ASSESSING THE KNOWLEDGE, ATTITUDE AND PRACTICES OF HEALTHCARE WORKERS ON COVID-19 INFECTION PREVENTION AND CONTROL AT ISOKA DISTRICT HOSPITAL, ZAMBIA.

By

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DECLARATION

I, Namukoko Gladys, do hereby affirm that this thesis is a result of my own research and true record, and that to the best of my knowledge, no such work has been done before at this University or any other University for similar purposes. All records quoted in this have been properly acknowledged.

Signature ……. Date…….

APPROVAL

This dissertation written by **Gladys Namukoko** has been approved as partial fulfilment of the requirements for the award of the degree of Master of Science in Public Health by the University of Zambia.

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Supervisor's Signature

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Dr. Cosmas Zyambo

ABSTRACT

Introduction: The Coronavirus disease 2019 (Covid-19), an infectious disease caused by a newly discovered coronavirus, called Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), has continued to wreak havoc across the globe. It has spread to literally all the countries and territories around the word, killing millions of people and decimating national economies. Zambia like many countries, is grappling with the Covid-19 pandemic and has, as of 29th April, 2021, reported a cumulative total of 307,636 cases with 39,933 deaths. Healthcare workers the world over, are at the forefront in the containment of Covid-19, its diagnosis, and management of infected patients and this is the case in Zambia. As a result, they are more exposed and prone to Covid-19 infection and are potential means by which the disease can spread from health facilities to the community. Thus, having the right knowledge and attitude, as well as employing the best practices, towards Covid-19 infection prevention and control, among healthcare workers, is cardinal if the fight is to be won.

Objective: This study sought to understand knowledge, attitude and practices of healthcare workers on Covid-19 infection prevention and control at Isoka District Hospital in Zambia.

Methodology: The research conductance a mixed method, cross-sectional survey using a structured questionnaire which collected data on demographic information, knowledge, attitudes, and practices of healthcare workers at Isoka District Hospital. The collected data was coded and analysed using SPSS version 20.0. Descriptive statistics, one-way ANOVA, Chi-square analysis and the Pearson's correlation coefficient was used to understand the characteristic composition of the population, relationship between demographic information and KAP factors and the correlation between KAP variables.

Results: Results show that healthcare workers at Isoka District Hospital have adequate Covid-19 IPC knowledge, positive Covid-19 IPC attitudes and good Covid-19 IPC practices. Results also show that demographic factors such as level of education, profession, religion as well as whether a healthcare worker lives with people or not, has a relationship with their knowledge, attitudes or practices. Further results indicate that there is a correlation between knowledge and attitudes of healthcare workers.

Conclusion: Researches like this research help in assessing the adherence of healthcare workers to Covid-19 IPC measures, especially those in rural areas. Although factors such as myths and misconceptions have continued to impact the knowledge, attitudes and practices of healthcare workers negatively, healthcare workers at Isoka District hospital showed adequate knowledge, positive attitudes and good practices concerning Covid-19 IPC. More and continuous sensitisation and training needs to be done in order to not only equip healthcare workers with knowledge for fighting this pandemic but to also prepare them for any future similar outbreaks.

***Keywords**: Covid-19, Knowledge, Attitude, Practice, Healthcare Workers, Infection Prevention and Control*

DEDICATION

This exposition is dedicated to my late father, who though absent has continued to inspire me and influence my character and hardworking spirit. He continues to hold a special place in my heart. May his soul continue to rest in eternal peace. I also want to dedicate this thesis to my mum and siblings who have been very supportive throughout my career. I can only pray that my God blesses them abundantly

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LIST OF ABBREVIATIONS AND ACRONYM

ANOVA	Analysis of Variance
HBM	Health Belief Model
CDC	Center for infectious Disease and Control
COVID-19	Coronavirus Disease 2019
HCW	Healthcare Worker
IPC	Infection Prevention and Control
KAP	Knowledge, Attitudes and Practices
MERS	Middle East Respiratory Syndrome
MERS-CoV	Middle East Respiratory Syndrome Coronavirus
MoH	Ministry of Health
SARS	Severe Acute Respiratory Syndrome
SARS-CoV	Severe Acute Respiratory Syndrome Coronavirus
WHO	World Health Organization

DEFINITIONS OF KEY TERMS

Attitude	A person's opinion or general feeling about something
Healthcare Workers	Anyone who works in the healthcare or social care sector, including students on clinical placement, frontline workers, volunteers and other workers not in direct patient contact (Health Protection Surveillance Centre, 2020).
Infection Prevention and Control	The practical, evidence-based approach which prevents patients and health workers from being harmed by avoidable infection and because of antimicrobial resistance (World Health Organisation, 2020).
Knowledge	Someone's general awareness of something or their possession of facts, truths, ideas or principles about something.
Practice	The voluntary application of someone's knowledge.
Social Distancing	The act of maintaining a greater than usual physical distance between an individual and other people and objects, in order to avoid contamination.
Vaccine	Any preparation that is used to stimulate the body's immune response against diseases (Centre for Disease Control, 2021).

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CHAPTER 1

INTRODUCTION

1.1 Background

Coronaviruses are enveloped, single-stranded RNA viruses that are known to cause flu-like symptoms marked by severe acute respiratory symptoms, high morbidity and mortality (Adesegun, et al., 2020; Ejeh , et al., 2020). Although their origin is still being studied, current evidence shows that coronaviruses are of zoonotic origin (Ikejezie, 2020; World Health Organisation, 2023). Previously, several viruses of the coronavirus family had threatened the human population (Ejeh , et al., 2020; World Health Organisation, 2023). The most prominent of these where the severe acute respiratory syndrome (SARS-CoV) which caused a disease outbreak in 2003, and the Middle East Respiratory Syndrome (MERS-CoV) which broke out in 2009 (Ejeh , et al., 2020).

Coronavirus disease 2019 (Covid-19) is an infectious disease caused by a newly discovered coronavirus (World Health Organisation, 2023), named as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) due to it similarities with previously discovered SARS-CoV coronaviruses (Ejeh , et al., 2020; Feldman, et al., 2021; Habib, et al., 2021).Covid-19 first broke out in Wuhan, China (Ikejezie, 2020; Habib, et al., 2021), with the first cases being officially reported by the Wold Health Organisation on 31stDecember, 2019 (World Health Organisation, 2023). On the 13th of January, 2020, the first case of Covid-19 outside China was reported in Thailand (World Health Organisation, 2023). The disease then spread rapidly to other countries and on 30th January, 2020, the World Health Organisation Director-General Dr Ghebreyesus declared the 2019-nCoV outbreak a Public Health Emergency of International Concern (World Health Organisation, 2023). WHO then, on the 12th of February, 2020 named the disease as Covid-19 and by 11th of March, 2020, the disease was officially pronounced as a global pandemic.

Since then, the disease has spread to almost every country and territory on earth and infected over 750 million people, causing more than 6.8 million people as of 17th February, 2023 (World Health Organisation, 2023). The Covid-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes (Republic of Zambia. Ministry of Health., 2023). It is also known to be transmitted by infected surfaces and objects

since the virus can survive everywhere (Asemahagn, 2020). The characteristic signs and symptoms of Covid-19 comprise respiratory symptoms, fever, cough and shortness of breath, but may sporadically include symptoms such as headache, muscle pain, sore throat, loss of taste or smell, haemoptysis, and diarrhoea (Asemahagn, 2020). Deterrence and control measures used against Covid-19 as advised by the WHO include social distancing (maintaining at least a 1-metre distance apart), wearing face masks to stop both the ingestion and transmission of infectious droplets, regular washing of hands or using alcohol-based hand sanitisers as well as avoiding crowded places. A number of vaccines have been developed and have been added to the list of preventive measures (World Health Organisation, 2023). These vaccines which are still being administered around the globe include the Vaxzevria developed by AstraZeneca, the Spikevax by Moderna and the Comirnaty developed by Pfizer or BioNTech. As of February 14, 2023, more than 13 billion vaccine dosses have been administered globally, with some countries giving up to 3 doses (World Health Organisation, 2023).

In Africa, Covid-19 has spread across the continent although the continent still remains the least hit by the pandemic. As of 14th February, 2021, the total number of laboratory confirmed Covid-19 case in Africa reached over 12.5 million, with about 250,000 deaths and over 12 million recoveries (WORLDOMETER, 2023). However, Mwananyanda, et al. (2021) have recently published a study that reviewed that one of the reasons for the low numbers in Africa is the lack of data. They argued that community deaths caused by Covid-19 were not being detected and thus the impact of Covid-19 in Africa was vastly underestimated (Mwananyanda, et al., 2021). Nevertheless, Africa has continued her fight against Covid-19 and has continued administering vaccines with allmost all African countries reported by WHO to have administered vaccines to their population (World Health Organisation, 2023). The African CDC reports that as of 19th February, 2023, over 1 billion vaccine doses have been administered (Africa Centre fo Disease Control, 2023).

Zambia like many countries African, has not been left out by the Covid-19 pandemic. The country reported the first laboratory confirmed cases of Covid-19 on 18th March 2020. Since then, the country has experienced multiple waves and has implemented a number of measures. Some of the measures that have so far been implemented includes closure of three international airports, closure of all schools, movement restrictions and closure of non-essential services such as restaurant, bar, gym and public gatherings to curb the transmission rate (United Nations Country Team, 2020). However, international land borders remained open, including

movement of commercial and border crossing, to avoid negative impact on trade and the economy (United Nations Country Team, 2020). Later, the country effected local lockdowns in cities and towns where cases rose. Overtime, businesses, and schools have opened and movement restrictions have been eased. As of 4th February, 2023, Zambia had cumulatively recorded total of 341,573 laboratory confirmed cases (Republic of Zambia. Ministry of Health., 2023). There were 335,970 recoveries cases comprising 98.4%, with about 4000 deaths amounting to 1.2% (Republic of Zambia. Ministry of Health., 2023). The country is ranked 9th in Africa when considering the total number of cases recorded (WORLDOMETER, 2023). There has even been a number of Covid-19 virus variants detected in the Zambian population. But on the 25th of March, 2021 cabinet approved the vaccine programme (Republic of Zambia. Ministry of Health., 2023). As of 4th February 2023, Zambia has administered more than 12.7 million total vaccinations and over 8.6 million fully vaccinated (Republic of Zambia. Ministry of Health., 2023).

Healthcare workers are at the forefront in the containment of Covid-19 outbreak, diagnosis, and management of infected patients (Ejeh , et al., 2020). Sadly, healthcare workers are also potential sources and means of nosocomial and community transmission (Ejeh , et al., 2020). Initial findings of the Covid-19 seroprevalence reported by the OCHA, (2020) survey revealed about 5-11 per cent infection in the population, 12-15 among outpatient service seekers &4-8 among health workers. Thus, provision of up-to-date information to the healthcare workers in order to influence their infection prevention and control (IPC) practices in Zambia is very cardinal. Even more important is the need to check whether the healthcare workers, especially those who are in rural areas, have the knowledge, attitudes, and practices that are in line with accepted Covid-19 IPC. This research investigated the current knowledge, attitudes and practices (KAP) of healthcare workers towards Covid-19 Infection Prevention and Control at Isoka District Hospital.

1.2 Problem Statement

Since the start of the Covid-19 pandemic, there has been a widespread propagation of myths and misconceptions about many aspects of the disease (Sahoo, et al., 2020; Abbas, et al., 2021; Vraga & Bode, 2021). These myths and misconceptions have mainly surrounded aspects of the origin (Abbas, et al., 2021), wearing of masks (Taylor & Asmundson, 2021), whereas other myths are associated with cure of the Covid-19 (Abbas, et al., 2021) and other Covid-19 vaccines (Abbas, et al., 2021). Even the World Health Organisation have reported the widely shared misinformation about Covid-19 including conspiracies around unproven treatments,

false cures and antivaccine message (World Health Organisation, 2020). Albeit they may look harmless at face value, myths and misconceptions have damaging consequences and can greatly sabotage the fight against Covid-19. They are known to lead to over- complacency and a reduction in IPC practices (Aiyewumi & Okeke, 2020).

Globally, recent reports show that lack of correct information about Covid-19 has led to large numbers of health workers and others at high risk still being unvaccinated. As of April 14, 2020, only 30% of healthcare workers and 20% of people aged 60 or older have been vaccinated in low-income countries (World Health Organisation, 2022), including Zambia. Research has also shown that the impact myths and misinformation have on healthcare worker tends to have trickle down effects on the overall population (Wirsiy, et al., 2021). Wirsiy, et al. (2021) found that attitude and uptake by health care workers and misinformation were among the factors that determined Covid-19 vaccine acceptability in the rest of the population. Thus, there is need to identify gaps in knowledge and sources of misinformation which can help public health efforts to design and implement more focused interventional measures (Sallam, et al., 2021). KAP studies provide an avenue for assessing these gaps in knowledge and countering misinformation.

Albeit a number of studies have been done on healthcare workers' knowledge, attitudes and practices in relation to Covid-19, various gaps have still remained. To start with, most, if not all the researches that have been done on this topic so far use online surveys to gather data (Adesegun, et al., 2020; Chawe, et al., 2021; Lincango-Naranjo, et al., 2021). Due to this, these studies mostly covered the urban population, as they are usually the ones who have access to the internet. Zambia has about 55% of rural population (The World Bank Group, 2020). Therefore, there is more need to investigate the KAP of healthcare workers working in rural areas in relation to Covid-19 IPC. Additionally, the fight against the Covid-19 pandemic has proved to be unceasing and dynamic. Thus, KAPs towards Covid-19 IPC has continued to evolve. For instance, a few months ago, it was a fact that Covid-19 had no vaccine and thus the only preventative measures that were known were, social distancing, hand washing, and mask wearing (Asemahagn, 2020; Mbachu, et al., 2020). However, now there are a number of vaccines being given globally to not only reduce the spread of Covid-19 but also reduce its severity and deaths. There is therefore still need to assess whether KAP of healthcare workers towards Covid-19 IPC is up to date. There are even more cases of Covid-19 globally and in Zambia currently, which stimulates interest in whether the KAP of people, and indeed that of healthcare workers has changed overtime as they get more familiar with the reality of the

Covid-19 pandemic. Lastly, there are very few researches in Zambia that have studied the KAP of healthcare workers in Zambia. To the best knowledge of the researcher, only Chawe, et al. (2021) have conducted a similar study. Further, the research done by Chawe and others investigated the KAP of Covid-19 among medical laboratory personel whereas this research is probing KAPtowards Covid-19 IPC among healthcare workers.

1.3 Significance of Study

The importance of healthcare workers (HCW's) in infection prevention and control as well as public health service delivery cannot be overemphasised. This is more so in IPC of Covid-19 where healthcare workers play a frontline role. They play a critical role in the clinical management of Covid-19 patients (Mukwangole, et al., 2020). Additionally, healthcare workers are a reliable source of public health information in communities where they hail as they are more easily accessible and trusted. Further, healthcare workers may act as Covid-19 transmission factors, spreading the disease from health facilities into their homes and consequently the community. Because of this, it is very important to ensure that healthcare workers are knowledgeable about the latest being employed in combating the Covid-19 IPC measures being employed globally in combatting the pandemic. It is also very cardinal that their attitudes and more importantly their practices are in line with accepted standards. This will ensure that the healthcare workers use best practices in Covid-19 IPC, thereby protecting themselves against infection and in turn protect their families and communities. This will also ensure that healthcare workers have the correct and up to date information to disseminate in the communities where they leave. In so doing, they will help in countering misconceptions, rumours, and conspiracies and thus improve adherence in communities. When healthcare workers and their communities are protected, then, the fight against the Covid-19 pandemic will be successful. This research is thus important as it counterchecks if the healthcare workers at Isoka District Hospital have up to date knowledge, positive attitudes and acceptable practices in relation to Covid-19 infection prevention and control. The research is timely, as Zambia will soon start rolling out the Covid-19 vaccination program. Thus, it is important that health workers are knowledgeable about the vaccine as well. Additionally, the research will add to the body of scientific knowledge currently existing on this topic and on Covid-19 in general.

1.4 Research Objectives

1.4.1 Main Objectives

To examine the knowledge, attitudes and practices of healthcare workers towards Covid-19 infection prevention and control.

1.4.2 Specific Objectives

i. To determine demographic factors associated with Knowledge on Covid-19 infection prevention and control at Isoka District Hospital.
ii. To determine demographic factors associated with Attitudes on Covid-19 infection prevention and control at Isoka District Hospital.
iii. To determine demographic factors associated with Practise on Covid-19 infection prevention and control at Isoka District Hospital.

