
- 2) No

**10. What factors influence compliance to Enhanced COVID-19 IPC protocols?**

- a) .....
- b) .....
- c) .....

### Observational checklists

<b>Protocols:</b>	<b>Med</b>	<b>Cardio</b>	<b>Neuro</b>	<b>Main</b>	<b>NICU</b>	<b>PICU</b>	<b>IDU</b>	<b>Mat</b>
<b>Hand Hygiene</b>	<b>CCU</b>	<b>CCU</b>	<b>CCU</b>	<b>CCU</b>			<b>CCU</b>	<b>CCU</b>
<b><u>Nurses based protocols</u></b>								
1.) Hand washing with soap and running water. or sanitizers in place.								
2.)Technique of 5 moments performed								
<b><u>Institution based protocols</u></b>								
1.)Hand washing sink with taps and running water .								
2.)Posters promoting hand hygiene								
2.)Posters promoting hand hygiene								
3.)Paper towels and waste bin available								

<b>Protocols:</b>	<b>Medical CCU</b>	<b>Cardiothoracic CCU</b>	<b>Neurology CCU</b>	<b>Main CCU</b>	<b>NICU</b>	<b>PICU</b>	<b>IDU CCU</b>	<b>Maternity CCU</b>
<b>Personal protective Equipment</b>								
<b><u>Nurses based protocols</u></b>  1.) Gowns properly worn and disposed off after use.								
2.) Surgical masks properly worn								
3.) Disposable gloves properly worn and disposed off. after use								
4.) Head gear properly worn and disposed off after use  <b>KEY:1.) Yes-50%</b>  <b>No-Less than 50%</b>								
<b><u>Institution based</u></b>								

<b><u>protocols</u></b>								
Adequate PPEs in stock								

<b>Protocols:</b>	<b>Medical CCU</b>	<b>Cardiothoracic CCU</b>	<b>Neurology CCU</b>	<b>Main CCU</b>	<b>NICU</b>	<b>PICU</b>	<b>IDU CCU</b>	<b>Maternity CCU</b>
<b>Patient placement</b>								
Distance of 1.5m apart								

<b>Protocols:</b>	<b>Med CCU</b>	<b>Cardio CCU</b>	<b>Neuro CCU</b>	<b>Main CCU</b>	<b>NICU</b>	<b>PICU</b>	<b>Mat CCU</b>	<b>IDU CCU</b>
<b>Environmental cleanliness</b>								
<b><u>Institutional based protocols</u></b>								
1.)Floor is clean and Surfaces well dusted								
2.) Patient care equipment is clean.								
Cleaning mops are colorcoded and appropriately used								

Preparation of detergents/disinfectants done								<b>KEY:Y:Y es-1 No-0</b>
<b>Protocols :Instrument reprocessing</b> <b><u>Institutional based protocols</u></b>	<b>Med CCU</b>	<b>Cardio CCU</b>	<b>Neuro CCU</b>	<b>Main CCU</b>	<b>NICU</b>	<b>PICU</b>	<b>IDU CCU</b>	<b>Mat CCU</b>
1.)Designated area for pre-soaking used instruments								
2.)Work instruction and decontamination checklists displayed								
3.)Instruments submerged in decontaminant								
4.)Instruments submerged in decontaminant								
5.)Sterile instruments and storage area clean well stored ,dried.								

**KEY:Present-1 Absent-0**

<b>Protocols:</b>	<b>Med</b>	<b>Cardio</b>	<b>Neuro</b>	<b>Main</b>	<b>NICU</b>	<b>PICU</b>	<b>Mat</b>	<b>ID</b>
<b>Waste management</b>	<b>CCU</b>	<b>CCU</b>	<b>CCU</b>	<b>CCU</b>				<b>U</b>
<b><u>Institution</u></b>								

<b><u>based protocols</u></b>								
1.)Pedal operated coded bins available								
2.)Transfer trolleys specifically for waste only								
3.)Posters available for waste segregation								

<b>Protocols: Linen Handling <u>Institutional based protocols</u></b>	<b>Med CCU</b>	<b>Cardio CCU</b>	<b>Neuro CCU</b>	<b>Main CCU</b>	<b>NICU</b>	<b>PICU</b>	<b>IDU</b>	<b>Mat CCU</b>
1.)Clean and dirty linen segregated separately in Linen cribs								

<b>Protocols; <u>Institutional based protocols</u></b>	<b>Med CCU</b>	<b>Cardio CCU</b>	<b>Neuro CCU</b>	<b>Main CCU</b>	<b>PICU</b>	<b>NICU</b>	<b>IDU CCU</b>	<b>Maternity CCU</b>
--	--------------------	-----------------------	----------------------	---------------------	-------------	-------------	--------------------	--------------------------

1.)Patients with transmissible conditions isolated								
2.)Any staff with infectious conditions								
3.)Is the ward overcrowded?								
3.)Is the air extraction system functional?								

