UNIVERSITY OF LUSAKA

SCHOOL OF MEDICINE AND HEALTH SCIENCES

KNOWLEDGE ATTITUDE AND PRACTICES ON COVID-19 VACCINE AMONG ADOLESCENTS OF SELECTED PRIMARY SCHOOLS IN LIVINGSTONE, ZAMBIA

BY

BERTHA DIANA NYIRENDA

BSPH19217395

BACHELOR OF SCIENCE IN PUBLIC HEALTH

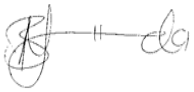
SUPERVISOR: DR. NOVAN TEMBO

A dissertation submitted to the University of Lusaka in partial fulfillment of the requirements for the award of the Bachelor of Science Degree in Public Health

DECLARATION

Bertha Diana Nyirenda BSPH19217395

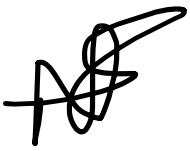
I declare that this is my creative work and to the best of acquaintance has not been presented for a degree in any other institution except where due, acknowledgement is made in the dissertation.

Signature of student:  Date: 26th May, 2023

Supervisor Name: Dr. Novan Tembo

This dissertation has been submitted with my approval as a University of Lusaka (UNILUS) supervisor.

School of Medicine and Health Sciences, Department of Public Health

Signature of supervisor:  Date: 26th May, 2023

APPROVAL

The university of Lusaka approved this research in partial fulfillment of the requirements for the award of the Bachelor of Science Degree in Public Health.

DEDICATION

I dedicate this research to my family and friends, who have always been my source of inspiration and motivation. Your love and support have been instrumental in my success.

ACKNOWLEDGEMENTS

I would like to express my heartfelt gratitude to God, from whom all blessings flow, for giving me the strength, patience, and wisdom to complete this research. I am also thankful to my family, especially my parents and siblings, for their unconditional love, unwavering support, and encouragement throughout my academic journey.

I extend my sincere appreciation to my colleagues and friends who have shared their insights and knowledge, and who have made valuable contributions to my research. I am particularly grateful to my supervisor, Dr. Novan Tembo, for providing me with guidance, motivation, and constructive feedback throughout the research process.

This endeavor would not have been possible without the University of Lusaka, for providing me with an intellectually stimulating environment, resources, and opportunities to explore my academic interests and passions. Your commitment to excellence has played an instrumental role in my academic growth and achievement.

I acknowledge the district health office for granting me the permission to conduct the research and the schools for allowing me to collect data in their respective schools. Lastly, I would like to thank all the participants who have shared their time, experiences, and perspectives, without whom this research would not have been possible.

ABSTRACT

Background: The covid-19 pandemic has had a significant impact on global health, emphasizing the need for effective vaccination strategies. The purpose of this study was to determine the knowledge, attitudes and practices on covid-19 vaccines among adolescents in Livingstone district, Zambia. The study focused on pupils in the district, providing valuable insights into this specific population, by investigating the levels of knowledge, attitudes, and practices among adolescents, this study aims at contributing to the development of effective public health strategies.

Methods: This study was conducted on pupils in two Government primary schools offering free primary education in Livingstone district, Zambia. The study design that was used in this research was a case-study. The study used a qualitative research approach because it aimed at acquiring an in-depth understanding of what existed on the knowledge and attitudes of adolescents on the Covid-19 vaccinations.

Results: The qualitative data that was obtained from the open-ended questionnaires, interviews, and observations produced six distinguishing themes: theme one (1)- Vaccine information and source, theme (2)- Adolescent's perception on safety, risk and benefits of covid-19 vaccines; theme three (3)- Observed side-effects, theme four (4)- Attitudes and beliefs on vaccine necessity, theme five (5)- Attitude and belief on vaccine hesitancy, influence and decision making, and theme six (6) - Perception and adherence to preventive measures.

Conclusion: The findings from this study focused on the adolescents aged twelve (12) and above who were yet to get the vaccine. The findings from this study are useful for informing public health strategies for improving willingness and uptake of the vaccine among adolescents. It is thus important to prioritize adolescence vaccination and ensure that young people are too, protected from Covid-19 by addressing their specific concerns, countering misinformation and emphasizing on safety and effectiveness.

Table of Contents

LIST OF ACRONYMS AND ABBREVIATIONS

BBC	British Broadcasting Network
CDC	Centers for Disease Control and Prevention
COVID-19	Corona Virus Disease 2019
MOH	Ministry of Health
UNICEF	United Nations Children's Emergency Funds
WHO	World Health Organization
ZDHS	Zambia Demographic and Health Survey

CHAPTER ONE

1.0 INTRODUCTION

The purpose of this study was to determine the knowledge, attitudes and practices on covid-19 vaccines among adolescents in Livingstone district. This study was conducted on pupils in two schools offering primary education in Livingstone district, Zambia. This chapter consist mainly of five sections including the background on covid-19, statement of the problem, the research justification, the study objectives and lastly the research questions.