1.5 Research Questions

1. How knowledgeable are Healthcare Workers at Isoka District Hospital on Covid-19 infection prevention and control?
2. What are the attitudes of Healthcare Workers at Isoka District Hospital towards Covid-19 infection prevention and control?
3. What are the practices of Healthcare Workers at Isoka District Hospital in relation to Covid-19 infection prevention and control?
4. Does the knowledge, attitudes and practices of healthcare workers at Isoka District Hospital vary across various demographic factors?
5. Is there a relationship between Isoka District Hospital Healthcare Workers' knowledge on Covid-19 infection prevention and control and their attitudes and practices, towards Covid-19 infection prevention and control?

1.6 Conceptual Framework

Knowledge, attitude, and practice (KAP) studies often guide the execution of public health interventions (PHIs), and are useful tools for political influence (Muleme, et al., 2017). The KAP framework hypothesizes a linear relationship between knowledge, attitudes and practices, in which levels of knowledge in a population result into positive attitudes towards PHIs and consequently yield better practices. Thus, PHIs use awareness campaigns in order to improve knowledge levels and subsequently have a desirable societal behavioural change (Muleme, et al., 2017)

The KAP studies framework follows a model that is widely used in PHIs, known as the health behaviour model (HBM) (Mckellar & Sillence, 2020; Connera & Norman, 2022). The HBM model postulates that a person's motivation to undertake a health behaviour can be divided into three categories: individual perceptions, modifying factors, and likelihood of action (Mckellar & Sillence, 2020). One of the main facets of the HBM framework is that behaviour can be changed if the interventions focus on addressing an individual's specific perceptions about susceptibility, benefits, barriers, and self-efficacy (Laranjo, 2016). What is clear is that behaviour can be influenced through knowledge disseminating interventions. Glanz (2001) indicated that the health behaviour model is widely used as a foundation for developing messages that may persuade individuals to make healthy decisions. It is this relationship between messaging (knowledge) and behaviour (attitudes and practices) that the KAP framework exposes. Thus, this study hypothesizes that knowledge affects attitudes, with attitudes then impacting on practices. The framework also posits that knowledge can also directly influence practices. The framework seeks to investigate if healthcare workers who have a higher knowledge on Covid-19 IPC, have positive attitudes towards Covid-19 IPC interventions. Further, it seeks to understand if positive attitudes tend to yield better and improved practices with regards to Covid-19 IPC. For instance, participants who have higher knowledge on the role of face masks, social distancing and vaccines were expecteded to not only be more willing to engaging in the IPC measures and encourage others to utilize the measure, but also have a higher rate of already utilizing the measures. The other component of the framework sought to know if higher rates of knowledge of Covid-19 IPC correlate with better practices. Thus, participants who have more knowledge on Covid-19 IPC measures were expected to have a high likelihood of already utilising the measures even when their attitudes are negative. Below is an illustration of part of the KAP framework that this study used;

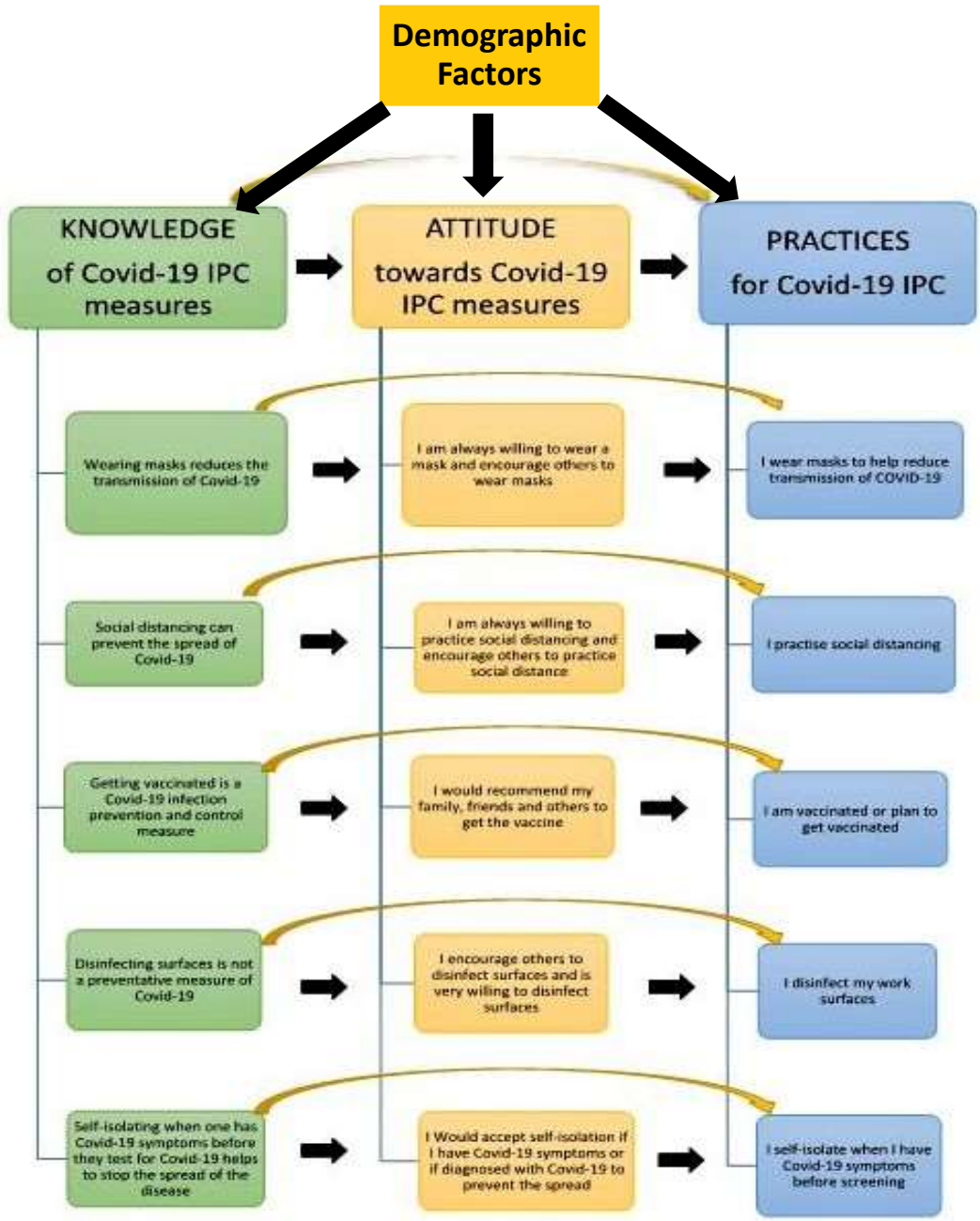

Figure 1.1: Conceptual framework on knowledge, attitudes and practices towards Covid-19 infection prevention and control.

However, it can be noted that Knowledge, Attitudes, and Practices can also be affected by other factors, such as social and cultural factors that have not been discussed in this study. These social and cultural factors include beliefs, myths and misconceptions. Studies like Aiyewumi & Okeke, (2020), Banko, (2020), Abbas, et al., (2021), and Vraga & Bode, (2021) have discussed how these social-cultural factors impacted on people's perception of the Covid-19 pandemic.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Since the first reported case of Covid-19 in November of 2019, the disease has spread to all corners of the world, affecting people, institutions, industries and businesses (Babu, et al., 2021; World Health Organisation, 2022). Healthcare workers have been at the forefront in the control of Covid-19 outbreak, diagnosis, and management of infected patients (Ejeh , et al., 2020). They have played a very important role in clinical management of patients with COVID-19 as well as in ensuring that adequate IPC measures are implemented and adhered to in health care facilities. Sadly, they have also acted as a source and means of transmission of the disease to the general population (Ejeh , et al., 2020), and some have even died in the process. To mitigate the spread of Covid-19, HCW's have had to strictly adhere to infection prevention and control measures (Mukwangole, et al., 2020; Omaka-Amari, et al., 2020; Michel-Kabamba, et al., 2021). Adherence to IPC measure however has been reported to be influenced by a number of factors, some of which include KAPs of HCW's on IPC measure (Ejeh , et al., 2020). Thus, a number of studies have been carried out to understand these factors. This chapter synthesises from literature, a number of aspects about Covid-19 infection prevention and control in relation to HCW's knowledge, attitudes and practices.

2.2 Covid-19 Infection Prevention and Control

The fight against Covid-19 has mostly cantered on infection prevention and control due to the fact that there still does not exist a proved cure for the disease. Thus, when the pandemic started in November, 2019, provided guidelines on how to prevent the spread of the disease. The guidelines included social distancing, wearing face masks to prevent both the inhalation and transmission of infectious droplets, as well as effective hand hygiene by regularly washing hands or using alcohol-based hand sanitisers (Chawe, et al., 2021). As the pandemic evolved, more IPC measures have been identified. These include, early screening and contact tracing as well as immunization against the Covid-19 virus. (World Health Organisation, 2022). Another very important IPC measure that has been widely employed across the globe is constant messaging of factual information about Covid-19 (Asemahagn, 2020). This has been targeted because there has been a constant spreading of myths and misconceptions about Covid-19,

which have seriously hampered the fight against the pandemic. Some of the conspiracies and misconceptions have questioned the zoonotic origin of the disease, claiming that it is a biological weapon (Banko, 2020) while others have questioned the severity of the disease and claimed that the disease is no more dangerous than common flu (Aiyewumi & Okeke, 2020). Others still, have questioned preventative measures such us face mask wearing (Taylor & Asmundson, 2021) and vaccines (Carlson, et al., 2020; Sallam, et al., 2021). This is why there is need to constantly update HCW's knowledge on Covid-19 IPC as well as assess their knowledge levels. Zhang, et al. (2020) reiterated that knowledge is essential for establishing prevention beliefs, forming positive attitudes, and promoting positive behaviours. For instance, countries with successful public-awareness programs against multiple infectious diseases have been reported to have very high rates of consensus on vaccine prevention, efficacy, and value (Abbas, et al., 2021). The importance of conducting KAP studies in order to assess and reaffirm Covid-19 IPC knowledge among HCWs can thus not be overemphasised.

2.3 Importance of KAP studies

One of the most popular tools that has been used in assessing HCW's adherence to Covid-19 IPC measures are KAP studies. Knowledge, attitudes and practices (KAP) surveys are usually carried out to collect data on the knowledge (known information), attitudes (opinions), and practices (actions) about general and/or specific topics of a particular population (Kaliyaperumal, 2004). KAP studies serve as an educational diagnosis of the community and their core purpose is to investigate changes in Knowledge and how it consequently affects attitudes and practices (Kaliyaperumal, 2004). They are widely recommended before and after vaccines are administered, and have been used to improve adherence (Riccó, et al., 2017; Ma, et al., 2018; Hua, et al., 2021).These studies are also important in dispelling rumours and ensuring that populations adhere to the IPC guidelines. Albeit a number of KAP studies have been done on Covid-19 globally, most studies utilized online based surveys. These surveys though effective, are reported by some researcher to draw biased samples due to only capturing participants who have access to the internet. Further, apart from studies done by (Chawe, et al., 2021) and (Mukwangole, et al., 2020), there are no KAP studies done in Zambia, to the best knowledge of the researcher. In fact, even the studies mentioned above used online based data collection methods and thus mostly collected data from the urban population, who tend to have more access to the internet than rural populations.

2.4 Knowledge of Healthcare Workers about Covid-19 IPC

Knowledge about things often influences people in many ways. This is because knowledge usually affects people's decisions and choices as well as their opinions and behaviours. Studies have shown for instance, that knowledge has an impact on what and how people buy online (Karimi, et al., 2015). Another study identified the impact of knowledge on people's dietary decisions (Morren, et al., 2021). We can also postulate that knowledge may also impact how quickly decisions are made. This is no different when it comes to making decisions about public health issues. An application of the health belief model framework in public health demonstrates that people first have to be aware of the risks diseases or public health issues pose to them before they decide to participate in preventative or curative measures (Mckellar & Sillence, 2020; Connera & Norman, 2022).

A confirmation of this model is a done by Abbas, et al. (2021), in which they reported that public knowledge of infectious diseases is strongly linked to vaccine confidence. This is also applicable to healthcare workers, who albeit there have access to correct information about Covid-19, may be influenced by myths, misconceptions and misinformations, especially through social media. Aiyewumi & Okeke (2020) found that social media had a tremendous impact on the public's collective perception, knowledge and attitude about Covid-19 and may also have an influence on HCW's knowledge. An example of this is a study that was carried out in Ecuodor by Lincango-Naranjo, et al. (2021), where they found that majority of the final year medical students that were sampled displayed negative attitudes something that is supposedly contrary to expectations.

As the Covid-19 pandemic contines to evolve, it is important to keep a constant check on the knowledge levels of HCWs with regards to Covid-19 IPC. A good number of studies have been done to assess the knowledge of HCWs cocerning Covid-19, yielding varrying results. Studies that were done in Nepal for instance among healthcare workers by Nepal, et al. (2020) and Tamang, et al. (2020) . Both studies found that Nepalian HCW's had adequate knowledge on Covid-19 in general. Identical studies were carried out in Yemen (Alrubaiee, et al., 2020), India (Grewal, et al., 2020), Pakistan (Saqlain, et al., 2020) and in China (Zhang, et al., 2020). The researches found acceptable levels of knowledge among HCWs with regard to Covid-19. Alrubaiee, et al. (2020) and Grewal, et al. (2020) however there were still gaps in knowledge among HCWs which needed to be addressed.

On the African continent, a good number of researches have examined HCW's knowledge in relationship to Covid-19. For instance, in Nigeria by (Mbachu, et al., 2020; Oboro, et al., 2020; Ogolodom, et al., 2020), Sierra Leone (Kanu, et al., 2021), including South Africa and Egypt (Moodley, et al., 2020; Wahed, et al., 2020), knowledge of HCWs on Covid-19 was assessed. Other African countries were similar sudies have been done include , Ethiopia, Uganda and Congo DR (Asemahagn, 2020). In these studies however, contrasting results were found. Although majority of the investigations found high knowledge levels among healthcare workers, Oboro, et al. (2020) reported that knowledge levels were low. They postulated that the differences may have arrisen from the fact that their study was refined to just infection prevention and control whereas other researchers included other aspects of the Covid-19 disease (Oboro, et al., 2020). Even Alrubaiee, et al. (2020) found that albeit HCWs have high levels of knowleddge on other IPC measures, their level of knowledge concerning situations that require wearing N95 masks were still low. There is thus need to investigate if indeed, finer-tuned studies might expose more, the lack of knowledge among the healthcare workers concerning IPC measures. This could help in filling the void that exist in their knowledge about Covid-19. An example of such a fine-tuned study within the healthcare subpopulation is the one that was done in Sounth Africa by (Feldman, et al., 2021) among community health workers. Feldman, et al. (2021) found that community health workers have very low levels of knowledge on Covid-19 infectiong prevention and control. They suggessted continous education on Covid-19 IPC measures if the workforcce of community health workers was to be useful in the fight against the pandemic.

In Zambia, assessments of the knowledge of HCWs on IPC measures are very rare or even non existent. Mukwangole, et al. (2020) who did a study in Nakonde focused on the adherence of HCWs to Covid-19 IPC measures and did not assess their knowledge. Thus, there remains a void in our understanding of HCW's knowledge on Covid-19 IPC measures especially in rural areas such as Isoka. This is the gap that this study seeks to fill.

2.5 Attitudes of Healthcare Workers Towards Covid-19 IPC

Attitudes of HCWs towards Covid-19 IPC refers to the feelings aw well as preconceived ideas that HCWs may have towards towards the subject (Kaliyaperumal, 2004). An assessment of attitudes tends to measure the prevailing attitudes, beliefs and misconceptions in the population about a given subject. Attitudes are very important in influencing people's decisions in that they may even be implicit and thus influence decisions on the subcontious level (Gawronski, et al., 2006). Because attitudes emanate from beliefs and misconceptions, they can easily be

swayed, especially in this era of social media. Vraga & Bode (2021) reiterated just how improtant social media is in influencing people's perception when they suggested that addressing missinformation on social media was an urgent need in the fight against Covid-19. Schmidt, et al. (2020) also reported that false information circulated on social media not only instigated confusion, fear and panic, but also contributed to the construction of misconceptions. The question is, could such vices have an effect on the attitudes of health care workers?

A number of studies have investigated the attitudes of healthcare workers with regards to Covid-19. Tamang, et al. (2020), Limbu, et al. (2020) and Nepal, et al. (2020) all conducted studies in Nepal and found that HCWs had positive attitudes. However, the level of positivity varied that Tamang, et al. (2020) and Limbu, et al. (2020) found were quite low. For example, Tamang, et al., only found about 54% who had positive attitudes wheras Limbu, et al., found 53,5% positivity in HCWs attitudes. This is despite HCWs showing much high scores in knowledge and practices. They explained that the low percentage in HCWs attitudes could have been influenced by religious beliefs. Nepal, et al. (2020) reported about 90% of HCWs having positive attitudes. They however cautioned that such high numbers in attitude could have been due to the study having been conducted during the early stages of the pandemic. Alrubaiee, et al. (2020) and Grewal, et al. (2020) also found that halthcare workers had positive attitudes. Verger, et al. (2021) had similar findings when they investigated the attitudes of HCW's towards Covid-19 vaccination in France, Belgium and Canada. They found that 72.4% were willing to get the vaccine. This is important considering the time now when people around the world are being immunized against Covid-19.