<b>Protocol:</b>	<b>Medical CCU</b>	<b>Cardiothoracic CCU</b>	<b>Neurology CCU</b>	<b>Main CCU</b>	<b>NIC U</b>	<b>PIC U</b>	<b>Maternity CCU</b>	<b>IDU CCU</b>
1.)Enhanced IPC COVID-19 Guidelines								
2.)CPD sessions on COVID-19 IPC protocols								

**KEY: Yes-1 No-0**

**KEY: Present-1 Absent-0**

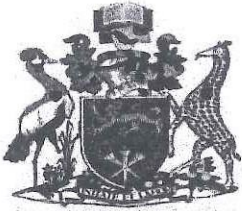
## Appendix 6: Budget

Item	Description	Unit of Measurement	Unit cost(Ksh)	Total(Ksh)
Literature Review	Search, transport , Wifi	12 weeks	@1000	15000
Stationery	A ream of A4 papers	1 pack	@800	800
Proposal development	Typing and Printing	3 drafts,60 pages each	@500	1500
Proposal development	Photocopy	6 drafts,60 pages each	@400	2400
Ethical committee Review charges	KNH-UON Ethics		@2000	2000
Data collection, Printing and photocopy	Pretesting 1 day	2000	@2000	2000
Training of Research Assistants	2 for 1 day	500	@1000	1000
Data collection	2 Research Assistants	1 weeks for 7days	@500	7000
Data analysis	Statistician	50000	@50000	50000
<b>Subtotal</b>				<b>81700</b>
Draft Report writing	Typing, printing And Photocopy	150 pages for 5 copies	@30 @600	4500 3000
Final report	Correction and printing	150 pages	@10	1500
Photocopy	5 copies	5	@600	3000
Binding	7 copies	7	@1000	7000
Dissemination Report	Typing and printing	20pages	@30	600
Photocopy	50 copies @20	@5	5000	5000
Binding	10 copies	@50	500	500
<b>Subtotal</b>				<b>25100</b>
Contingencies 10%				
<b>Grand total</b>				<b>106,800</b>



## Appendix 7: Time frame

ACTIVITY/MONTH	2022								
	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP - NOV
Thesis Proposal development									
Forwarding to KNH-UoN ERC after supervisors clearance									
Correction from ERC and resubmission to ERC for approval									
Questionnaire pretesting									
Data collection and cleaning									
Data processing and Analysis									
Report Writing									
Draft report presentation and corrections to the supervisor									
Report presentation and Submission to the supervisor									
Research defense at School of Nursing sciences									



UNIVERSITY OF NAIROBI  
FACULTY OF HEALTH SCIENCES  
P O BOX 19676 Code 00202  
Telegrams: varsity  
Tel:(254-020) 2726300 Ext 44355

**KNH-UON ERC**

Email: [uonknh\\_erc@uonbi.ac.ke](mailto:uonknh_erc@uonbi.ac.ke)  
Website: <http://www.erc.uonbi.ac.ke>  
Facebook: <https://www.facebook.com/uonknh.erc>  
Twitter: @UONKNH\_ERC [https://twitter.com/UONKNH\\_ERC](https://twitter.com/UONKNH_ERC)



KENYATTA NATIONAL HOSPITAL  
P O BOX 20723 Code 00202  
Tel: 726300-9  
Fax: 725272  
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/394

4<sup>th</sup> October, 2022

Priscilla Lily Kidayu  
Reg.No. H56/34601/2019  
Dept. of Nursing Sciences  
Faculty of Health Sciences  
University of Nairobi



Dear Priscilla,

**RESEARCH PROPOSAL: NURSES' COMPLIANCE TO ENHANCED INFECTION PREVENTION AND CONTROL OF COVID-19 ASSOCIATED PROTOCOLS IN THE CRITICAL CARE UNIT AT KENYATTA NATIONAL HOSPITAL (P392/05/2022)**

This is to inform you that KNH-UoN ERC has reviewed and approved your above research proposal. Your application approval number is **P392/05/2022**. The approval period is 4<sup>th</sup> October 2022 – 3<sup>rd</sup> October 2023.