1.1 BACKGROUND

Corona virus disease 2019 (covid-19), as stated by the Centers for Disease Control and Prevention (2021), is a highly pathogenic disease caused by a novel respiratory acute syndrome virus known as SARS-CoV-2 and was discovered in Wuhan, China in the year 2019. It is assumed to be of zoonotic origin based on the large number of people who were exposed in Wuhan city (Shereen, 2020). Shereen (2020) further states that the phylogenetic analysis revealed that SARS-CoV-2 has significant sequence similarities with that of severe acute respiratory syndrome-like (SARS-like) bat viruses, therefore suggesting that bats could have been the primary possible reservoir.

Covid-19 is a highly contagious airborne disease which could be easily transmitted from person to person when people with Covid-19 coughs, sneezes, speaks, or otherwise breath out droplets or aerosols that contain the virus (Centers for Disease Control and Prevention, 2022) therefore, had quickly spread around the globe resulting into an outbreak leading to its declaration as a pandemic by the World Health organization (WHO) director-general Dr Tedros Adhanom Ghebreyesus in March 2020 (Cucinotta Domenico, 2020). Covid-19. Symptoms of covid-19 may appear approximately 2 to 14 days after exposure to the virus and range from mild to severe symptoms which include but not limited to difficulty in breathing, shortness of breath, coughing, fatigue, headache, body aches, loss of smell or taste, nausea or vomiting and fever or chills (Centers for Disease Control and Prevention, 2022), these symptoms vary among individuals.

Covid-19 Pandemic had led to appalling loss of lives, as of 2nd September, 2022 there had been 601 189 435 confirmed cases of covid-19 and 6 475 346 deaths globally, which proves to have detrimental impacts on most aspects of health, namely, the physical, social, mental and financial aspects. Perceived risks of having the disease had led governments to put up a number of control measures of which Zambia is not an exception. Zambia had recorded 332 822 confirmed cases of covid-19 with 4016 deaths reported to the World health organization as of 21st August, 2022 since the beginning of the outbreak (World Health Organization, 2020).

Measures which had been put in place to prevent and mitigate the disease from spreading further include physical distancing, rigorous hygiene practices, wearing protective facial coverings and contacting the nearest health facility if a person is showing signs of covid-19 (Ministry of Health, 2022). Ministry of Health. (2022) further included vaccine services across all age groups as the most plausible solution to curb the spread of the disease and most viable option to contain morbidity and mortality statistics of covid-19 disease, intending to having not less than 70% of the total population vaccinated at every level of the country, province district and community, with the aim of having a fully protected population.

Vaccinations in Zambia are on voluntary bases, yet the population was still hesitant to get vaccinated despite the levels of awareness put in place. Therefore this study aimed to understand the hesitancy from receiving the vaccine which hinderd the high and equitable coverage among all populations thus meeting the not less than 70% of the population to be vaccinated, included addressing reasons for the adolescents who did not intend to receive the covid-19 vaccines, which is critical to prevent the spread of the disease thus contributing to ending the pandemic. Understanding the knowledge, attitudes and practices that the adolescents had towards the covid-19 vaccines were essential prerequisites to design suitable intervention activities.

1.2 STATEMENT OF THE PROBLEM

On 11th March 2020, the world Health Organization had declared the outbreak of covid-19 as a public health emergency of international concern. As of 2nd September, there had been 601 189 435 confirmed cases of covid-19 and 6 475 346 deaths globally with Zambia recording 332 822 confirmed cases of covid-19 with 4016 deaths reported to the World health organization as of 21

August 2022 (World Health Organization, 2020). Since the first discovery of covid-19, cases were not sustained for long due to continued travel links between China, Europe and Africa. Perceived risk of acquiring covid-19 had led to the Zambian government to put forth a variety of control measures including the vaccination against Covid-19 in which the first batch of vaccines were procured by the United Nations Children's Fund (UNICEF) closely with the World Health Organization through the covid-19 vaccine distribution program COVAX facility, and through continued research and safety monitoring, researchers further approved Pfizer vaccines for adolescents (Centers for Disease Control and Prevention, 2021).

As the Ministry of Health (2022) intended to reach 70% of the total population to be vaccinated, statistics acquired, show that only 48.1% of the total doses where administered per 100 population and 3.26% persons boosted per 100 population (World Health Organization, 2020). With this in mind the information about the acceptability of covid-19 among adolescents in Zambia is lucking thus leading to a high probability of undetected cases which might prove to be fatal if left unprevented and mitigated. With most close contact of person to person is among primary school children, there is higher risk of easily spreading the disease, however most vaccination programs in schools are conducted without knowing the knowledge and attitudes that the adolescents have with regards to the vaccine, it was therefore essential to understand the knowledge, attitudes and practices that the adolescents had towards the vaccines in order to reach the 70% of the vaccinated population and thus enabling the design of suitable intervention programs, therefore contributing to the prevention of the spread of the disease.

1.3 JUSTIFICATION OF STUDY

Although considerable research has been undertaken into the complex range of vaccines, very few have been conducted in Zambia on the assessment of knowledge, attitudes and practices that the adolescents had towards the covid-19 vaccines particularly in Livingstone district. Most studies curried out in Zambia mostly focused on the knowledge, attitudes and practices that people over the age of 18 have towards covid-19 measures. Even though there was a number of awareness programs put in place by the Zambian government, populations were still hesitant to get vaccinated against Covid-19.