Others researchers have however reported negative attitudes among HCWs (Mbachu, et al., 2020; Michel-Kabamba, et al., 2021). Michel-Kabamba, et al. (2021) for example reported that HCW had negative attitudes towards vaccines something they attributed to misinformation. The causes of these differences in findings isan interesting cause for discussion. There are however rare studies that focused on Covid-19 IPC amoung HCWs. It was thus interesting to explore what attitudes HCWs in this study exhibit.

2.6 Practices of Healthcare Workers on Covid-19 IPC

Practices of HCWs with regards to Covid-19 IPC refers to the actions that the partcipants take to protect themselves and others from Covid-19 infection, which demonstrate their knowledge and attitude. (Kaliyaperumal, 2004). There are a variety of Covid-19 infection prevention and control practices recommended by the world health organisation. In general terms, these IPC

measures boarder on early screening, mainting both hand and respiratory hiegyne, universal and targeted masking including social distancing (World Health Organisation, 2021). WHO also recommends that all HCWs be vaccinated as an IPC measure. Due to a number of factors, practices among HCW have not been consistent, especially practices to do with Covid-19 IPC.

For example, researchers such as Tamang, et al. (2020) and Limbu, et al. (2020) and Nepal, et al. (2020) found that HCWs implemented suitable practices with regards to Covid-19. Alrubaiee, et al. (2020) also found that participants had positive attitude and good preventive behaviours toward Covid-19. On the other hand, a lot of people, including HCW are still not vaccinated albeit a good number of these would accept wearing masks, social distancing and handwashing practices. This is even more evident on the African continent where only a number less than 30% are vaccinated including healthcare workers (World Health Organisation, 2022). Another example is a research done by Azlan, et al. (2020) in Malaysia who found that the practice of wearing masks was not so popular among the Malaysian public even though other practices like social distancing were acceptable. They stressed the importance of consistent messaging from relevant authorities and institutions, including the need for customised health education programs aimed at improving the levels of knowledge, attitudes and practices (Azlan, et al., 2020).

Others researchers have also reported a lack lack of good practice among HCWs (Asemahagn, 2020; Mbachu, et al., 2020; Ogolodom, et al., 2020; Michel-Kabamba, et al., 2021). Even Chawe, et al. (2021) and Mukwangole, et al. (2020) who conducted similar investigations in Zambia found that there were sill low levels of Covid-19 IPC practices. Chawe, et al. (2021) bemoaned that such low levels of adherence could result in safety incidents (such as infection transmission) which could be deadly to both the concerned staff and their immediate environment, including co-workers, families and patients or laboratory clients (Chawe, et al., 2021). In fact, Mukwangole, et al. (2020) even reported Covid-19 positive cases among HCWs which were only detected through mass screening and pointed out lack of adherence as one of the causes. If the fight agaist Covid-19 is to be won, there is need to improve HCWs adherence to IPC guidelines especially in rural areas.

2.7 Factors that Influence Adherence to Covid-19 IPC Practices

A number of factors have been reported to affect practices and adherence to Covid-19 infection prevention and control measures. Some of these factors have a positive influence whereas others have a negative influence. From literature, these factors have been observed to include

demographic variables, knowledge and attitudes, and myths, misinformation and beliefs. In Jordan, Sallam, et al. (2021) discovered that individuals with a lower socio-economic status had low knowledge on Covid-19 IPC but had a higher belief in misinformation. This consequently affected their adherence to Covid-19 IPC measures, making them succeptible to infection. They recommended focused awareness campaigns and proper delivery of correct information in order to reduce the negative impact of the pandemic on their lives (Sallam, et al., 2021)

Myths on the other hand are leading to widespread stigma in society. They have the potential of making people over-complacent and resultantly more at risk of getting infected (Sahoo, et al., 2020). Myths are having a pervasive impact on public viewpoint and thus disease transmission (Sahoo, et al., 2020). The findings by Sahoo, et al. (2020) are identical to what Abbas, et al. (2021) when they reported that the presence of myths, conspiracies appeared to be a major barrier to vaccine uptake. Most of these myths, misconceptions and misinformation are being peddled on social media platforms. For example, people's adherence to the government's Covid-19 IPC measures where reported to be influenced by compliance attitude, social media interference, misconceptions and myths, inadequate health facilities, and distrust for government (Omaka-Amari, et al., 2020) In Khubchandani, et al's (2021) study, vaccine hesitancy was shown to be predicted signifcantly by sex, education also found by Grewal, et al. (2020) and Chawe, et al. (2021), employment, income, having children at home, political afliation, and the perceived threat of getting infected with COVID-19 in the next 1 year. Taylor & Asmundson (2021) also found findings in line with Khubchandani, et al's results when they reported that political afiliation may also influence people's adherence to Covid-19 IPC measures.

Other predicting variables may include profession (Chawe, et al., 2021), work experience and job category. Zhang, et al. (2020) for instance, found that work experience and job category influenceed HCWs' practices concerning Covid-19 in a study that was done by Zhang, et al. (2020) in China. The profession of the HCW is also one factor that has been reported to have influence on Covid-19 IPC practices. Tesfaye, et al. (2020) that pharmacists had better Covid-19 IPC practices than other HCWs. Wahed, et al. (2020) on the other hand found that lack of PPE may actually reduce the level of Covid-19 IPC practices. This was more pronounced when the pandemic just started, especially on the African continent. Tamang, et al. (2020) also found that experienced forntline HCWs with higher education and who received IPC training and

online course regarding Covid-19 had better practices. They further found that knowledge and attitudes positively correlated with better Covid-19 IPC practices. This tallies with what other researchers (Limbu, et al., 2020; Mbachu, et al., 2020; Nepal, et al., 2020), However, this is exactly oposite to what Oboro, et al. (2020) found. They reported a very high level of Covid-19 IPC practices among HCWs even though there knowledge and attitudes were low and negative, respectively. It is evident that factors that influence adherence to IPC measures by the general population, and indeed healthcare workers, are numerous. A good number of them may not even be investigated in this enquiry. However, it wil be interesting to see what factors influence HCW's practices considering how long the pandemic has been and how it has evolved.

2.8 Conclusion

In summary, a number of studies have been done to assess the knowledge, attitudes and practices of healthcare workers, since the outbreak of the Covid-19 pandemic. These researches have reported contrasting finding. A good reseasong for that could be the fact that the studies were done at different times dunring the Covid-19 pandemic. The other reason could be because the studies were conducted in different settings in relation to the samples. Some of the researches were conducted at a much larger scale, sampling countries, country regions and continental regionns whereas others much smaller samples. Still, very few of these studies investigated the KAP of HCWs with regards to specifically, Covid-19 infection prevention and control. Further, very few of such studies have been conducted in Zambia. The methods used in collecting data in these studies also indicate some bias towards the urban population where prople have access to the internet. Even the study done by Chawe, et al. (2021) in Zambia focused much on the urban population. Mukwangole, et al. (2020) however conducted a study in Nakonde but had a very small sample. A gap thus still remains for a study that is not only fine tuned, but also used data collection methods that capture rural healthcare workers.

CHAPTER 3

METHODOLOGY

3.1 Study Design

This study employed a cross-sectional study design in which both descriptive and correlational designs utilised. A cross sectional study design is suitable for this investigation as it allows for comparison and evaluation of many different variables at the same time, and allows for getting a clear picture of characteristics, trends and relationships as they exist in the real world (Kaliyaperumal, 2004; Lau & Kuziemsky, 2016). The descriptive study design part sought to assess the knowledge, attitudes and practices of participants while the correlational component sought to understand the relationship between demographic factors knowledge, attitudes and practices of participants with regards to Covid-19 IPC. The relationship between the factors knowledge attitudes and practices was also be studied. All Covid-19 preventive measures were adhered to during the data collection process. This included, wearing of a mask at all times, hand sanitizing, social distancing and minimizing contact with participants.

3.2 Study Site

This study was conducted at Isoka District Hospital in Isoka District, Muchinga Province, Zambia. The study was carried out at Isoka District Hospital, between 2nd August 2022 and 31st Aungust, 2022. Isoka District is found in the newly created Muchinga Province of Zambia with its administrative centre located near the borders with Tanzania and Malawi (Nexus Commonwealth Network, 2020). It is located at the far Eastern corner of Zambia between longitude 32˚, 29’ and 33’, 50’ East and latitude 9’ 45’ and 10’ 49’ 2’ South (SMART Zambia Institute, 2018). The district is on the average mountainous and thus is located at an altitude of 1450 meters above sea level (Nexus Commonwealth Network, 2020). It covers an area of 13,846 square Kilometres with an estimated population of about 100,000 people and an annual growth rate of around 2.3 percent.

Isoka town is the administrative centre of Isoka district located at Longitude 32° 38' 0" East and Latitude 10° 9' 38" South. The town has an approximate population of 13, 122 (World Population Review, 2021), which is serviced by the Isoka District Hospital as well as 3 clinics. To the best knowledge of the researcher, there are no private owned health care institution in the district. Statistics on Covid-19 in Isoka District as well as Isoka town were not available on

the internet and could not be obtained by the researcher from the District Hospital, citing ethical reasons.

Isoka District Hospital is the largest health institution in Isoka District located in Isoka town. The hospital has been selected because it is the biggest health institution in the district and it is also the referral hospital for all health centres in the district and at the time of this research, it was the testing centre for Covid-19 samples in the district as well as the totalling centre for all Covid-19 cases in the district. Further, the hospital was selected because it is located in the same area the researcher resides thus making it easy and cost-effective for data collection.

3.3 Study Population

The study population for this research comprised all HCW's at Isoka District Hospital. Isoka district has 292 HCW's whereas Isoka District Hospital has 187 HCW's as of May 6, 2021. This entails that the hospital has roughly 64 percent of all HCW's in the district and thus formed a representative target population.

The study population comprised all HCW's from all departments as long as they work at Isoka District Hospital. The population thus included doctors, nurses, laboratory workers, and clinical or medical officers. Hospital administrative workers and community HCW's (if any work at the hospital) were also included in the research. This is because HCW's are defined as people whose job it is to protect and improve the health of their communities (World Health Organisation, 2006). This is also because this research desires to include all HCW's who have been left out in similar studies due to the use of internet-based data collection methods.

3.3.1 Inclusion and Exclusion Criteria

Participants in this study were included and excluded based on whether or not they meet certain conditions. HCW's that met the conditions were included in the sample whereas those that did not meet the conditions were excluded from the sample. Below is a summary of the guidelines that was followed when including and excluding participants in this research.

Inclusion Criteria

- ✓ The study only included healthcare workers currently working, volunteering or attached at Isoka District Hospital during our period of study.

Exclusion Criteria

- ➢ This study excluded all HCW's from all departments who are currently not working (Those on leave, those who have travelled for more than the period of our data collection)

3.4 Sample Size and Sampling Strategy

The sample size for this research was determined using the Epi Info 7 which was also used in Wahed, and others, (2020) research. For calculating the sample size, the estimated population size of 297 healthcare workers in Isoka District was used. The study assumed a moderate expected frequency of 50%, an acceptable margin of error of 5%, and confidence interval of 95%. Further, a design effect of 1 and cluster size of 1 were used and this estimated a sample size of 167. However, as many HCW's as accepted to participate in this research were included to make the sample more representative. This is in line with what was done in similar research that was conducted in South Africa (Hoque, et al., 2021). The figure below shows the Epi Info 7 sample size calculations.

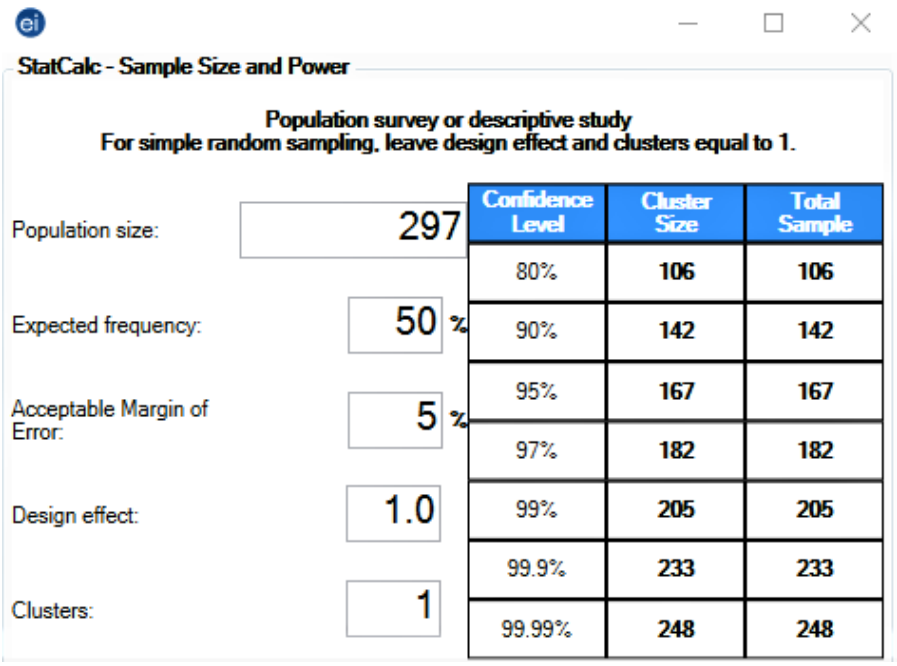

Figure 3.1: Sample size calculation using Epi Info 7

Simple random data sampling technique was employed. The simple random technique is recommended by literature to be useful in studies with small samples as it tends to produce representative samples (Lau & Kuziemsky, 2016). This is because randomised sampling methods are great at reducing bias. A list of all HCW's at Isoka District Hospital from the human resource department. Participants on the list were assigned random numbers which were generated using Microsoft Excel 2019. Respondents were then drawn randomly from the sampling frame. In an event where the randomly selected participant doesn't want to participate in the study, their number was removed from the sampling frame and a replacement respondent was drawn randomly.

3.5 Data Collection

Data was collected using a self-administered structured questionnaire covering demographic information; knowledge, attitudes, and practices with regards to Covid-19 infection prevention and control measures was administered to HCW's at Isoka District Hospital. This research used a paper-based questionnaire that was self-administered with help from the researcher where needed. The study did not employ online questionnaire platforms as widely used in most of the KAP studies on Covid-19. This ensured that even participants who have no access to the internet or those who may not know how to use online platforms are all included in the survey.

An initial draft of the questionnaire was designed, and then validated. Content validation of the questionnaire was done by administering the questionnaire to at least 20 healthcare workers at clinics that were not included in the main study, in a pilot study. This ensured that the responses from the pilot study are not included in the analysed data but only used for the purpose of improving the quality of the questionnaire.

The questionnaire consisted of 4 parts. These were a) Demographic information, b). Knowledge on Covid-19 IPC, c). Attitude towards Covid-19 IPC, and d) Practices in Covid-19 IPC. An introductory part was also included that introduced the researcher to the respondents together with a section seeking informed consent. In formulating the questions in the questionnaire and the responses that qualify as correct, the researcher utilized the latest information on Covid-19 and recommendations by World Health Organisation.

The first section of the questionnaire collected data on gender, age, and marital status, as well as level of education and work experience. Other demographic data that were collected included religion, number of people living with the participants, and number of old people (60 years and above) living with the participants. The information on the number of people living

with the participant especially the number of old people living with the participant shade light on whether HCW's improve their attitudes and practices if they have people living with them, more so those at risk of dying from Covid-19. Appendix A shows a questionnaire that was employed to collect data for this research with part A presenting a summary of the demographic information that was collected in this research.

The second section collected data on the knowledge the respondents have on Covid-19 infection prevention and control. There were 10 questions in this section and the questions had three responses; true, false or I don't know (see appendix). Each correct answer was assigned 1 point whereas an incorrect answer or I don't know answer accrued zero points. Thus, the total number of points that a respondent could obtain on the knowledge score raged between 0 and 10.

The third section sought to investigate the attitudes of HCW's towards Covid-19 infection prevention and control. The section had 10 questions that asked participants' opinion or thoughts on a given statement (check appendix). The questions utilized a 5-point Likert scale with responses ranging from strongly agree, agree, and neutral to disagree and strongly disagree. Some statements were reversed to prevent respondents from picking the same answer. The responses were given points ranging between 1 and 5 with the most positive response assigned 5 points whereas the most negative response was given 1 point. The total number of scores that a respondent could get on the attitude test was between 10 and 50 points.