This approval is subject to compliance with the following requirements;

- i. Only approved documents including (informed consents, study instruments, MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by KNH-UoN ERC.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KNH-UoN ERC 72 hours of notification.
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH-UoN ERC within 72 hours.
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to KNH-UoN ERC.

Protect to discover

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,



**DR. BEATRICE K.M. AMUGUNE**  
**SECRETARY, KNH-UoN ERC**

- c.c.     The Dean, Faculty of Health Sciences, UoN  
          The Senior Director, CS, KNH  
          The Assistant Director, Health Information Dept., KNH  
          The Chairperson, KNH- UoN ERC  
          The Chair, Dept of Nursing Sciences, UoN  
          Supervisors: Dr. Samuel Kimani, Dept, of Nursing Sciences UoN  
                      Dr. Theresa Odero, Dept of Nursing Sciences, UoN



KENYATTA NATIONAL HOSPITAL  
P.O. Box 20723-00202 Nairobi

Tel.: 2726300/2726450/2726565  
Research & Programs: Ext. 44705  
Fax: 2725272  
Email: [knhresearch@gmail.com](mailto:knhresearch@gmail.com)

KNH/R&P/FORM/01

## Study Registration Certificate

1. Name of the Principal Investigator/Researcher

PRISCILLA LILY KIDATHI

2. Email address: [lilyprkide@gmail.com](mailto:lilyprkide@gmail.com)

Tel No. 0723295835

3. Contact person (if different from PI) N/A

4. Email address: N/A

Tel No. N/A

5. Study Title

NURSES COMPLIANCE FOR ENHANCED IPC COVID 19 PROTOCOL IN  
THE CRITICAL CARE UNIT, KNH.

6. Department where the study will be conducted CRITICAL CARE UNIT  
(Please attach copy of Abstract)

7. Endorsed by KNH Head of Department where study will be conducted.

Name: Dr J. Gwaro

Signature

Date

11/10/2022

8. KNH UoN Ethics Research Committee approved study number  
(Please attach copy of ERC approval)

9. I PRISCILLA LILY KIDATHI

commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Medical Research.

Signature

Date

11/10/2022

10. Study Registration number (Dept/Number/Year)

(To be completed by Medical Research Department)

CCU 12 OCT 2022

1167 / 2022

11. Research and Program Stamp

All studies conducted at Kenyatta National Hospital must be registered with the Department of Medical Research and investigators must commit to share results with the hospital.



**UNIVERSITY OF NAIROBI**  
FACULTY OF HEALTH SCIENCES  
DEPARTMENT OF NURSING SCIENCES  
OFFICE OF THE CHAIRMAN

TELEPHONE: 020 - 2726300 EXT: 43390  
TELEFAX: 020 2711250  
Email: [dept-nursing@uonbi.ac.ke](mailto:dept-nursing@uonbi.ac.ke)

P.O. BOX 19676 -00202  
KENYATTA NATIONAL HOSPITAL  
NAIROBI KENYA

OUR REF: H56/3460/2019

DATE: November 8, 2022

Director  
NACOSTI,  
NAIROBI

RE: INTRODUCTION LETTER - PRISCILLA LILY KIDAYU – H56/3460/2019

This is to certify that the above named is a student at the University of Nairobi, Department of Nursing Sciences, currently pursuing her MSc. in Nursing. Her research topic is “**Nurses’ compliance to enhanced infection prevention and control of COVID-19 associated protocols in the critical care unit at Kenyatta National Hospital**” (P392/05/2022)”. Attached is a copy of KNH-UON ERC Ethical Approval letter.

Any assistance accorded to her to undertake the study will be highly appreciated.

  
  
DR. EMMAH K. MATHEKA  
Chairman,  
Department of Nursing Sciences



ISO  
9001:2015  
CERTIFIED

Quality Management System Excellence in University Education and Training

DR. SAMUEL KEMANT  
24/11/2022

# Nurses' Compliance To Enhanced Infection Prevention And Control Of Covid-19 Associated Protocols In The Critical Care Unit At Kenyatta National Hospital

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