This study would aid the tailoring of awareness programs being implemented thus contributing to the baseline information on the knowledge, attitudes and practices of the target population, because Zambia's population is largely made up of adolescents up to 48% of the population, are below the age of 15 (Zambia Statistics Agency et al., 2018) and if not addressed, they would largely contribute to the spread of the disease due to undetected cases. This research was designed to add knowledge to the existing information as to understand the knowledge, attitudes and practices adolescents have towards covid-19 vaccines.

OBJECTIVES

1.4 GENERAL OBJECTIVES

To determine the knowledge, attitude and practices of covid-19 vaccines among adolescents of selected primary schools in Livingstone, Zambia.

1.5 SPECIFIC OBJECTIVES

- To establish the existing knowledge on the covid-19 vaccines among adolescents of selected primary schools in Livingstone district.
- To determine the attitude adolescents, have towards the covid-19 vaccine
- To explore the practices adopted by adolescents in response to the Covid-19 pandemic.

1.6 RESEARCH QUESTIONS

- How knowledgeable are the adolescents on the Covid-19 vaccine?
- What attitudes do adolescents have towards the Covid-19 vaccine?
- What practices are observed and acceptable by adolescents against Covid-19?

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 GLOBAL LEVEL

Globally, Covid-19 has resulted to over one million mortalities (Robinson et al., 2021) and as the number of cases increase, so does the pursuit to find effective and safe ways to minimize the impact of the covid-19 disease, these pursuits include the development of effective and safe covid-19 vaccines being produced. Further, reports from World Health Organization (2022) state that nearly every country has implemented vaccinations against covid-19 with approximately 12 million doses being administered globally and further adds that most countries are yet to achieve high vaccination coverage. Robinson (2021), further states that the widespread uptake of the vaccine is important as it is the most plausible solution to prevent and mitigate the covid-19 pandemic.

However, a study done by Razai et al. (2021) on Covid-19 vaccination hesitancy, describe that there seem to be lack of confidence with the vaccines among the populations, despite of the number of Covid-19 vaccines available worldwide and his findings note that this could be due to a number of reasons such as unknown future effects and side effects of the covid-19 vaccines, and luck of trust generated from the unprecedented time the vaccines were developed, thus making Covid-19 vaccination hesitancy a global public health concern. Furthermore a review done by Sallam (2021) on vaccine acceptance rate globally, established that there are low rates of covid-19 vaccine acceptance in the Middle East, Sub-Saharan Africa, Russia and many of the European countries. Sallam (2021) further adds that the acceptance of the covid-19 vaccines among the populations has a crucial role in the control of the pandemic.

Reports from Centers for Disease Control and Prevention (2021) assert that many countries are mainly focused on vaccinating most at risk populations and individuals above the age of 18 and reports from World Health Organization (2022) observed that the cases of covid-19 among adolescents dramatically increased during the second wave of Covid-19 known as the OMRICON variant with 10.44% reported cases globally as of 24th July, 2022. World Health Organization (2022) further remarks that the benefits of having adolescents vaccinated include minimizing

transmission of the disease among themselves as well as transmission between adolescents and adults. World Health Organization (2022) further suggested that countries should consider the benefits of having adolescents vaccinated against Covid-19, as most covid-19 vaccination programs put in place do not include adolescents thus a lot of cases go undetected among adolescent, this is in line with the researcher's objectives of targeting adolescents' knowledge, attitudes and practices on the covid-19 vaccines. Similar studies were carried out in the United States by Scherer et al. (2021) which proved that 56% of the unvaccinated adolescents resolved to getting vaccinated due to increased information of the safety and efficacy of the covid-19 vaccines.

2.2 SUB-SAHARA LEVEL

Sub-Sahara being home to approximately 60 % of the world's population of which it comprises of low-income and middle-income countries, with poor resourced healthcare systems, is unique in having majority of the population mainly consisting of adolescents and prone to insecurities such as high mortality and morbidity rates, major outbreaks of infectious diseases (Ebola, Cholera, Measles, Yellow fever), Human Immunodeficiency Virus (HIV), Tuberculosis, Lower Respiratory Infections, Meningitis, Malaria among others still being major causes of mortality in the continent (Mennechet, 2020). As at 22nd May, 2022, over 1 billion individuals are yet to be vaccination against covid-19 (World Health Organization, 2022). Covid-19 vaccination hesitancy in the Sub-Saharan countries vary, but range from reasons such as reliability of the sources of the vaccines, misinformation on social media platforms and anti-vaccine campaigns targeted at warning Africans to not accept the covid-19 vaccines from foreign regions, head of households influence and perceptions of the supplying pharmaceutical industries (Olufunke, 2022).