The final section of the questionnaire collected data on the practices of HCW's in relation to Covid-19 infection prevention and control. The section also had 10 questions which had 3 option answers of yes, no or sometimes (see appendix). Scores that were assigned to the responses were 2 points for a yes response, 1 point for a sometimes response and zero points for any no response. The minimum total score that a participant could obtain was 0 while the maximum score was 20 points.

3.6 Variables and Measurements

3.6.2 Variables

A variable as defined by Wagner, et al. (2019) is "a logical grouping of attributes that can be observed and measured and is expected to vary from person to person in a population". It is any object or thing that can assume or represent more than one value (Passer, 2013). In this study, only quantitative data was collected and thus, only qualitative variables were measured.

The main variables that were measured in this research are knowledge, attitudes and practices. Other variables that were studied include demographic factors such as age, gender, marital status as well as social economic variables. Main variables for this study are discussed below.

Knowledge

Knowledge is the general awareness or possession of information, facts, ideas, truths, or principles (Microsoft® Encarta® , 2009). It is the acquisition, retention, and use of information or skills (Rav-Marathe, et al., 2016). This variable thus assessed the information and facts that HCW's at Isoka District Hospital have on Covid-19 infection prevention and control.

Knowledge was measured using a 10 points questionnaire that had 10 questions were adapted from different KAP studies (Mukwangole, et al., 2020; Olum, et al., 2020; Chawe, et al., 2021). Each question had 3 responses of "true", "false", and "I don't know". A correct response to a statement was weighed with 1 point whereas each incorrect answer was given a 0 weight. The response "I don't know" was also be awarded a zero score. Weights were then be added to find the total score out of a maximum of 10 scores. Participants who scored 80% and above were graded as having good knowledge while those who had a weighted score below 80% were deemed to have poor knowledge.

Attitude

Attitude is a persons' opinion or general feeling about something (Microsoft® Encarta® , 2009). It involves making decisions in the light of preconceived ideas and emotions someone has about something. In this study, the research seeks to assess the preconceptions and opinions that HCW's at Isoka District Hospital have with regards to Covid-19 infection prevention and control.

Attitude was assessed using a questionnaire comprising ten, 5-point Likert scale questions that was adapted from previous researches such as Chawe, et al. (2021), Mukwangole, et al. (2020) and others, and was adjusted appropriately to suit assessment of attitudes with regards to Covid-19 infection prevention and control. The responses were; strongly disagree, disagree, neutral, agree and strongly agree, which were weighted between 1 and 5. Some questions were reversed and coded in reverse so as to eliminate biases of giving a single similar response in all the questions. Participants whose scores were above the Bloom's cut off score were said to have positive Covid-19 IPC attitudes and those whose scores were below the cut off score were deemed to have negative attitudes.

Practice

Practice is the voluntary action of doing something repeatedly in order to improve performance (Microsoft® Encarta® , 2009). It involves the demonstration of knowledge acquisition and change in attitude. This research measured the level of Covid-19 infection prevention and control practices among HCW's at Isoka District Hospital.

Practice was evaluated using a 3-point Lkert scale comprising questions that had responses of "always", "occasional", and "never". Responses were coded between 1 and 3 with always given 3, occasional given 2 and never coded with 1. The scores yielded a maximum total of 30 scores and a minimum of 10 scores. Total scores for each respondent were calculated. The total of participants who scored above the cut off score were deemed to have good Covid-19 IPC practices whereas those whose scores were below the cut off score were deemed to have poor Covid-19 IPC practices.

3.6.3 Measurement Scales

These four categories of variables that qualitative and quantitative variables are divided into are also called levels of measures (Johnson, 2015). Measures are processes that are used to scientifically assign values that represent attributes of organisms, objects, or events (Passer, 2013).

Nominal scales of measure represent only qualitative differences of the characteristic being studied (Passer, 2013). The difference in the trait under study is based on type. Any numbers that may be assigned to each category is illogical. The next level of measure is the ordinal scale. Ordinal scales are ordered nominal scales. In ordinal scales, numbers signify rank order and indicate the order of quality or quantity (Lee, 2016). Ordinal scales indicate not only the differences in properties but how much the differences are. These two scales are qualitative in nature.

The other two scales are quantitative scales that deal with quantity. They include the Interval scales and the Ratio scales. The Interval scale measures the quantitative differences among data, but assume equal differences in the amount of the attribute being measured (Passer, 2013). The scale has the property that differences in the numbers represent real differences in the variable but have no true zero. Ratio scales are like interval scales but with a true zero. This means that the value of zero represents the total absence of the variable being measured. Table 1 below summarises the variables that were studied in this study and their associated scales.

Table 3.1: Summary of study variables and measures

Type of Variable	Variable	Scale of Measure	Level of Measure
Independent Variables	Gender	Female, Male	Nominal
	Age	≤ 30 years, > 30 years	Ordinal
	Marital status	Unmarried, Married	Nominal
	Level of education	Non-tertiary, Tertiary	Ordinal
	Religion	Non-Christian, Christian	Nominal
	Profession	Non-medical, Medical	Nominal
	Number of people living with participant	0, ≥1	Ordinal
	Above 60 years old people living with participant	YES/NO	Nominal
	Knowledge	Sufficient knowledge-Insufficient knowledge	Ordinal
	Attitude	Positive attitude-Negative Attitude	Ordinal
Dependent Variables	Knowledge	Sufficient knowledge-Insufficient knowledge	Ordinal
	Attitudes	Positive attitude-Negative Attitude	Ordinal
	Practices	Good practice-Poor practice	Ordinal

3.7 Data Collection Techniques

Primary data was collected using a self-administered, structured questionnaire that was used to assess the knowledge, attitudes and practices of healthcare workers towards Covid-19 infection prevention and control, and associated factors. Secondary data was collected from previous studies, reports, journals and books. Secondary data was useful in clear understanding of the problem and helped in determining sample size as well as in the formulation of the framework

and questionnaire. It was also useful in helping understand the background of the research, and the gaps that exist on the topic.

3.8 Data Management and Analysis

Data was summarized and coded using Microsoft Excel 2019 and then entered into the Statistical Package for the Social Sciences (SPSS) version 20.0 software for analysis. All questionnaires that had missing answers were excluded from the data analysis. Efforts were made to ensure that all the sections in the questionnaire were filled in correctly by putting the researcher's contact details on the questionnaire for respondents to get clarifications.

Descriptive statistics such as frequencies and percentages were drawn for socio-demographic variables. To compute Covid-19 knowledge, the mean score and standard deviation for the sample population was calculated. A mean (μ) ± standard deviation (SD) cut-off used in a similar study by (Hager, et al., 2020) was used to determine those who showed insufficient and sufficient knowledge. The respondents who scored below the cut-off were deemed to have poor Covid-19 IPC knowledge whereas those who score greater or equal to the cut-off were graded to have sufficient Covid-19 IPC knowledge. Similarly, means and standard deviation for attitude and practice were computed. Participants' attitude scores that were below the mean plus/minus cut-off score were considered to have negative attitude whereas those that scored about the mean ± standard deviation was considered to have positive attitude. Further, participants' practice scores that were about the mean ± standard deviation cut off score represented good Covid-19 IPC practices while scores that were below the cut of score were deemed as poor Covid-19 IPC practices.

To examine the relation between the demographic characteristics and the knowledge, attitudes and practices of the respondents, a Chi-square test was used ((Hager, et al., 2020). An independent sample t-test was then employed to understand the variation of knowledge, attitudes and practices of healthcare workers across various demographic variables' groups. An independent t-test is similar to a one-way analysis of variance test which have been similarly used in researches like Chawe, et al., (2021). The independent t-test however is used when the categories of independent variables are binary. Other researchers have also used similar statistical analysis methods (Nepal, et al., 2020; Oboro, et al., 2020; Wahed, et al., 2020; Zhang, et al., 2020). To verify and further understand the findings of the independent sample t-test, a binary logistics regression analysis was used. This helped to determine to what extent the

knowledge, attitudes and practices of healthcare workers varied across categories of demographic variables.

To understand the relationship between knowledge, attitude and practices with regards to Covid-19 infection prevention and control, a Spearman's correlation analysis was used. The Spearman's correlation coefficient has been cited to be more suited to ordinal data correlation analysis and was employed in similar studied (Ejeh , et al., 2020; Kanu, et al., 2021). The correlation coefficient was then used to determine the type and strength of relationship that exists between the variables and the p-value indicated if the relationship is significant or not.

3.9 Ethical Consideration

Approval from the University of Zambia Biomedical Research ethics committee (UNZABREC) was sought and approval from the National health Research Authority (NHRA) was granted. This approval was accompanied by an introductory letter to the health institution where the data was collected. Further, approval from the Ministry of Health at provincial and district level was obtained. Participant's identity in this research was anonymous and voluntary. Informed consent was sought from the respondents and participants were allowed to withdraw from the survey at any time in line with stipulations of the World Medical Association Declaration of Helsinki Ethical principles (World Medical Association, 2013).

3.10 Limitations

Several limitations arose during the time this study was carried out. The study had a number of many participants drop out of the study due to other engagements and thus reduced the sample size from the projected 167 to 153 thereby reducing the representativeness of the sample. Besides this, refusal to participate in this study by some essential healthcare workers was another challenge. Another limitation is the fact that this study was a cross-sectional study and thus, cannot address the questions of causality.

CHAPTER 4

RESULTS, DICUSSION, CONCLUSION AND RECOMMENDATIONS

4.1 Results

A total of 170 questionnaires were distributed among healthcare workers at Isoka District Hospital between November 30th., 2022 and December 31st, 2022. Out of the total number of distributed questionnaires, 160 were filled and collected. The remaining 10 questionnaires were not collected due to the respondents no having managed to fill them because of various reasons. The 160 collected questionnaires were checked for missing sections and parts so as to remove those that had missing parts or sections. 7 questionnaires were found to have missing parts and/or sections and were removed from the data analysis, leaving only 153 correctly filled questionnaires.

4.1.1 Demographic Variables

There were slightly more males (n = 81,52.9%) than females (n = 72, 47.1%). More respondents were aged above 30 years (n = 83, 54.2%) than those who were aged 30years and bellow (n = 70, 45.8%). Figure 4.1 illustrates the age categories of healthcare workers at Isoka District Hospital.

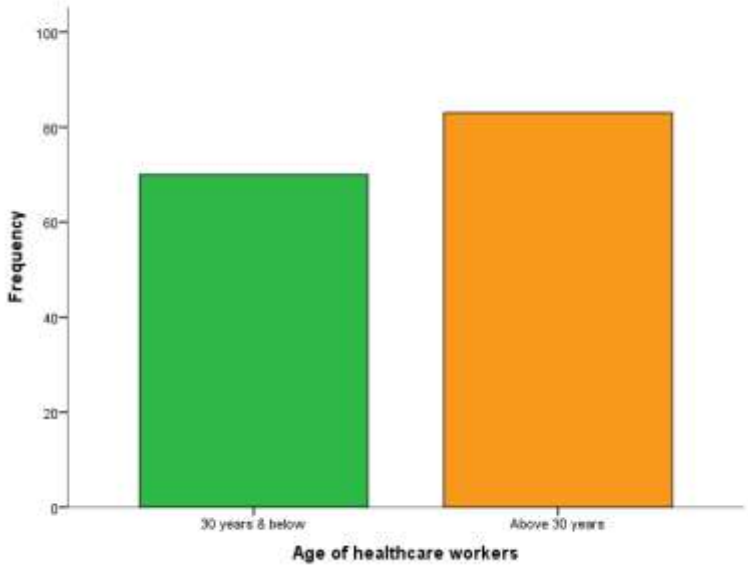

Figure 4.1: Age categories of respondents.

Participants who were married (n = 81, 52.9%) were slightly more than those who were unmarried. As would be expected, almost all participants (n = 147, 96.1%) reported being Christians with only 3.9% (n = 6) being non-Christian healthcare workers. Majority of the participants had a tertiary education (n = 130, 85.0%) whereas the rest had no tertiary education (n = 23, 15%). As indicated in Figure 4.2 below, 77.1% (n = 118) of healthcare workers belonged to medical professions whereas 22.9% (n = 35) belonged to non-medical professions.

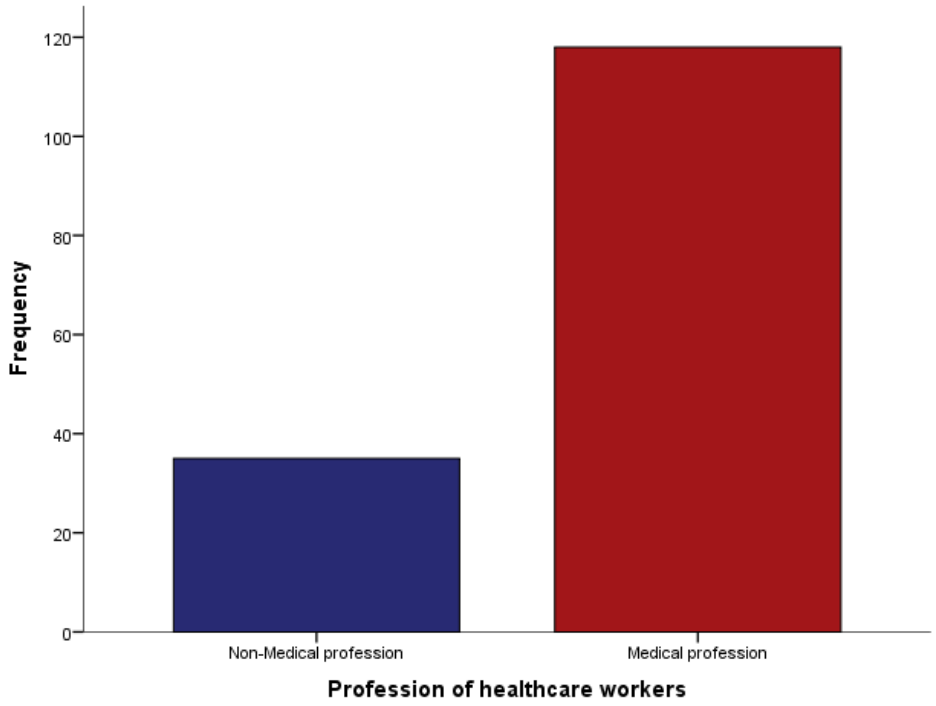

Figure 4.2: Professions of healthcare workers at Isoka District Hospital

Majority of the participants were living with at least one person (n = 131, 85.6%) with only 14.4% (n = 22) of the participants reporting that they were living alone. However, only a few (n = 20, 13.1%) were living with someone who was 60 years and above as 86.9% (n = 133) had no elderly living with them. A summary of demographic characteristics of healthcare workers at Isoka District Hospital is given in Table 4.1.

Table 4.1: Demographic characteristics of healthcare workers at Isoka District Hospital

Variable	Sub-variable	n	%
Gender	Female	72	47.1
	Male	81	52..9
Age	30yrs & below	70	45.8
	Above 30yrs	83	54.2
Marital status	Unmarried	72	47.1
	Married	81	52..9
Religion	Non-Christian	6	3.9
	Christian	147	96.1
Level of education	Non-tertiary Education	23	15.0
	Tertiary Education	130	85.0
Profession	Non-Medical Profession	35	22.9
	Medical Profession	118	77.1
Is respondent living with someone?	No	22	14.4
	Yes	131	85.6
Is respondent living with elderly?	No	20	13.1
	Yes	133	86.9

4.1.2 Knowledge, Attitudes and Practices of Healthcare Workers towards Covid-19 IPC

Of the studied healthcare workers, 132 comprising 86.3% had adequate knowledge on Covid-19 infection prevention and control, with only 21 (13.7%) showing inadequate knowldge. Concerning healthcare workers' attitudes towards Covid-19 infection prevention and control, just 86.3% (n = 132) demonstrated positive attitudes, with only 13.7% showing negative attitudes. Majority of the participants showed good practices with regards to Covid-19 infection prevention and control (n = 126, 82.4%). The remaining 17.6% (n = 27) demonstrated bad Covid-9 IPC practices. Table 2 below gives a summary of healthcare workers' knowledge, attitudes and practices towards Covid-19 infection prevention and control.

Table 4.2: Knowledge, Attitudes and Practices of Healthcare Workers

Factor	Obtainable scores		Respondents' Scores		Mean ± SD	Scores ≥ Cutoff	Scores < Cutoff
	Maximum Scores	***Minimum Scores***	***Maximum Scores***	***Minimum Scores***			
Knowledge	10	0	10	5	8.99 ± 1.280	132 (86.3%)	21 (13.7%)
Attitudes	50	10	50	25	40.43 ± 4.834	132 (86.3%)	21 (13.7%)
Practices	20	0	20	9	15.29 ± 2.781	126 (82.4%)	27 (17.6%)

4.1.3 Relationship Between Demographic Variables and Knowledge, Attitudes and Practices of Healthcare Workers

To understand the association between demographic factors and the knowledge, attitudes and practices of healthcare workers, a Chi-square test was run and is summarised in Table 4.3 below. Further, an independent t-test was used to further determine variations in knowledge, attitudes and practices of healthcare workers across various groups. This is summarised in Table 4.4 below. To further understand to what extent the variations in knowledge, attitudes and practices of healthcare workers across various groups are, a binary logistics regression was run. Table 4.5 presents a summary.