Studies done by Wake et al. (2021) on the acceptance rate of covid-19 in Africa, 2021 using a systematic review found that the acceptance rate of covid-19 was very low among adults, similar studies were done by Alemayehu et al. (2022) on Covid-19 vaccine acceptance and the determinant factors among general public in east Africa contradicts Wake's findings stating that the vaccine acceptance levels among the general public was good. However, a study conducted in Ethiopia by Abebe et al. (2021) on understanding Covid-19 vaccine knowledge, attitude, acceptance and determinants of covid-19 among the Ethiopian population, argues that age and level of education

were significantly associate with covid-19 vaccine acceptance, but these studies were mainly focused on adults and did not account for adolescents which is the main focus of this study.

Reports from the British Broadcasting Network (2021) find that despite Africa accounting for about 60% of the total population, approximately 9% of the total population had been vaccinated against covid-19. BBC further remarks that vaccine hesitancy and skepticism could be one of the possible reasons as to the low number of vaccinated people though it is difficult to quantify the impact, this is supported by the reports from the United Nations (2021) which state that of more than 5.4 billion vaccine doses that had been administered worldwide, Africa only accounted for 2% of those administered doses. Meanwhile, despite genuine efforts made by sub-Saharan governments to curb the disease, covid-19 hesitancy still plays a major role in achieving a more than 70% of the populations to be vaccinated in the African countries which would prove to be a struggle on already poor resourced health systems if not achieved, however there is little research done on the knowledge, attitudes and practices of covid-19 vaccines among adolescents which is the main objective of this research in the Sub-Saharan region as many of these studies are mainly concentrated on adults.

2.3 LOCAL LEVEL

Zambia has a population of approximately 18 million of which 48% comprises of adolescents below the age of 15 (Zambia Statistics Agency et al., 2018), in relation with other sub-Saharan countries, it consist of poor resourced healthcare system, disease burdens such as HIV and AIDS, Cholera, Malaria, insufficient epidemiologic surveillance and understaffed and underfunded health system. With the increase in the covid-19 cases, the most reasonable way to manage the spread of the disease as a nation, is through covid-19 vaccinations. Since Zambia had recorded the first cases of covid-19 in March 2020, over 4 million school going children's learning had been disrupted (World vision, 2020), of which Livingstone district, the tourist capital of Zambia is not an exception.

There little is known information as to why adolescents are hesitant to get vaccinated against covid-19, Mennechet (2020) maintain that reasons as to these adolescents not developing severe forms of the disease is yet to be known but they are still likely to develop complications that require intensive care and most likely transmit the disease among themselves which would further lead

the disease being transmitted to adults, thus if adolescents are not included in Covid-19 vaccinations, would lead to difficulties in controlling the disease. Thus, the government of Zambia, through the Ministry of health had implemented covid-19 vaccination programs that is inclusive of adolescents aged 12 and above, and yet there was a low turn out of adolescents who got vaccinated against the covid-19 disease (Ministry of Health, 2022) in a number of schools, including schools in the tourist capital of Zambia, Livingstone, which is the focus of this study.

2.4 THEORATICAL FRAMEWORK

This study was guided by the Ecological systems theory by Bronfenbrenner (2006). According to the theory, "the interaction of children with their environment gets them exposed to a number of different influences that are conceptualized as nested speres that radiate outward from proximal to distal. This include, the microsystem which is the most immediate and influential social circle (i.e., family and school). The mesosystem includes influences such as friends and teachers. Beyond the mesosystem is the exosystem, which includes influences such as the media and extended family. The macrosystem is more distal and includes influences such as cultural narratives and societal ideals. The Chronosystem, which refers to the stage of life that the person is in regarding the situations they're going through an example of this would be the death of a loved one which has a very different impact on a young person compared to adults".

The study attempts to find out whether the influences from these different systems determine the hesitancy of adolescents to acquire the Covid-19 vaccine. The microsystems could be the opinions and decisions of the guardians to not have the adolescents vaccinated, mesosystem would be the influence from their peers. The macrosystem can be the cultural and religious beliefs to not get vaccinated and the Chronosystem would be a rare case of the adolescent's experience with having a loved one die after acquiring the Covid-19 vaccine.

2.5 CONCEPTUAL FRAMEWORK

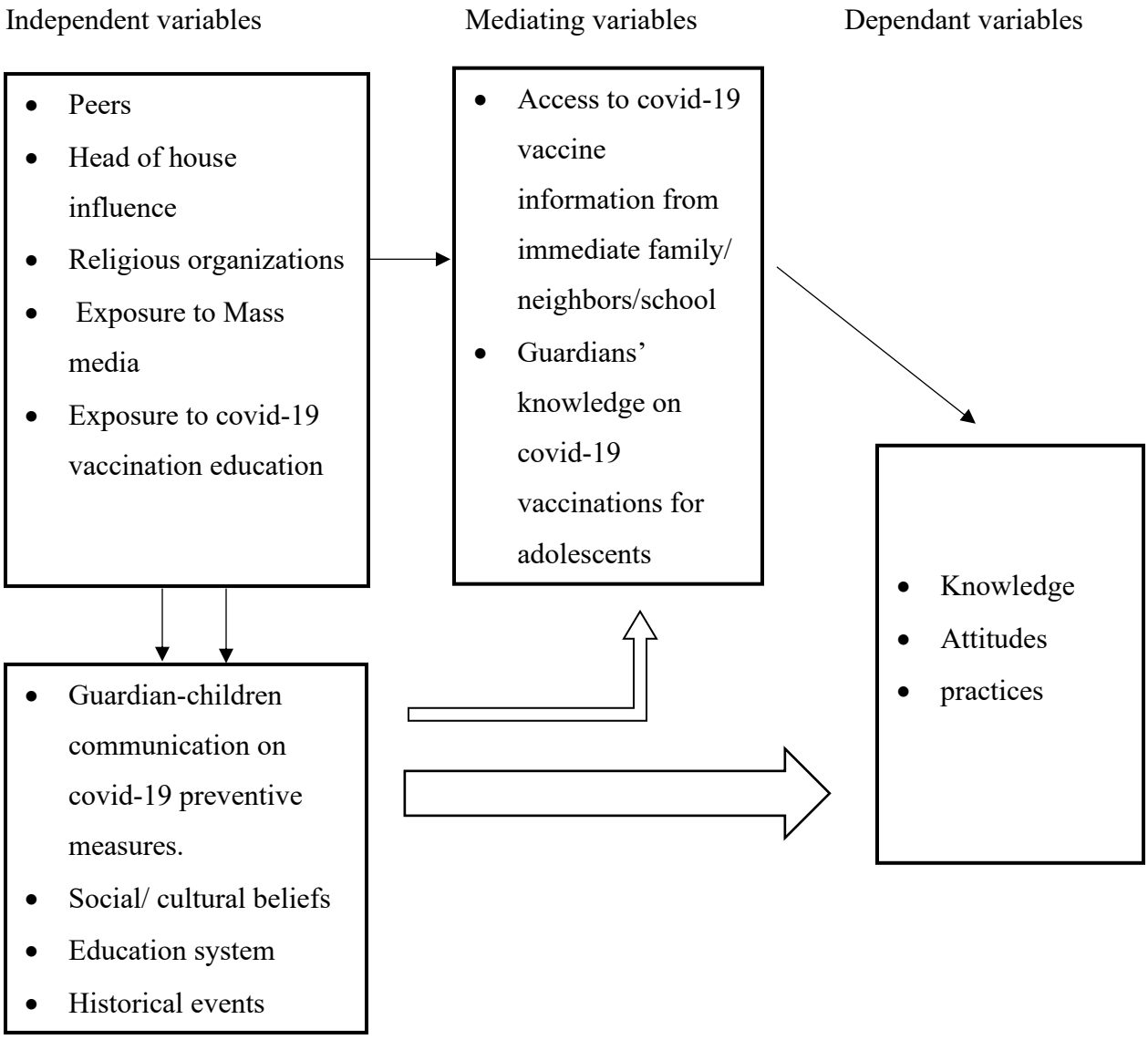


Figure 1- *Ecological systems theory attributes to adolescent's acceptance of Covid-19 Vaccine* (Source: Researcher, 2022).

CHAPTER 3

3.0 METHODOLOGY

3.1 STUDY APPROACH

This research used a qualitative research approach because it aimed at acquiring an in-depth understanding of what existed on the knowledge, attitude and practices on the covid-19 vaccination from the research participants.

3.2 STUDY DESIGN

This study adopted a case-study design. The study aimed at collecting Information on the knowledge, attitude and practices of covid-19 vaccine through open-ended questionnaires, oral recordings and observations of pupils enrolled at the selected schools using this design, which was used to highlight, explore, describe, in-depth, the issue as to why some adolescents shunned from acquiring the covid-19 vaccine. Although the study design has limitations of only looking at a specific group which in our study are adolescents and is not as broad in the participant selection, however, it brought about deeper insights and better understanding as to why adolescents in these selected schools were not acquiring the covid-19 vaccine.

3.3 STUDY SITE

The study was carried out in Livingstone city, located in Southern province of Zambia. Purposive sampling was used to select the city as it is the tourist capital of Zambia thus prone to intercity transmission of the pandemic. In Livingstone, two (2) government schools are purposefully selected as study locations. This is because due to the introduction of free education, there is an impressive number of children accessing education from government schools and due to the introduction of vaccinations of adolescents below the age of 18, there is less strictness on the adherence of covid-19 guidelines.

3.4 STUDY POPULATION

The total population of this study were respondents that had enrolled from the selected government primary schools aged 12 years and above of all grades at primary level in Livingstone city at the time that the data was be collected. Exclusion criteria were pupils below the age of 12 of all grades at primary level and pupils aged 12 and above that were not willing to participate, pupils that were not allowed by their guardians to participate in the study and pupils that were absent on the days of data collection.