Knowledge

A Chi-square test showed no relationship between gender of healthcare workers and their Covid-19 IPC knowledge. When an independent t-test was run for gender, there was no significant difference in the means between males and females in relation to their Covid-19 IPC. Binary logistic regression also revealed that there was no significant difference in odds between the males and females in their Covid-19 IPC knowledge. A Chi-square test showed no relationship between age of respondents and their knowledge on Covid-19 infection prevention and control. When the means of the age groups were compared using an independent t-test, in relation to their Covid-19 IPC knowledge, no significant difference was detected across the groups. Additional analysis showed that healthcare workers who were 30 years of age or below were 2.5 times more likely of having inadequate Covid-19 IPC knowledge than those who were above 31 years of age. The difference in odd was however not significant.

Chi-square analysis detected no significant relationship between marital status of participants and healthcare workers' knowledge on Covid-19 IPC. An independent t-test on marital status also found no significant difference in Covid-19 IPC knowledge between the married and unmarried healthcare workers. Further analysis showed that Healthcare workers who were unmarried had 2.3 odds of having inadequate Covid-19 IPC knowledge than those who were married, albeit the difference in odds was not significant. There was no significant relationship between religious affiliation and Covid-19 IPC knowledge of healthcare workers at Isoka District Hospital as indicated by Chi-square test. There was also no significant difference in the mean Covid-19 IPC knowledge grades between the Christians and Non-Christians. Further analysis revealed that healthcare workers who were non-Christians had an almost significant 7.5 likelihood of having inadequate Covid-19 IPC knowledge than those who were Christians.

Table 4.3: Crosstabulation summary of the association between demographic factors and knowledge, attitudes and practice.

DEMOGRAPHIC FACTORS	DEPENDENT VARIABLE														
	KNOWLEDGE					ATTITUDES					PRACTICES				
	Adequate (n)	*Inadequate (n)*	*df*	*Chi-Square (X^2)*	*Sig (2-tailed)*	*Positive (n)*	*Negative (n)*	*df*	*Chi-Square (X^2)*	*Sig (2-tailed)*	*Good (n)*	*Bad (n)*	*df*	*Chi-Square (X^2)*	*Sig (2-tailed)*
GENDER															
Female	64	8	1	0.785	0.482	63	9	1	0.172	0.815	61	11	1	0.525	0.528
Male	68	13				69	12				65	16			
AGE (Years)															
30yrs & below	61	9	1	0.082	0.818	60	10	1	0.034	1.000	54	16	1	2.410	0.140
Above 30yrs	71	12				72	11				72	11			
MARITAL STATUS															
Unmarried	61	11	1	0.277	0.643	61	11	1	0.277	0.643	56	16	1	1.959	0.203
Married	71	10				71	10				70	11			
RELIGION															
Non-Christian	4	2	1	2.028	0.192	5	1	1	0.046	0.594	3	3	1	**4.498**	**0.068**
Christians	128	19				127	20				123	24			
LEVEL OF EDUCATION															
Non-tertiary	13	10	1	**20.236**	**<0.0001*** **	14	9	1	**14.754**	**0.001*** **	19	4	1	0.001	1.000
Tertiary	119	11				118	12				107	23			
PROFESSION															
Non-Medical Profession	25	10	1	**8.447**	**0.009****	26	9	1	**5.508**	**0.026***	29	6	1	0.008	1.000
Medical Profession	107	11				106	12				97	21			
RESPONDENT LIVING WITH PEOPLE?															
Yes	19	3	1	0.0001	1.000	21	1	1	1.829	0.313	14	8	1	**6.194**	**0.029***
No	113	18				111	20				112	19			
RESPONDENT LIVING WITH ELDERLY?															
Yes	115	18	1	0.032	0.740	115	18	1	0.032	0.740	109	24	1	0.111	0.739
No	17	3				17	3				17	3			

*** p-value significant at 0.05, ** p-value significant at 0.01, *** p value significant at 0.001**

Table 4.4: Variation of knowledge, attitudes and practice across demographic factors

DEMOGRAPHIC FACTORS	DEPENDENT VARIABLES														
	KNOWLEDGE					ATTITUDES					PRACTICES				
	Mean Diff.	*df*	*Std. Error Diff.*	*t-stat*	*Sig.*	*Mean Diff.*	*Df*	*Std. Error Diff.*	*t-stat*	*Sig.*	*Mean Diff.*	*df*	*Std. Error Diff.*	*t*	*Sig.*
GENDER															
Female	0.104	26.884^	0.117	0.888	0.379	0.049	151	0.118	0.413	0.680	0.077	151	0.106	0.721	0.472
Male															
AGE (Years)															
≤ 30 Years	0.034	151	0.118	0.285	0.776	-0.022	151	0.118	-0.184	0.855	-0.164	151	0.106	-1.555	0.122
> 30 Years															
MARITAL STATUS															
Unmarried	-0.062	151	0.118	-0.523	0.602	-0.062	151	0.118	-0.523	0.602	-0.148	151	0.106	-1.399	0.164
Married															
RELIGION															
Non-Christian	-0.065	22.128^	0.067	4.724	0.345	-0.010	151	0.046	-0.212	0.832	-0.087	28.593^	0.063	-1.383	0.177
Christian															
LEVEL OF EDUCATION															
Non-tertiary	-0.378	22.223^	0.115	**-3.294**	**0.003****	-0.323	22.422^	0.114	**-2.832**	**0.010****	0.003	151	0.076	0.035	0.972
Tertiary															
PROFESSION															
Non- Medical Professions	-0.287	22.903^	0.117	**-2.455**	**0.022***	-0.232	24.103^	0.116	**-1.997**	**0.057**	0.008	151	0.090	0.089	0.930
Medical Professions															
RESPONDENT LIVING WITH PEOPLE?															
No	0.001	151	0.083	0.013	0.990	0.111	40.807^	0.057	1.944	0.059	-0.185	31.313^	0.094	**-1.973**	**0.057**
Yes															
RESPONDENT LIVING WITH ELDERLY?															
No	0.014	151	0.080	0.177	0.860	0.014	151	0.080	0.177	0.860	-0.024	151	0.072	-0.331	0.741
Yes															

*** p-value significant at 0.05, ** p-value significant at 0.01, *** p value significant at 0.001, ^ Levene's Test for Equality of Variances was significant**

Table 4.5: Binary Logistic Regression analysis of knowledge, attitudes and practices of healthcare workers in relation to demographic factors

KNOWLEDGE GRADES						
Adequate Knowledge[a]					95% Confidence Interval for Exp(B)	
			Odds Ratio	Sig.	Lower Bound	Upper Bound
Inadequate Knowledge	Gender	Female	0.559	0.310	0.182	1.719
		Male				
	Age	≤30 Years	2.511	0.252	0.520	12.116
		>30 Years				
	Marital Status	Unmarried	2.331	0.232	0.582	9.337
		Married				
	Religion	Non-Christian	7.542	0.057	0.943	60.332
		Christian				
	Level of education	Non-tertiary	**27.196**	**0.008****	2.352	314.489
		Tertiary				
	Profession	Non-Medical	0.976	0.984	0.086	11.034
		Medical				
	Respondent living alone?	No	1.009	0.991	0.222	4.579
		Yes				
	Respondent Living with elderly?	No	1.803	0.450	0.391	8.307
		Yes				
ATTITUDE GRADES						
Positive Attitude[a]					95% Confidence Interval for Exp(B)	
			Odds Ratio	Sig.	Lower Bound	Upper Bound
Negative Attitudes	Gender	Female	0.720	0.545	0.249	2.084
		Male				
	Age	≤30 Years	3.043	0.140	0.695	13.330
		>30 Years				
	Marital Status	Unmarried	2.010	0.266	0.587	6.881
		Married				
	Religion	Non-Christian	2.656	0.431	0.234	30.199
		Christian				
	Level of education	Non-tertiary	**17.858**	**0.020***	1.572	202.847
		Tertiary				
	Profession	Non-Medical	0.892	0.926	0.079	10.056
		Medical				
	Respondent living alone or not	No	0.221	0.170	0.026	1.904
		Yes				
	Respondent Living with elderly or not	No	1.750	0.456	0.402	7.621
		Yes				
PRACTICE GRADES						

Good Practices[a]					95% Confidence Interval for odds ratio	
			Odds Ratio	Sig.	Lower Bound	Upper Bound
Poor Practices	Gender	Female	0.676	0.406	0.268	1.703
		Male				
	Age	≤30 Years	2.214	0.173	0.706	6.942
		≥31 Years				
	Marital Status	Unmarried	1.248	0.691	0.419	3.712
		Married				
	Religion	Non-Christian	**6.697**	**0.046***	1.031	43.486
		Christian				
	Level of education	Non-tertiary	1.754	0.551	0.277	11.121
		Tertiary				
	Profession	Non-Medical	1.280	0.771	0.244	6.724
		Medical				
	Respondent living alone or not	No	**2.941**	**0.060**	0.954	9.070
		Yes				
	Respondent Living with elderly or not	No	1.069	0.926	0.263	4.339
		Yes				

*** p-value significant at 0.05, ** p-value significant at 0.01, [a] reference dependent variable category**

A relationship between healthcare worker's level of education and their Covid-19 IPC knowledge was found (X = 20.236, p < 0.001). Further, a significant difference in the mean Covid-19 IPC knowledge grades of healthcare workers in relation to level of education was found (t-stat = -3.294, p = 0.003). Binary logistic regression further showed that healthcare workers who had non-tertiary education had more than 27 odds of having inadequate knowledge than those who had tertiary education and this difference in odds was significant (p = 0.008). When the relationship between Covid-19 IPC knowledge of healthcare workers at Isoka District hospital and healthcare workers' profession was analysed, a significant relationship was found (X = 8.447, p = 0.009). An independent t-test also showed that there was a significant difference in mean Covid-19 IPC knowledge between non-medical and medical healthcare workers' professions (t-stat = -2.455, p = 0.022). Binary logistics regression however revealed that there was no significant difference in the odds of having inadequate Covid-19 IPC knowledge among healthcare workers.

Chi-square analysis showed no significant relationship between the number of people that respondents lived with and their Covid-19 IPC knowledge. It further showed no relationship between whether healthcare workers were living with elderly people and their Covid-19 IPC knowledge. Independent t-test showed no significant difference between healthcare workers who lived alone and those who lived with someone in terms of their Covid-19 IPC knowledge.

The independent t-test further showed that Covid-19 IPC knowledge did not differ significantly between healthcare workers who lived with elderly people and those who did not. A binary logistics regression analysis further indicated that the odds of having inadequate knowledge did not differ significantly in relation to whether healthcare worker lived alone or not or whether healthcare worker lived with elderly or not. More details are summarised in Table 4.2, Table 4.3 and Table 4.5.

Attitude

Table 4.3, Table 4.4 and Table 4.5 gives a summary of the relationship between demographic factors and the Covid-19 IPC knowledge, attitudes and practices of healthcare workers as well as the variation in the Covid-19 IPC knowledge, attitudes and practices of healthcare workers across various demographic factors. A relationship between gender and respondents' attitudes concerning Covid-19 IPC was not detected by the Chi-square test. An independent t-test also showed that there was no significant difference in the means between the males and females when it comes to their attitudes towards Covid-19 IPC. Binary logistic regression further found no significant difference in the odds of having negative attitudes between the males and females.

There was also no association found between age of participants and their attitudes towards Covid-19 infection prevention and control, when a Chi-square test was run. An independent found no difference in the means of participants concerning their Covid-19 IPC attitudes between healthcare workers who were 30 years old or below and those who were above 30 years of age. Binary logistics regression however indicated that healthcare workers who were 30 years or below in age were 3 times more likely to have negative attitudes concerning Covid-19 IPC than those who were above 30 years of age. The difference in odds was however not significate (see Table 4.5). No significant relationship between participants' marital status and their attitudes towards Covid-19 IPC was also found, when a Chi-square analysis was used. Additionally, no significant difference in mean Covid-19 IPC attitudes was detected between the unmarried and married healthcare workers. Further analysis showed that healthcare workers who were unmarried had 2 times odds of having negative attitudes than those who were married, although the difference in odds was not significant.

No relationship was detected between healthcare workers religious affiliation and their Covid-19 IPC attitudes when a Chi-square test was used. There was no significant mean difference in the Covid-19 IPC attitudes of participants between healthcare workers who were non-

Christians and those who were Christians. However, a binary logistics regression indicated a non-significant difference in the odd of having negative attitudes. Healthcare workers who were no-Christians were found to be roughly 2.7 times more likely to have negative attitudes than those who identified as Christians. Chi-square analysis showed that there was a significant association between healthcare workers' level of education and their Covid-19 IPC attitudes ($X = 14.754$, $p = 0.001$). A significant difference in the mean Covid-19 IPC attitude grades of participants was also detected between healthcare workers who had non-tertiary education and those who had tertiary education (t-stat = -2.832, $p = 0.010$). Binary logistic regression further indicated that healthcare workers with non-tertiary education were roughly 17.9 times more likely to have negative attitudes than healthcare workers who had tertiary education ($p = 0.020$).

A significant association between healthcare workers profession and their Covid-19 IPC attitudes was found by a Chi-square analysis ($X = 5.508$, $p = 0.026$). An independent t-test on the other hand showed a non-significant difference in healthcare worker's attitudes between the non-medical professions and the medical professions (t-stat = -1.997, $p = 0.057$). Binary logistic regression also did not show a significant difference in odds in healthcare workers' Covid-19 IPC attitudes between the non-medical healthcare workers and the medical healthcare workers.

Chi-square analysis also showed no significant relationship between the number of people that respondents lived with and their Covid-19 IPC attitudes. A non-significant difference in the mean Covid-19 IPC attitudes between healthcare workers who lived alone and those who lived with other people (t-stat = 1.944, $p = 0.059$). Binary regression analysis also showed no difference in odds of having negative attitudes between healthcare workers who lived alone and those who lived with other people. There was also found no relationship between healthcare workers' living with people who were 60 years old or above and their Covid-19 IPC attitudes. Further, there was not found any significant difference between respondents who lived with people who were 60 years old or above and those who did not. There was also no difference in the odds of having negative Covid-19 IPC attitudes between healthcare workers who lived with an elderly person and those who did not.

Practice

A Chi-square test also showed no relationship between gender of healthcare workers and their Covid-19 IPC practices. An independent sample t-test was run for gender in relation to participants' Covid-19 IPC practices and detected no significant difference in the means

between males and females. No significant difference in odds in healthcare workers' Covid-19 IPC practices between males and females was found by a binary logistic analysis. A Chi-square analysis found no significant relationship between respondents' age groups and their Covid-19 IPC practices. No significant difference respondents' Covid-19 IPC practices were found between healthcare workers who were 30 years of age or below and those who were above 30 years of age. Binary logistics regression found a non-significant difference in the odds of having poor Covid-19 IPC practices. Respondents who were 30 years or below in age were about 2 times more likely to have poor Covid-19 IPC practices than those who were older.

No association was fond between healthcare workers' marital status and their Covid-19 IPC practices. An independent t-test further showed no significant variation in mean Covid-19 IPC practices between the unmarried healthcare workers and the married healthcare workers. There was also no significant difference in the odds of having poor Covid-19 IPC practices between the unmarried and married healthcare workers. A non-significant association between healthcare workers religious affiliation and their Covid-19 IPC practices was found ($X = 4.498$, $p = 0.068$). Although participants' Covid-19 IPC practices were not significantly different between non-Christians and Christians when an independent t-test was run, binary logistics regression indicated that non-Christian healthcare workers were roughly 6.7 times more likely to have poor Covid-19 IPC practices than those who were Christians.

No relationship was detected between healthcare worker's level of education and their Covid-19 IPC practices. There was no significant difference in the mean practice level of Covid-19 IPC practices of healthcare workers at Isoka District Hospital, across the different levels of education. Additionally, there was no significant difference in the odds of having poor Covid-19 IPC practices between healthcare workers who had non-tertiary education and those who had tertiary level of education. A Chi-square analysis found no relationship between Covid-19 IPC practices and healthcare workers' professions. There was further no difference in mean Covid-19 IPC practices between healthcare workers with non-medical professions and those with medical professions. Binary logistics regression further showed no significant difference in the odds of having poor Covid-19 IPC practices between non-medical healthcare workers and medical healthcare workers.

Chi-square analysis found that there was a significant relationship between the number of people that healthcare worker lived with and their Covid-19 IPC practices ($X^2 = 6.194$, $p = 0.029$). However, an independent t-test showed a non-significant difference in mean Covid-19

IPC practices between healthcare workers who lived alone and those who lived with people (t-stat = -1.973, p = 0.057). A binary logistics regression also showed a non-significant difference in odds ratio between healthcare workers who lived alone and those who lived with people. Healthcare workers who lived alone were found to be about 2.9 times more likely to exhibit poor Covid-19 IPC practices than those who lived with at least 1 person. No relationship was found between respondent's Covid-19 IPC practices and whether they lived with elderly people or not. There was also found no significant difference in healthcare workers Covid-19 IPC practices between healthcare worker who lived with an elderly person and those who did not. There was also no significant difference the odds of having poor Covid-19 IPC practices between healthcare workers who lived with an elderly person and those who did not.

4.1.4 Relationships Between Knowledge, Attitudes and Practices of Healthcare Workers Towards Covid-19 Infection Prevention and Control

A Spearman's correlation analysis was done to understand the relationship between the dependent variables; knowledge, attitude and practice. The results are summarized in Table 4 below.

Table 4.6: Relationship between Knowledge, Attitudes and Practices of Healthcare Workers

		knowledge grades	***attitude grades***	***practice grades***
knowledge grades	Correlation Coefficient	1.000	0.227**	-0.035
	Sig. (2-tailed)		0.005	0.666
	N	153	153	153
attitude grades	Correlation Coefficient	.227**	1.000	0.114
	Sig. (2-tailed)	0.005	.	0.159
	N	153	153	153
practice grades	Correlation Coefficient	-0.035	0.114	1.000
	Sig. (2-tailed)	0.666	0.159	
	N	153	153	153

**. Correlation is significant at the 0.01 level (2-tailed).

A positive relationship was found between the knowledge of healthcare workers on Covid-19 infection prevention and control and their attitudes towards Covid-19 infection prevention and control ($r = 0.227$, $p < 0.01$). A very weak negative relationship between knowledge of healthcare workers on Covid-1 infection prevention and control and their practice concerning

Covid-19 infection prevention and control was detected. However, this relationship was not significant. Similarly, a non-significant, weak, positive relationship between attitudes of healthcare workers towards Covid-19 IPC and the practice pertaining to Covid-19 IPC was found.

4.2 Discussion

Since the start of the Covid-19 pandemic in November 2019, numerous researches have been carried out to understand the behaviour of populations in response to the evolution of the pandemic. However, very few of these studies have been carried out in Zambia. This study was carried out at Isoka District Hospital, Isoka district, in Zambia to assess the knowledge, attitudes and practices of healthcare workers towards Covid-19 infection prevention and control. Out of the 187 healthcare workers at Isoka District Hospital, 153 healthcare workers were involved in this study representing 81.82% sample representation. The gender ratio representation was almost even, with slightly more males (52.9%) than females (47.1%). There were also more medical profession healthcare workers (n = 118, 77.1%) than those who belonged to non-medical professions (n = 35, 22.9%).

1.1.1 Covid-19 IPC Knowledge, Attitudes and Practices of Healthcare Workers

Covid-19 IPC IPC Knowledge

The findings of this study reveal that majority of healthcare workers have adequate knowledge (86.3%). These findings are similar to what was found by Chawe, et al., (2021) in a similar study that was done in Zambia to assess the knowledge, attitudes and practices of Covid-19 among medical laboratory professionals. There research however did not include all healthcare professionals and thus there findings may have been influenced by the fact that medical laboratory workers were involved in Covid-19 sample collection and testing. Other studies conducted in other countries have also found high levels of knowledge among healthcare workers (Limbu, et al., 2020; Oboro, et al., 2020; Olum, et al., 2020). There studies however studied the general Covid-19 knowledge of healthcare workers and did not concentrate on the Covid-19 infection prevention and control knowledge.

Among the ten questions that were asked to assess knowledge, participants scored more than 85% on 8 questions. However, there was a much lower score on the 2 questions that asked about whether early Cocid-19 testing and screening as well as Covid-19 vaccination were

infection prevention and control measures. This just showed that the importance of early Covid-19 testing and screening and vaccination was not well grasped by the healthcare workers. This could have grieve consequences as healthcare workers may fail to convincingly educate general populace about the improtance of early testing and vaccination in the infection prevention and control of the Covid-19 pandemic. The healthcare workers' knowledge on these two sub-factors may have been significantly impacted negatively, by misinformation and conspiracies (Gómez, et al., 2020; Sallam, et al., 2021). Thus, there is need to continiously educate and update healthcare workers with the latest infrmation on the Covid-19 infection prevention and control measures.

Covid-19 IPC Attitudes

Healthcare workers at Isoka Distric Hospital had positive attitudes (86.3%). Similar findings were obtained in studies done in Egypt (Wahed, et al., 2020), Nigeria (Oboro, et al., 2020; Kanu, et al., 2021) and in Yemen (Alrubaiee, et al., 2020). However, there are also studies that have reported negative attitudes towards Covid-19 among healthcare workers (Mbachu, et al., 2020; Verger, et al., 2021). Other studies have found poor and somewhat indifferent attitudes (Mbachu, et al., 2020) among healthcare workers, especially towards Covid-19 infection prevention and control, most especially vaccines (Verger, et al., 2021). Others have also found very low percentages of healthcare workers with positive attitudes (Limbu, et al., 2020). They attributed the poor attitudes to various reasons such as time since the pandemic started when the study was done as well as myths misinformation and misconceptions. A genuine lack of adequate Covid-19 PPE may also exacerbate the negative attitudes among healthcare workers (Maleki, et al., 2020), especially in rural settings like the current study area.

Among the responses of healthcare workers at Isoka District Hospital, 76.5% reported that they would accept receiving the Covid-19 vaccine. This is an encouraging finding and more sensitization among healthcare workers is needed to further improve the number of healthcare workers who are willing to get the vaccine. Michel-Kabamba, et al., (2021) reported differing findings with 70% of healthcare workers in their study showing reluctance to receive the vaccine. They reported that rumours and myths were the most likely factor that negatively influenced healthcare workers decisions with regards to the vaccine. However, only 63.2% of these indicated that they could recommend their families, friends and others to take the vaccine. This shows that albeit the attitudes of healthcare workers maybe positive, their willingness to influence other people's attitudes may not be very high. Other interesting responses on attitudes were that 40.1% of healthcare workers believed that regardless of the Covid-19 infection

prevention and control measures they implemented, they still could get infected. This fear may have been influenced by lack or shortage of necessary protective equipment at the facility, which was also a reported problem in other studies. In fact, studies like the one done by KassieI, et al., (2020) in Ethiopia (66.2%), (Zhang, et al., 2020) in China (85%) found an even higher percentage of healthcare workers who feared that they will get infected.

Majority of healthcare workers (85.8%) also expressed fears that they may be a source of infection to their lovd ones. This is a positive attitude in the fight against Covid-19 as it may influence healthcare workers to take extra precautionary practices in order to prevent the spread of the disease to their loved ones. A study done by (Tamang, et al., (2020) found that 88% of healthcare workers feared sprading the disease to others, including their family, friends, and society. They reiterated that this was a positive attitue that could help healthcare workers to prepare for the worst duing the pandemic. Ogolodom, et al., (2020) who found similar results however adised that there was need to provide adequate and sufficient PPEs in order to allay these fears.

Covid-19 IPC Practices

There was good Covid-19 infection prevention and control practices among most healthcare workers at Isoka District Hospital (82.4%). Studies by Wahed, et al., (2020) in egypt, Olum, et al., (2020) in Uganda and Oboro, et al., (2020) also found good practices among healthcare workers. Other studies that found good practices among healthcare workers concerning Covi-19 IP include Grewal, et al., (2020) and Kanu, et al., (2021). However, a similar study done by Chawe, et al., (2021) in Zambia found that most of the medical laboratory workers in Zambia had poor practices. They cited limited resources, health information and laboratory materials in most clinic and health centre laboratories found in rural areas as some of the reasons why healthcare workers displayed poor practices (Chawe, et al., 2021). The good practices found in this study may be due to the time the study was carried out (Nepal, et al., 2020). Whereas most of the studies cited in this research were done in 2020 and 2021, this study collected data in 2022. There is thus reason to believe that healthcare workers may have had a better understanding of the Covid-19 infection prevention and control practices as the pandemic evolved. The good practices (82.4%) that healthcare workers showed in this study may also be due to the good attitudes (86.3%) that was prevailing in among healthcare workers. Previous studies have shown that positive attitudes have a positive influence on the IPC practices among healthcare workers (Mbachu, et al., 2020). Goo practices may have also been due to availabity of PPE’s during the time this study was being carried (Olum, et al., 2020).

It was however interesting to see that albeit healthcare workers had overall good practices, their responses on some of the Covid-19 IPC practices indicated that there was still a lot of gaps. For instance, only 35.3% said that they practiced social distancing always, while the majority (62.7% said that they practiced social distancing sometimes. One of the reasons for not pacticing social distancing always may be the nature of healthcare workers' job which requires constant interaction with patients and thus makes it impossible to practice social distancing. This however is not unique to this study as it has been reported in other studies (Olum, et al., 2020) where healthcare workers indicated that it was not even possible for them to social distance from patients who presented Covid-19 symptoms. However, sudies like Limbu, et al., (2020) and Chawe, et al., (2021) showed that majority of healthcare workers in their studies practiced social distancing.

Other informative results in the responses that healthcare workers gave with regards to Covid-19 IPC were that only 41.8% of them wore masks always. This may again be dues to lack of adequate and sufficient PPEs. It was encouraging to see that more than 75% practiced hand washing always, about 60% disinfected surfaces and close to 60% indicated that they encouraged people to get vaccinated. The study could however not probe how many of the healthcare workers involved in the study were vaccinated as this was against standard medical practices.

1.1.2 Relationship Between demographic factors and the Covid-19 IPC Knowledge, Attitudes and Practices of Healthcare Workers

Relationship Between Demographic Factors and Knowledge

There was a non-significant association between healthcare workers' religious affiliation and respondents' knowledge on Covid-19 IPC (Table 4.3) and healthcare workers' mean Covid-19 IPC knowledge did not differ significantly between the healthcare workers who were non-Christian and those who were Christians (Table 4.4). A binary logistic regression also showed no significant difference in the odds of having inadequate knowledge between healthcare workers who were Christians and those who were non-Christians. It still however revealed that non-Christian healthcare workers were 7.5 times more likely to have inadequate knowledge. Similar studies done in various countries by Kanu, et al., (2021) and Oboro, et al., (2020) all found that the knowledge of healthcare workers on Covid-19 varried across religions. They found that respondents who said that they belonged to other religions showed lower levels of knowledge than those who belonged to Christian or Islam. This tallies with what the odds ratio

results of the binary logistics regression indicated even though the odds were non-significant. It should however be noted that this study only had 2 categories of religious groups with those who belonged to other religions and the non-religions grouped together. This could thus not clearly show which specific group among the non-Christian healthcare workers contributed much to the low levels of Covid-19 IPC knowledge. There is still however evidence to indicate that being religious may improve someone's chances of accessing information about Covid-19 and thus contribute to there high levels on knowledge on Covid-19 IPC.

A significant relationship between level of education and Covid-19 IPC knowledge among healthcare workers was reported with respondents' knowledge varying across different levels of education. Those who had education were found to have about 27 times more likelihood of having inadequate Covid-19 IPC knowledge compared to those who had tertiary education. Previous studies done in Ethiopia (Kassie, et al., 2020), Yemen (Alrubaiee, et al., 2020),and Egypt (Wahed, et al., 2020) including Zambia (Chawe, et al., 2021) have reported similar findings. It should be noted that most, if not all, of these studies used qualifications to measure the level of education whereas the general level of education was used in this study. Thus, their assessments would have yielded more credible findings than that of this exposition. Many other studies have however reported no variation in the knowledge of healthcare workers across different levels of education (Olum, et al., 2020; Tamang, et al., 2020). These studies instead, found that only preventative practices varied across varied levels of education, contrary to what was found in this study. The nuances in findings reported in the cited studies may have been due to differences in study population composition, data collection tools and data analysis methods.

Variations in Covid-19 knowledge across professions have been reported in previous studies like Nepal, et al., (2020), Moodley, et al., (2020) and Wahed, et al., (2020) including Alrubaiee, et al., (2020). This study found identical results with an association between healthcare profession and their Covid-19 IPC knowledge reported. Further, the study found that the mean Covid-19 knowledge differed between non-medical and medical professions. However, the odds of having inadequate knowledge did not differ significantly across professions. The reason postulated in most studies is that healthcare workers who work in medical professions are more involved in frontline work and would thus have better knowledge about diseases than healthcare workers in non-medical professions. This agrees with the findings of this research where the Covid-19 IPC knowledge of non-medical healthcare workers was slightly lower than that of healthcare workers in medical professions. Other studies like Oboro, et al., (2020), and

Michel-Kabamba, et al., (2021) have however found no differences in healthcare workers' knoledge across professions. The lack of difference could be attributed to the positive impact that local and international media had in diserminating information about to the general public thereby ensuring that both medical and non-medical people had access to the right inforrmation on Covid-19 IPS.

Relationship Between Demographic Factors and Attitudes

A significant association between the level of education of healthcare workers and their Covid-19 IPC knowledge was found. There was also a significant difference among healthcare workers' Covid-19 IPC attitudes between healthcare workers with non-tertiary education, was observed (Table 4). In studies that were previously done by researchers like Alrubaiee, et al., (2020) in Yemen, Mbachu, et al., (2020) and Oboro, et al., (2020) in Nigeria, and Tamang, et al., (2020) in Nepal, similar findings were reported. This could be because the level of education had a significant strong relationship with the level of knowledge which is known to have an effect on the attitudes of respondents. The level of education may also better access to information which will inturn may lead to having more knowledge. Still, other studies done in Uganda (Olum, et al., 2020), Egypt (Wahed, et al., 2020) and the Democratic Republic of Congo (Michel-Kabamba, et al., 2021) have reported contrasting results. These disparities in findings could agin be due to variations in study population and sudy methods.

Albeit a positive association between healthcare workers' professions and their Covid-19 IPC attitudes was detected, further analysis revealed no variation in healthcare worker's Covid-19 IPC attitudes across professions or a difference in the odds of having negative Covid-19 IPC attitudes. It is thus, difficult for this study to conclude with certainty, if indeed a relationship between healthcare workers' profession and attitude exists. Studies whose findings support both sides however exist. For instance, Mbachu, et al., (2020), Oboro, et al., (2020), and Tamang, et al., (2020) all found that healthcare worker's attitudes were greatly influenced by the profession they belonged to. Other contrary, Nepal, et al., (2020), Olum, et al., (2020) and Wahed, et al., (2020) all found that profession of healthcare workers did not have any impact on what attitude they had towards Covid-19. The influence of profession on healthcare worker's attitude towards Covid-19 IPC could thus be masked my confounding factors which could not be controlled for in this research.

Relationship Between Demographic Factors and Practice

Although religion of healthcare worker has been postulated by previous researchers to have a significant relationship with knowledge and attitudes but also practices, very few researches have sought to understand how religious affiliation impacts Covid-19 IPC practices. Kanu, et al., (2021) who tried to inestigate this only found a relationship between religious affiliation and knowledge. Kassie, et al., (2020) included it in their research demographic variables but did not analyse its relationship with KAP variables. Still, some studies like Oboro, et al., (2020) have reported an association between religion and Covid-19 IPC practices. This study found that there was no significant association between religious affiliation and healthcare worker's Covid-19 IPC practices. There was also no reported variations in the mean Covid-19 IPC practices between the non-Christians and Christians even though there was a significant difference in the odds of having poor Covid-19 IPC practices among healthcare workers belonging to the two rreligoius affiliations. Healthcare workers who were non-Christians were roughly 6.7 times more likely to have poor Covid-19 IPC practices than those who were Christians. These variations in odds may be due to the small number of non-Christian healthcare workers which could have distorted and skewed the impact of this demographic factor.