3.5.0 SAMPLING TECHNIQUE

The sampling technique that was used to select the participants in this study was convenience sampling. This is because the sampling technique is less costly and fast, furthermore, respondents under the study were participating on voluntary basis and thus were perceived as reliable to the study for in-depth analysis related to the study of assessing the knowledge, attitudes and practices of covid-19 vaccination among adolescents

3.5.1 SAMPLE SIZE

The sample selection for this study comprised of two (2) government primary schools from each school, there was a total participant of 15 pupils, thus a total of 30 participants were involved. The sample size was determined based on the principle of data saturation, which is the point at which the collection of data no longer yields novel or relevant information (Saunders, 2017). The sample size was considered adequate based on the criteria set for qualitative research studies, which prioritize depth over breadth. These study participants were perceived to be reliable in giving information on their knowledge, attitude and practices towards covid-19 vaccination.

3.6 DATA ANALYSIS

Thematic analysis was used to analyze the data. The data was thoroughly analyzed and grouped so as to identify common themes based on responses from the participants. Despite the analysis heavily relying on the judgment of a single analyst thus prone to subjectivity and researcher bias, it is flexible.

3.7 ETHICAL CONSIDERATION

Ethical approval to conduct the study was sought from the University of Lusaka Research Ethics Clearance Committee (UNILUSREC). Permission was obtained from the National Health Research Authority (NHRA). Informed consent was obtained from the study participants before distribution of questionnaires and involvement in oral recordings. Participants were assured confidentiality, autonomy and anonymity regarding their information.

4.0 CHAPTER 4

4.1 RESULTS

The qualitative data that was obtained from the open-ended questionnaires and interviews produced six distinguishing themes: theme one (1)- Vaccine Information and Source, theme (2)- Adolescent's perception on safety, risk and benefits of covid-19 vaccines, theme three (3)- Observed side-effects, theme four (4)- Attitudes and beliefs on vaccine necessity, theme five (5)- Vaccine hesitancy, influence and decision making, theme six (6) – Perception and adherence to preventive measures. Theme 1 answered the first research question i.e., *How knowledgeable are the adolescents on the covid-19 vaccine?* Themes 2, 3, 4 and 5 addressed the second research question i.e., *What attitudes do adolescents have towards the Covid-19 vaccine?* Theme 6 addressed the third research question i.e., *what practices are observed and acceptable against Covid-19?* We further discuss each theme below:

4.1.1 Theme one: Vaccine information and source

The theme explored the hesitancy of the pupils to acquire the vaccine using the knowledge that the pupils have from the available sources of information they rely on to learn about the covid-19 vaccine. The theme explored the levels of awareness about covid, and covid-19 vaccines, identified the sources of vaccine information for adolescents, examined their understanding and identified gaps in their knowledge. Participants demonstrated varying levels of knowledge about Covid-19 vaccines, including awareness of their existence, understanding of their purpose and benefits and familiarity with its availability. This theme also identified primary, and secondary sources of vaccine information, such as teachers, parents/ guardians, social media, internet, and television. The theme further explains, from the pupils' point of view, how best the covid-19 information can be communicated to ensure the most efficient way to increase vaccinations among the pupils.

When the pupils were asked on the knowledge that they had on the Covid-19 vaccines and how best could the implementers provide information to ensure efficient and maximum coverage on the covid-19 vaccines, the following where the main responses;

Participant 1 had the following to say from the interviews:

I heard about the covid-19 from my parents, but I don't know much about the covid-19 vaccine. My teachers at school told us that it is necessary to get the vaccine because without it, you can become sick or ill that is why we need the vaccine to protect ourselves from the disease, but despite having enough information widely available, it is not well and often communicated to us in school and my parents did not permit me to get the vaccine when the nurses came to give the Covid-19 vaccine in school. Therefore, if the health workers could find the best way to communicate and explain the full importance of having us children vaccinated, it would help in having majority of children vaccinated especially us whose parents did not give permission to get the vaccine.

Participant 2 also said that:

I know about the Covid-19 from Facebook, I read a lot of information on covid-19 from social media but I don't know if what I read was true about the vaccine or they were just scaring us. Most of us do not want to get the vaccine because we strongly think that we will die fast if we get the vaccine and we are also scared of our hands getting swollen like we have seen from those that got the vaccine, like by brother at home who complained of having a swollen hand when he got the vaccine. With the information on the Covid-19, I think there is enough information because mostly we are always reminded to mask up and keep one meter distance and we were reminded to tell our parents on the covid-19 vaccinations so that our parents can give us permission to get the vaccine. A lot of the pupils can get vaccinated if the clinics and hospitals can coordinate with schools and parents with providing information and also sensitizing our parents.

Participant 8 commented that:

It is important to get the Covid-19 vaccine because it helps when get you get the virus, the effects that will be on you will not be as bad as the ones without the vaccine. There is enough information on the Covid-19 vaccines and those who do not want to get the vaccine are just ignorant because the covid-19 information and the importance of getting the vaccine is communicated to us through the teachers, together with the children, and we were told to tell our parents on the importance of

getting the vaccine when we were asking for permission to get the vaccine at school. Healthcare providers can help in ensuring that we get enough information by coming to schools and educating us and helping us understand the importance of us adolescents getting the vaccine.