A significant relationship between a healthcare worker's Covid-19 IPC practices and the number of people respondent lived with was reported. Still, participants' Covid-19 practices did not differ significantly between those who lived alone and those were living with at least 1 person ($p = 0.057$). There was further, no significant difference in the odds of healthcare workers having poor Covid-19 IPC practices ($p = 0.060$). However, healthcare worker's who lived with no one were reported to have a 2.9 likelihood of having poor Covid-19 IPC practices than those who lived with someone. Albeit previous studies did not assess relationships between the number of people a healthcare worker lived with and their Covid-19 preventative practices, similar observations have been made. Wahed, et al., (2020) and Maleki, et al., (2020) for instance reported that healthcare workers were afraid of getting infected with Covid-19, for the fear of transmitting the disease to their loved ones. It is this fear that is postulated to influence healthcare workers to engage in better infection prevention and control practices. There's still however need for further research to understand this further as well as the other factors that might be contributing to this. Living with a partner has been reported to impact positively on healthcare worker's knowledge on Covid-19 (Mbachu, et al., 2020). Thus, it is

posible that the positive association between helathcare worker living with someone and healthcare's Covid-19 IPC practices may be a result of increased knowledge.

4.2.5 Relationships Between Covid-19 IPC Knowledge, Attitudes and Practices of Healthcare Workers

There was a significant correlation between Covid-19 IPC knowledge of healthcare workers and their Covid-19 IPC attitudes (see Table 6). A number of previous studies have reported a correlation between knowledge and attitudes of healthcare workers across different levels of education (Alrubaiee, et al., 2020; Limbu, et al., 2020; Oboro, et al., 2020). Another study conducted on the general population also reported a correlation between knowledge and attitudes (Saqlain, et al., 2020). This relationship between knowledge and attitude has been postulated by various researchers. The understanding is that knowledge about a phenomenon can affect how one behaves towards that phenomenon. This is more evident in situations that cause fear and panic like disease outbreaks, as those who are more knowledgeable tend to respond more positively to such situations. Thus, the recommendation from literature is that information about Covid-19 should be disseminated regularly so as to influence people's attitudes positively (Alrubaiee, et al., 2020; Oboro, et al., 2020; Saqlain, et al., 2020). More, importantly, updated Covid-19 IPC information should be regularly provided to healthcare workers so as to improve their Covid-19 IPC knowledge and consequently affect their Covid-19 IPC attitudes positively. This will improve how they handle Covid-19 patients but also protect them from getting infected. Similar studies have however reported no correlation between healthcare workers' knowledge and their attitudes (Mbachu, et al., 2020; Nepal, et al., 2020). This is possible because these research were carried out when the pandemic had just started and thus, healthacare worker's attitudes may have been affected negatively by misinformation.

There was however no significant correlation between respondents' Covid-19 IPC knowledge and their Covid-19 IPC practices. These results are in line with what was reported by Nepal, et al., (2020) and Oboro, et al., (2020) who found that the practice of healthcare workers did not differ by their knowledge scores. Alrubaiee, et al., (2020), Limbu, et al., (2020), as well as Mbachu, et al., (2020) however found differing results as they reported a positive correlation between knowledge and practive. The cause of these variations in results could be the different study area and population. It might also be because of the variations in the data collection tools which could have led to differences in how the knowledge was assesed. Knowledge of healthcare workers in this study was sticttly assessed on infection prevention and control

whereas, in the other studies, it mostly included causes of the disease as well as symptoms of the disease (Alrubaiee, et al., 2020).

Similarly, there was no significant relationship between healthcare workers' Covid-19 IPC attitudes and their Covid-19 IPC practices. This is what was also found in research done by Oboro, et al., (2020). However, other researchers found contrary results (Alrubaiee, et al., 2020; Limbu, et al., 2020; Nepal, et al., 2020). Their findings align with what was conceptualised in this study, that attitudes have a correlation with practice. The timing of this current study may have distorted this correlation. Because healthcare workers now have a better understanding of the pandemic and the necessary prenventative measures, their practices may have been influenced more by their experience rather than attitudes. Work experience has been cited to have a relationship with both attitudes and practices (Nepal, et al., 2020).

4.3 Conclusion

Coronavirus disease 2019 (Covid-19), an infectious disease which first broke out in Wuhan, China, in November 2019 has spread across the globe, causing a lot of deaths (World Health Organisation, 2023). Albeit the severity of the pandemic has reduced, largely due to vaccines, the disease still continues to affect lives. Healthcare workers were and still are at the forefront in the containment of Covid-19 outbreak, diagnosis, and management of infected patients (Ejeh , et al., 2020). They were and still are also potential sources and means of healthcare-associated infections and community transmission. Lack of correct information about Covid-19 has led to large numbers of health workers having poor Covid-19 practices and majority still being unvaccinated especially on the African continent. This has been compounded by the rapid spread of myths and misconceptions (Aiyewumi & Okeke, 2020) and the impact of this tends to have trickled down effects on the overall population (Wirsiy, et al., 2021). It is thus important to understand the knowledge, attitudes and practices of healthcare workers on the pandemic, especially concerning the infection prevention and control.

This study assessed the knowledge, attitudes and practices of healthcare workers on Covid-19 infection prevention and control, at Isoka District Hospital. The study further assessed the demographic factors that affect the Covid-19 IPC knowledge, attitudes and practices of healthcare workers while also evaluating the relationships between healthcare worker's knowledge, attitudes and practices with regards to Covid-19 infection prevention and control.

Results reveal that healthcare workers at Isoka District Hospital have adequate knowledge, positive attitudes and good practices concerning Covid-19 infection prevention and control.

Results also show that religion, level of education and profession have an impact on the Covid-19 IPC knowledge of healthcare workers. Further, healthcare workers' level of education and/or profession may affect their Covid-19 IPC attitudes while the number of people living with healthcare worker as well as their religious affiliation may have a significant or non-significant impact on their Covid-19 IPC practices. Further results show that there is a correlation between healthcare workers' knowledge and their attitudes towards Covid-19 infection prevention and control.

4.4 Recommendations

A number of actions could help bring more success in the fight against Covid-19 or even any future pandemic while also improving the knowledge, attitudes and practices or healthcare workers as well as that of the general population. These include;

- Periodic risk assessments and training for capacity building on infection prevention and control for occupational infection prevention should be implemented (Michel-Kabamba, et al., 2021).
- There is need to improve the country's readiness for any Covid-19 outbreak or any pandemic outbreak by constantly training healthcare workers in emergency preparedness and response.
- The country should build capacity for local production of personal protective equipment so as to have stock to meet the healthcare workers' needs, especially during pandemic peaks.
- Healthcare workers went through a lot of psychological traumas and may thus have post-traumatic stress disorders that could lead to fear and stress caused by this disease. Thus, psychological counselling of healthcare workers across the country should be carried out to overcome the fear and stress caused by disease transmission among healthcare workers at the onset of and during these epidemics (Maleki, et al., 2020), more so among healthcare workers who have witnessed mortalities caused by Covid-19 in their close circles.
- More healthcare workers need to be hired, especially during such epidemics. This will ensure that healthcare workers work in shifts and are getting enough rest during the pandemic (Zhang, et al., 2020). Healthcare workers should be sufficiently motivated by providing incentives and ensuring that financial support is given to the healthcare workers (Wahed, et al., 2020).

- There is need to conduct similar studies in smaller health institutions such as clinics and mini hospitals who were not included in this study so as to also assess their knowledge, attitudes and practices with regards to Covid-19 infection prevention and control.
- Because level of education has a significant impact on the knowledge and attitudes of healthcare workers concerning Covid-19 infection prevention and control, continuous professional development among healthcare workers should be encouraged.
- All concerns that healthcare workers have about the Covid-19 vaccine should be swiftly dealt with so as to improve the number of healthcare workers who are vaccinated.

References

Abbas, Q., Mangrio, F. & Kumar, S., 2021. Myths, beliefs, and conspiracies about COVID-19 Vaccines in Sindh, Pakistan: An online cross-sectional survey. *Authorea*, p. DOI: 10.22541/au.161519250.03425961/v1.

Adesegun, O. A. et al., 2020. The COVID-19 Crisis in Sub-Saharan Africa: Knowledge, Attitudes, and Practices of the Nigerian Public. *American Journal of Tropical Medicine and Hygiene*, 103(5), pp. 1997-2004.

Africa Centre fo Disease Control, 2023. *Africa CDC Vaccine Dashboard.* [Online] Available at: https://africacdc.org/covid-19-vaccination/ [Accessed 19 August 2023].

Aiyewumi, O. & Okeke, M. I., 2020. The myth that Nigerians are immune to SARS-CoV-2 and that COVID-19 is a hoax are putting lives at risk. *Journal Global Health,* 10(2), p. doi: 10.7189/jogh.10.020375.

Alrubaiee, G. G., Al-Qalah, T. A. H. & Al-Aawar, M. S. A., 2020. Knowledge, attitudes, anxiety, and preventive behaviours towards COVID-19 among health care providers in Yemen: an online cross-sectional survey. *BMC Public Health,* 20(1541), pp. https://doi.org/10.1186/s12889-020-09644-y.

Asemahagn, M. A., 2020. Factors determining the knowledge and prevention practice of healthcare workers towards COVID-19 in Amhara region Ethiopia: a cross-sectional survey. *Tropical Medicine and Health,* 48(72), pp. https://doi.org/10.1186/s41182-020-00254-3.

Azlan, A. A. et al., 2020. Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia. *PLoS ONE 8,* 15(5), p. e023366. https://doi.org/10.1371/journal.pone.0233668.

Babu, G. et al., 2021. *Zambia efforts in prevention, early detection and treatment of wasting during COVID-19,* Lusaka: Field Exchange issue 64.

Banko, O. H., 2020. The Politics of SARS-CoV-2 (COVID-19) Pandemic and Conspiracy Theories: The Implications for Travesty of Scientific Logic. *African Journal of Politics and Administrative Studies,* 13(1), pp. 1-24.

Carlson, C. J., Gomez, A. C. R., Bansal, S. & Ryan, S. J., 2020. Misconceptions about weather and seasonality must not misguide COVID-19 response. *Nature Communications volume,* 11(4312), pp. https://doi.org/10.1038/s41467-020-18150-z.

Centre for Disease Control, 2021. *Immunization: The Basics.* [Online] Available at: https://www.cdc.gov/vaccines/vac-gen/imz-basics.htm [Accessed 15 May 2022].

Chawe, A. et al., 2021. Knowledge, attitude and practices of COVID-19 among medical laboratory professionals in Zambia. *African Journal of Laboratory Medicine,* 10(1), p. https://doi.org/10.4102/ajlm.v10i1.1403.

Connera, M. & Norman, P., 2022. Health Behavior. In: S. Edition, ed. *Comprehensive Clinical Psychology.* s.l.:Elsevier, pp. 1-33.

Ejeh , F. E. et al., 2020. Knowledge, attitude, and practice among healthcare workers towards COVID-19 outbreak in Nigeria. *Heliyon,* Volume 6, pp. 1-10.

Feldman, M. et al., 2021. Community health worker knowledge attitudes and practices towards COVID-19: Learnings from an online cross-sectional survey using a digital health platform, UpSCALE, in Mozambique. *PLoS ONE,* 16(2), p. e0244924. https://doi.org/10.1371/journal.pone.0244924.

Gawronski, B., Hofmann, W. & Wilbur , C. J., 2006. Are ‘‘implicit’’ attitudes unconscious?. *Consciousness and Cognition,* Volume 15, pp. 485-499.

Gómez, S. M. M., Mendoza , O. E. O., Ramirez, J. & Olivas-Luján, M. R., 2020. Stress and Myths Related to the COVID-19 Pandemic’s Effects on Remote Work. *Management Research,* 18(4), pp. 401-420.

Grewal, V. S. et al., 2020. Knowledge, Attitude, Practices and Behaviour study regarding COVID-19 amongst Health Care Workers of Armed Forces in North-Western part of India. *Journal of Marine Medical Society,* 22(1), p. DOI: 10.4103/jmms.jmms_95_20.

Habib, A. M. et al., 2021. Knowledge, attitude and practice survey of COVID-19 pandemic in Northern Nigeria. *PLoS ONE,* 16(1), p. e0245176. https://doi.org/10.1371/journal.pone.0245176.

Hager, E. et al., 2020. Knowledge, attitude, and perceptions towards the 2019 Coronavirus Pandemic: A bi-national survey in Africa. *PLoS ONE,* 15(7), p. e0236918. https://doi.org/10.1371/journal.pone.0236918.

Health Protection Surveillance Centre, 2020. *Definition of a healthcare worker.* [Online] Available at: https://www.hpsc.ie/notifiablediseases/casedefinitions/healthcareworkerdefinition/ [Accessed 15 May 2022].

Hoque, A. M. et al., 2021. Knowledge, Attitudes, and Practices towards COVID-19 of Pregnant Women at a Primary Health Care Facility in South Africa. *European Journal of Medical and Health Sciences,* 3(1), p. http://dx.doi.org/10.24018/ejmed.2021.3.1.654.

Hua, S. et al., 2021. A nationwide post-marketing survey of knowledge, attitude and practice toward human papillomavirus vaccine in general population: Implications for vaccine roll-out in mainland China. *Vaccine,* 3(1), pp. 33-44.

Ikejezie, J., 2020. *Coronavirus disease 2019 (COVID-19): Situation Report-94,* Geneva: WHO.

Johnson, C. W., 2015. *Variables and Measures.* [Online] Available at: https://www.uth.tmc.edu/uth_orgs/educ_dev/oser/L1_2.HTM [Accessed 18 February 2022].

Kaliyaperumal, K., 2004. *Guideline for Conducting a Knowledge, Attitude and Practice (KAP) Study,* Madurai: Rotary Aravind International Eye Bank .

Kanu, S. et al., 2021. Healthcare Workers’ Knowledge, Attitude, Practice and Perceived Health Facility Preparedness Regarding COVID-19 in Sierra Leone. *Journal of Multidisciplinary Healthcare,* Volume 14, pp. 67-80.

Karimi, S., Papamichaila, N. K. & Holland, C. P., 2015. The effect of prior knowledge and decision-making style on the online purchase decision-making process: A typology of consumer shopping behaviour. *Decision Support Systems,* 77(DOI: 10.1016/j.dss.2015.06.004), pp. 137-147.

Kassie, B. A. et al., 2020. Knowledge and attitude towards COVID-19 and associated factors among health care providers in Northwest Ethiopia. *PLoS ONE,* 15(8), p. e0238415 https://doi.org/10.1371/journal.pone.0238415.

Khubchandani, J. et al., 2021. COVID-19 Vaccination Hesitancy in the United States: A Rapid National Assessment. *Journal of Community Health,* Volume 46, pp. 270-277.

Laranjo, L., 2016. Chapitre 6 - Social Media and Health Behavior Change. In: *Participatory Health Through Social Media.* s.l.:Academic Press, pp. 83-111.

Lau, F. & Kuziemsky, C., 2016. *Handbook of eHealth Evaluation: An Evidence-based Approach.* Victoria: University of Victoria.

Lee, J. A., 2016. *measurement scale.* [Online]
Available at: https://www.britannica.com/topic/measurement-scale
[Accessed 20 February 2022].

Limbu, D. K., Piryani, R. M. & SunnyI, A. K., 2020. Healthcare workers' knowledge, attitude and practices during the COVID-19 pandemic response in a tertiary care hospital of Nepal. *PLoS ONE,* 15(11), p. e0242126. https://doi.org/10.1371/journal.pone.0242126.

Lincango-Naranjo, E. et al., 2021. Paradigms about the COVID-19 pandemic: knowledge, attitudes and practices from medical students. *BMC Medical Education,* 21(128), pp. https://doi.org/10.1186/s12909-021-02559-1.

Maleki, S. et al., 2020. Knowledge, Attitude and Behavior of Health Care Workers in the Prevention of COVID-19. *Research Square,* pp. https://doi.org/10.21203/rs.3.rs-23113/v1.

Ma, Y. et al., 2018. Knowledge, Attitudes and Practices (KAP) toward seasonal influenza vaccine among young workers in South China. *Human Vaccines & Immunotherapeutics,* 14(5), p. https://doi.org/10.1080/21645515.2017.1423157.

Mbachu, C. N. P. et al., 2020. COVID-19 infection: Knowledge, attitude, practices, and impact among healthcare workers in a South-Eastern Nigerian state. *Journal of Infection in Developing Countries,* 14(9), pp. 943-952.

Mckellar, K. & Sillence, E., 2020. Chapter 2 - Current Research on Sexual Health and Teenagers. In: *Teenagers, Sexual Health Information and the Digital Age.* s.l.:Academic Press, pp. 5-23.

Michel-Kabamba, N. et al., 2021. Occupational COVID-19 Prevention among Congolese Healthcare Workers: Knowledge, Practices, PPE Compliance, and Safety Imperatives. *Tropical Medicine and Infectious Disease,* 6(6), p. https://doi.org/10.3390/tropicalmed6010006.

Microsoft® Encarta® , 2009. *Microsoft Encarta Dictionary.* s.l.:Microsoft Corporation.

Moodley, S. V. et al., 2020. SARS-CoV-2 infection prevention and control at healthcare facilities in South Africa: A knowledge, attitudes, and practices survey of health workers in four provinces. *Research Square,* pp. https://doi.org/10.21203/rs.3.rs-104855/v1.