Participant five 9 also had the following to say:

What I know about the vaccine is that if we get the vaccine, there will be no death and that it will lessen the Covid-19 restrictions. The information on the covid-19 is rare at times and they don't tell us the importance of getting the Covid-19 vaccine. The best way to help more adolescents have the Covid-19 vaccine is to advise them on the benefits of acquiring the vaccine despite the fact that you will still get the virus even when you get the vaccine. The best way to ensure that they get the vaccine is by putting up covid-19 information that is understood by us.

Participant 15 had this to say:

I understand that Covid-19 is a very dangerous virus and that we human beings should try to get rid of it and the best solution for now is to acquire the Covid-19 vaccine. The vaccine is important because it helps and protects us from this disease. Although people might fear to take the vaccine, what they do not know is that it will help them a lot. It is also necessary to get the vaccine because it helps the people to get rid of the virus. There is enough information on the covid-19 vaccine and they tell us at school during assembly and in class, and I can encourage others to get the vaccine. The best way that most adolescents can get vaccines is to sensitize them using platforms that mostly used by them.

Participant 16 stated that:

I know that the covid-19 vaccine was has been developed to help protect people from getting the Covid-19 virus. I learnt about covid-19 vaccine from school and on tv but am not sure about the details of the vaccine, then I have heard that it is important to get it. I think the best way to ensure

that we get vaccinated is to take the vaccines to schools, taking the vaccines to people's homes, and making clubs that teach us about the dangers of Covid-19 and the importance of the vaccine.

Participant 17 further said that:

It is important to get the vaccine because it prevents us from dying when we get Covid-19 and the spread of the virus. From what I know I was told that we won't get sick of Covid-19 so I think that it is important to get the vaccine because if we get the vaccine, then there will be no more deaths from the Covid-19 therefore it is necessary to get vaccinated and follow the Covid-19 guidelines to be safe. The best way you can ensure that most adolescents get the vaccine is to make sure that you talk to us about the vaccine and that the vaccine saves lives.

Participant 18 said that:

What I know about Covid-19 is that it is a can be cured, and that it has medicine, because my grandmother was given medicine when she had Covid-19 and that it is contagious. I don't want to get the vaccine because I don't know anything about what is in the covid-19 vaccine. I was told that I won't get sick if I don't get the vaccine so why get vaccinated? The best way for to ensure that most adolescents get the vaccine is by telling them that they won't die when they take the vaccine.

4.1.2 Theme 2: Adolescents' perception on safety, risk, and benefits of covid-19 vaccines

This theme explored the participants' perception of safety, risk, and benefits associated with the vaccine. The theme identified safety concerns and doubts among adolescents, assessed their risk perception and understanding of vaccine benefits, and examined issues surrounding vaccine acceptance or hesitancy among adolescents, identifying reasons for their attitudes, and the following information was obtained from the interviews and open-ended questionnaires.

Participant 3 had this to say:

I don't think that I will be getting the vaccine because I am afraid of getting sick, as those who have been vaccinated are the ones that are dealing with and getting sick of Covid-19.

Participant 5 also had this to say:

I will not take the vaccine and will not advise my friends to do the same, also I think it is important to get the vaccine like they tell us at school, i am not willing to get the vaccine because I am afraid, i might die when I get the vaccine.

Participant 6 further said that:

I am afraid of getting the vaccine because am if I do, I may end up with a swollen hand, I want to see how it will affect my friends first, so I don't think I will get the vaccine when it is available.

Participant 6 also had this to say:

I don't want to get the vaccine because I don't know anything about what is in the covid-19 vaccine. I was told that I won't get sick if I don't get the vaccine because am young and heal so why get vaccinated?

Participant 22 also added that

I don't want to get the vaccine because I am afraid that it will lower my immune system, am afraid I can have an allergic reaction. I have concerns about the long-term effects.

Participant 23 had the following to say:

I think the vaccine is safe and effective because it has been approved by health authorities for us to get the vaccine but am not sure about the safety of getting the vaccine, but I am willing to get vaccinated.

4.1.3 Theme 3: Observed side-effects

This theme addressed the covid-19 vaccination hesitancy in the perspective of observed side effects from peers or family that had the covid-19 vaccine. The theme sought to identify any side-effects that the adolescents may have observed or heard about from others who received the vaccine. It aimed to assess their perceptions of these side-effects and how they influenced their attitudes towards the vaccine. The theme also addressed the attitude adolescents have towards the covid-19 vaccine, and these where the main responses obtained from the open-ended questionnaires and interviews:

Participant 1 stated that:

Some of my friends got the vaccinated and had complained of having fever, sore hands and headaches, so am scared of getting the vaccine because I don't want to get sick.

Participant 23 had this to say:

the vaccine was developed to quickly and most of us are afraid of the long-term side effects, there are still many things that are not known about the Covid-19.

Participant 24 also had this to say:

I think from what I have seen so far, the side-effects can be worse than actually getting the Covid-19. It has bad effects.