Morren, M., Mol, J. M., Blasch, J. E. & Malek, Ž., 2021. Changing diets - Testing the impact of knowledge and information nudges on sustainable dietary choices. *Journal of Environmental Psychology,* Volume 75, p. https://doi.org/10.1016/j.jenvp.2021.101610.

Mukwangole, C. et al., 2020. *Case-Control Study of Health Workers with Coronavirus Disease 2019 (COVID-19) and an assessment of adherence to infection prevention and control (IPC) guidelines in Nakonde District, Zambia,,* Nakonde: s.n.

Muleme, J. et al., 2017. A Framework for integrating Qualitative and Quantitative Data in Knowledge, attitude, and Practice studies: a case study of Pesticide Usage in eastern Uganda. *Frontiers in Public Health,* 5(318), p. doi: 10.3389/fpubh.2017.00318.

Mwananyanda, L. et al., 2021. Covid-19 deaths in Africa: prospective systematic postmortem surveillance study. *BMJ,* 372(334), p. http://dx.doi.org/10.1136/bmj.n334.

Nepal, R. et al., 2020. *Knowledge, attitude and practice regarding COVID-19 among healthcare workers in Chitwan, Nepal,* s.l.: Research Square.

Nexus Commonwealth Network, 2020. *Muchinga Province: Isoka.* [Online]
Available at: https://www.commonwealthofnations.org/info/regions-in-zambia/muchinga-province/isoka/
[Accessed 01 August 2021].

Oboro, I. L. et al., 2020. Knowledge, Attitude and Practice of Covid-19 Infection Prevention and Control Among Healthcare Workers in River State, Nigeria. *Gazette of Medicine,* 8(1), pp. ISSN: 2315-7801.

OCHA, 2020. *ZAMBIA: Situation Report,* Lusaka: OCHA.

Ogolodom, M. P. et al., 2020. Knowledge, Attitudes and Fears of HealthCare Workers towards the Corona Virus Disease (COVID-19) Pandemic in South-South, Nigeria. *Health Science Journal,* 1(002), pp. ISSN 1791-809X.

Olum, R. et al., 2020. Coronavirus Disease-2019: Knowledge, Attitude, and Practices of Health Care Workers at Makerere University Teaching Hospitals, Uganda. *Frontiers in Public Health,* 8(181), p. doi: 10.3389/fpubh.2020.00181.

Omaka-Amari, L. N. et al., 2020. Coronavirus (COVID-19) Pandemic in Nigeria: Preventive and Control Challenges within the First Two Months of Outbreak. *African Journal of Reproductive Health,* 24(2), pp. 87-97.

Passer, I. R., 2013. *Chapter 4: Defining and Measuring Variables.* [Online]
[Accessed 18 February 2022].

Rav-Marathe, K., Wan, T. T. & Marathe, S., 2016. A SYSTEMATIC REVIEW ON THE KAP-O FRAMEWORK FOR DIABETES EDUCATION AND RESEARCH. *Medical Research Archives,* 4(1), pp. 1-21.

Republic of Zambia. Ministry of Health., 2023. *Zambia COVID-19 Dashboard.* [Online]
Available at: https://rtc-planning.maps.arcgis.com/apps/opsdashboard/index.html#/3b3a01c1d8444932ba075fb44b119b63
[Accessed 07 April 2023].

Riccó, M., Vezzosi, L., Gualerzi, G. & Signorelli, C., 2017. Knowledge, attitudes and practices (KAP) towards vaccinations in the school settings: an explorative survey. *Jonour of Preventive Medicine and Hygiene,* 58(4), pp. doi: 10.15167/2421-4248/jpmh2017.58.4.673.

Sahoo, S. et al., 2020. Demystifying the myths about COVID-19 infection and its societal importance. *Asian Journal of Psychiatry,* 54(102244), p. https://doi.org/10.1016/j.ajp.2020.102244.

Sallam, M. et al., 2021. COVID-19 misinformation: Mere harmless delusions or much more? A knowledge and attitude cross-sectional study among the general public residing in Jordan. *PLoS ONE,* 15(12), p. e0243264. https://doi.org/.

Saqlain, M. et al., 2020. Knowledge, attitude, practice and perceived barriers among healthcare professionals regarding COVID-19: A Cross-sectional survey from Pakistan. *Journal of Hospital Infection,* p. doi: 10.1016/j.jhin.2020.05.007.

Schmidt, T. et al., 2020. Myths, misconceptions othering and stigmatizing responses to Covid-19 in South Africa: A rapid qualitative assessment. *PLoS ONE,* 15(12), p. e0244420. https://doi.org/10.1371/journal.pone.0244420.

SMART Zambia Institute, 2018. *Provincial Administration, Muchinga Province: A Smart and Value-Centred Public Service.* [Online]
Available at: https://www.muc.gov.zm/?page_id=4860
[Accessed 1 August 2021].

Tamang, R. et al., 2020. COVID-19: a National Survey on perceived level of knowledge, attitude and practice among frontline healthcare Workers in Nepal. *BMC Public Health,* 20(1905), pp. https://doi.org/10.1186/s12889-020-10025-8.

Taylor, S. & Asmundson, G. J. G., 2021. Negative attitudes about facemasks during the COVID-19 pandemic: The dual importance of perceived ineffectiveness and psychological reactance. *PloS ONE,* 16(2), p. https://doi.org/10.1371/journal.pone.0246317.

Tesfaye, Z. T., Yismaw, M. B., Negash, Z. & Ayele, A. G., 2020. COVID-19-Related Knowledge, Attitude and Practice Among Hospital and Community Pharmacists in Addis Ababa, Ethiopia. *Integrated Pharmacy Research and Practice,* Volume 9, p. http://doi.org/10.2147/IPRP.S261275.

The World Bank Group, 2020. *Rural population (% of total population) - Zambia.* [Online]
Available at: https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=ZM
[Accessed 9 February 2022].

United Nations Country Team, 2020. *UNITED NATIONS COVID-19 EMERGENCY APPEAL: ZAMBIA,* Lusaka: UN Country Team.

Verger, P. et al., 2021. Attitudes of healthcare workers towards COVID-19 vaccination: a survey in France and French-speaking parts of Belgium and Canada. *Euro Surveillance,* 26(3), pp. https://doi.org/10.2807/1560-7917.ES.2021.26.3.2002047.

Vraga, E. K. & Bode, L., 2021. Addressing COVID-19 Désinformation on Social Media Preemptively and Responsively. *Emerging Infectious Diseases,* 27(2), p. doi: 10.3201/eid2702.203139.

Wahed, W. Y. A., Hefzy, E. M., Ahmed, M. I. & Hamed, N. S., 2020. Assessment of Knowledge, Attitudes, and Perception of Health Care Workers Regarding COVID-19, A Cross-Sectional Study from Egypt. *Journal of Community Health,* Volume 45, pp. 1242-1251.

Wirsiy, F. S. et al., 2021. Acceptability of COVID-19 Vaccine in Africa. *International Journal of Maternal and Child Health and AIDS,* 10(1), pp. 134-138.

World Health Organisation, 2006. *The World Health Report 2006: Working Together for Health,* Geneva: World Health Organization.

World Health Organisation, 2020. *Infection Prevention and Control.* [Online]
Available at: https://www.who.int/teams/integrated-health-services/infection-prevention-control
[Accessed 15 May 2022].

World Health Organisation, 2021. *Infection prevention and control during health care when coronavirus disease (COVID-19) is suspected or confirmed,* Geneva: World Health Organisation.

World Health Organisation, 2022. *World Health Organisation's Director-General's opening remarks on Member State Session on COVID-19 - 14 April 2022,* Geneva: WHO.

World Health Organisation, 2023. *World Health Organisation Coronavirus (COVID-19) Dashboard.* [Online]
Available at: https://covid19.who.int
[Accessed 4 April 2023].

World Medical Association, 2013. World Medical Association Declaration of Helsinki ethical principles for medical research involving ing human subjects. *JAMA,* 310(https://doi.org/10.1001/jama.2013.281053 PMID: 24141714), pp. 2191-2194.

World Population Review, 2021. *Population of Cities in Zambia.* [Online]
Available at: https://worldpopulationreview.com/countries/cities/zambia
[Accessed 1 August 2021].

WORLDOMETER, 2023. *COVID-19 CORONAVIRUS PANDEMIC.* [Online]
Available at: https://www.worldometers.info/coronavirus/
[Accessed 7 April 2023].

Zhang, M. et al., 2020. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. *Journal of Hospital Infection 105,* Volume 105, pp. 183-187.

APPENDICES

APPENDIX A: PARTICIPANT INFORMATION SHEET

Chairman Research and Ethics Committee Details

Name: Prof. Sody Mweetwa Munsanka

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Research Title

Knowledge, Attitude and Practices of Healthcare Workers towards Covid-19 Infection Prevention and Control at Isoka District Hospital, Zambia

Invitation

You are being invited to take part in a research project that seeks to understand the knowledge, attitudes and practices of healthcare workers at Isoka District Hospital towards Covid-19 infection prevention and control. Before you make a decision to take part, it is important for you to understand why the research is being done and what participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Few free to ask me if there is anything that is not clear or if you would like more information. Please take your time in deciding whether or not you wish to take part. Thank you for reading this and thank you in advance for your participation.

Purpose of the Research

This study is done as a requirement for the award of a Master of Science degree in Public Health at the University of Zambia. The study will involve administering a questionnaire which you have been invited to answer. Multiple participants were handed the questionnaire and the answers to the questionnaire was analysed to get an understanding of the prevailing knowledge, attitudes and practices of healthcare workers towards Covid-19 prevention and control at Isoka District Hospital. Your response to the questionnaire is thus very important.

Why You Have Been Chosen

You have been chosen to participate in this study because you are a healthcare worker at Isoka District Hospital. This research will only administer questionnaires to healthcare workers who work, volunteer or are being trained at Isoka District Hospital. You being a healthcare worker at Isoka District Hospital thus makes you a qualified candidate for this study.

Do You Have to Take Part?

Participating in this research is completely voluntary. For this reason, once you decide to participate in this study, you will be asked to sign a participant consent form. However, even after signing the consent form, you will still be at liberty to opt out of the study at any stage of the process.

Confidentiality

Concerning the confidentiality of the information you will provide in this study; your identity will be kept anonymous and thus any information you will provide will not and cannot be traced back to you. In this connection, you will be asked not to write your name on the questionnaire that you will answer.

Are there any disadvantages for taking part?

I don't foresee any disadvantages for you in taking part. However, it is possible that talking about your daily experience in may cause some distress. Filling out the questionnaire may also take part of your personal or professional time.

What to do if any challenge arises

If you encounter any problem, please feel free to contact me on 0977531744 or email on gladysnamukoko1227@gmail.com. We will also have a brief talk at the end of the process to discuss how you found the experience and what challenges you encountered.

Who has reviewed this study?

This research has been reviewed by the University of Zambia, School of Public Health Ethics Committee and has been deemed to meet all the ethical standards. Further, the study has also been cleared by the Isoka District Hospital Ethics Committee.

Any further queries?

If you need any further information, please feel free to reach me on 0977531744 or email on

gladysnamukoko1227@gmail.com.

APPENDIX B: RESEARCH QUESTIONNARE

Dear Participant,

You have been selected to be part of this survey and we would, therefore, like you to answer this questionnaire. This survey is being conducted by the Ms. Gladys Namukoko, a student at the University of Zambia, pursuing a Master of Science in Public Health and an employee working as a microbiologist at Isoka District Hospital. This survey is only being done at Isoka District Hospital.

The information you provide will only be used to for Ms. Namukoko's dissertation which seeks to understand the knowledge, attitudes and practices of healthcare workers towards Covid-19 infection prevention and control.

The questionnaire can be answered and submitted within 1 week and will ask you questions about:

- ✓ Some personal details,
- ✓ Your knowledge on Covid-19 infection prevention and control,
- ✓ Your opinion on Covid-19 infection prevention and control, and
- ✓ Your practices with regards to Covid-19 infection prevention and control.

The information you provide is totally confidential and will not be disclosed to anyone. It will only be used for research purposes. Your name will be removed from the questionnaire, and only a code will be used to connect your name and your answers without identifying you. The researcher may contact you again only if it is necessary to complete the information on the survey.

Your participation is voluntary and you can withdraw from the survey after having agreed to participate. You are free to refuse to answer any question that is asked in the questionnaire. If you have any questions about this survey you may ask the researcher or her supervisor.

Signing this consent indicates that you understand what will be expected of you and are willing to participate in this survey.

Read by Respondent	☐
Agreed	☐
Refused	☐

Respondent (sign): _____ Date: ___/___/__

PART A: DEMONGRAPHIC INFORMATION

Instructions: ***Please tick in the boxes what applies to you***

Factor	Sub-factor	
GENDER		
	Male	☐
	Female	☐
AGE		
	≤30 Years	☐
	>30 Years	☐
MARITAL STATUS		
	Unmarried	☐
	Married	☐
RELIGION		
	Non-Christian	☐
	Christian	☐
LEVEL OF EDUCATION		
	Non-tertiary	☐
	Tertiary	☐
PROFESSION		
	Non-Medical	☐
	Medical Doctor	☐
IS RESPONDENT LIVING WITH SOMEONE?		
	No	☐
	Yes	☐
IS RESPONDENTS LIVING WITH ELDERLY?		
	No	☐
	Yes	☐

PART B: KNOWLEDGE ON COVID-19 IPC

Instructions: ***Please tick the statement you think is true or false***

Covid-19 Infection Prevention and Control Measures	**TRUE**	**FALSE**	**I DON'T KNOW**
Social distancing can prevent the spread of Covid-19	☐	☐	☐
Wearing masks reduces the transmission of Covid-19	☐	☐	☐
Disinfecting surfaces is not a preventative measure of Covid-19	☐	☐	☐
Frequent washing of hands with soap or using a hand sanitizer prevents the spread of Covid-19	☐	☐	☐
Avoiding crowded and poorly ventilated places reduces the transmission of Covid-19	☐	☐	☐
Covering one's mouth and nose when coughing and sneezing prevents the spread of Covid-19	☐	☐	☐
Avoiding touching eyes, mouth and nose with unwashed hands does not reduce the transmission of Covid-19	☐	☐	☐
Self-isolating when one has Covid-19 symptoms before they test for Covid-19 helps to stop the spread of the disease	☐	☐	☐
Going for Covid-19 testing early when one notices Covid-19 symptoms cannot reduce the spread of Covid-19	☐	☐	☐
Getting vaccinated is not Covid-19 infection prevention and control measure	☐	☐	☐

PART C: ATTITUDES TOWARDS COVID-19 IPC

Instructions: ***Please tick what you think is applicable to you (Use the Key for reference)***

Variable	SA	A	N	D	SD
I Would accept isolation from the community if diagnosed with Covid-19 to prevent the spread	☐	☐	☐	☐	☐
I Would accept to be vaccinated against COVID-19 if a vaccine was available	☐	☐	☐	☐	☐
I can't recommend my family, friends and others to get the vaccine	☐	☐	☐	☐	☐
I would willingly go for Covid-19 testing if I have any Covid-19 symptoms	☐	☐	☐	☐	☐
I encourage people to go for Covid-19 testing if they have any Covid-19 symptoms	☐	☐	☐	☐	☐
I am not ready to participate in any Covid-19 infection prevention and control measure	☐	☐	☐	☐	☐
Only healthcare workers have a role to play in Covid-19 infection prevention and control	☐	☐	☐	☐	☐
I think everyone can get infected Covid-19 and so everyone should be involved in prevention and control	☐	☐	☐	☐	☐
I don't think that I am are a potential source of contagion for your family?	☐	☐	☐	☐	☐
I feel that I could be infected with COVID-19 at my facility regardless of the precautions I take	☐	☐	☐	☐	☐

KEY

SD: Strongly disagree

D: Disagree

N: Neutral

A: Agree

SA: Strongly agree

PART D: PRACTICES TOWARDS COVID-19 IPC

Instructions: ***Please tick in the boxes where suitable***

Practice	ALWAYS	SOMETIMES	NEVER
I practise social distancing during work	☐	☐	☐
I wear masks to help reduce transmission of COVID-19	☐	☐	☐
I disinfect my work surfaces	☐	☐	☐
I wash my hands often, with soap or use a hand sanitizer	☐	☐	☐
I avoid crowded and poorly ventilated places	☐	☐	☐
I cover my mouth and nose when coughing and sneezing	☐	☐	☐
I go for Covid-19 testing when I notice any symptoms	☐	☐	☐
I self-isolate when I have Covid-19 symptoms before screening	☐	☐	☐
I encourage people to get vaccinated	☐	☐	☐
I avoid touching my eyes, mouth and nose with unwashed hands	☐	☐	☐

Thank you for your invaluable contribution and participation