4.1.4 Theme 4: Attitudes and beliefs on vaccine necessity

The theme looks at attitude in terms of adolescents' perception that the covid-19 virus is not a serious threat to their health and should not be taken seriously. The theme sought to understand the perceived necessity of the Covid-19 among the participants. This notion may result from a number of things, including a lack of knowledge about the risks linked with the virus, peer pressure, the youthful sense invincibility, or false information from unreliable sources. The theme aimed to assess how adolescents perceived the importance of getting vaccinated against Covid-19 and the factors that influence their decision-making process. The following responses were obtained from the participants:

Participant 12 also had the following to say:

I think I can protect myself though the Covid-19 guidelines like wearing a mask, washing hands with soap and avoiding handshakes therefore, I don't think it is necessary.

Participant 13 also said that:

I know some people that got the vaccine and still got sick of the Covid-19 virus, so does not seem to be effect to me that is why I think that it is not necessary.

Participant 21 also said that:

I don't think the vaccine is necessary because at home, school, and television, we were told that we are not one of the at-risk group of people.

Participant 23 also added that:

I don't think it is necessary to get the Covid-19 vaccine because I think that it is not as dangerous as people on TV and social media makes it out to be.

Participant 26 had this to say:

The vaccine is not really necessary because I don't know, or heard of anyone who got very sick from the Covid-19. I don't believe the vaccine is as effectives they say it is, because it wasn't tested enough.

Participant 27 had this to say:

It won't really be necessary for me to get the covid-19 vaccine because I already had covid-19 and I didn't get very sick so I can't get sick again, just like they taught us in class on what happens with the immunity system.

Participant 28 had this to say:

I don't think it is necessary personally to get the Covid-19 vaccine because I have heard that that it is only effective for a few months.

Participant 29 mentioned that:

I just think the media is hyping up the Covid-19 to scare us into getting the vaccine and even though we get the vaccines wont we just sick again if there is a new variant?

Participant 30 said that:

I don't see the need to get the vaccine because I can still get the virus even if I get the vaccine, which is the same as not getting the virus.

4.1.5 Theme 5: Vaccine hesitancy, influence and decision making

The theme looks at the attitude, and hesitancy that adolescents have towards Covid-19. The theme sought to understand the aspects contributing to vaccine hesitancy among adolescents, including personal concerns, influence from media, peers, family and health professionals on adolescents' decision to receive or refuse the vaccine. The theme aimed at exploring the influences on their attitudes towards the Covid-19 vaccine. The theme aimed to gain insight into the influences that shape vaccine hesitancy among adolescents and their decision-making process in relation to the Covid-19 vaccine. By understanding the influences that affect adolescents' decision-making, and their perceptions of the Covid-19 vaccine, researchers and health personnel can develop more effective interventions to increase uptake among this population. The following responses were generated from the open-ended questionnaires and interviews:

Participant 1 explained to say:

I think it is important to get the Covid-19 vaccine as they usually say on tv and at school because it will help to stop the spread of Covid-19, so I think I will get the vaccine.

Participant 2 also had the following to say:

I am not worried about getting covid-19 because I know I won't get very sick, but I will get it just to protect other because they told us at school.

Participant 5 also had the following to say:

My parents are making me get the vaccine, but am scared of getting the vaccine because I don't want to get sick.

Participant 13 commented to say:

My friends said that they are going to get the vaccinated, so am also going to get the vaccine.

Participant 14 stated that:

People at home all got the vaccine, so I will also get vaccinated.

Participant 16 said the following:

I was not allowed to get the vaccine by my guardians, because they are afraid of the side effects, so i won't get the vaccine.

Participant 19 said the following:

I am going to wait a bit before I get the vaccine, I want to see if there will be any bad effects afterwards.

Participant 20 replied that:

I am scared of getting the vaccine because I heard that I won't be able to have kids when I grow up.

Participant 30 also said that:

am not sure if the vaccine is worth taking if I still have to wear the masks and practice social distancing, but i will get the vaccine if my friends are going to get the vaccine.

4.1.6 Theme 6: Perception and adherence to preventive measures,

this theme explores the actual practices of adolescents in schools regarding the covid-19 vaccine. the theme captured the responses related to the different measures that the adolescents in primary schools follow to prevent the spread of the covid-19 disease. Such measures included physical distancing, wearing facemasks, use of alcohol-based hand sanitizers, avoiding handshakes, regular washing of hands and consideration of taking the covid-19 vaccine. The following responses were generated from the open-ended questionnaires and interviews:

Participant 1 had the following to say:

I use a hand sanitizer that I was given at home, I wear a mask sometimes, but we always reminded to do so at school, when I cough or sneeze, I cover my mouth

Participant 2 also had the following to say:

When I feel sick, I stay at home, I wash my hands often and I try not to touch my face.

Participant 6 also had this to say:

We wash our hands with soap and water, avoid crowded places, social distancing, masking up, and using hand sanitizers

Participant 13 had the following to say:

practicing good hygiene, following the guidelines and encouraging friends and family to do the same.

Participant 16 said that:

by washing hands, masking up, sanitizing hands with alcohol-based sanitizers, social distancing and getting the vaccine.

participant 28 said that:

I avoid shaking hands or hugging people if am not sure if they are vaccinated because they can have Covid-19.

5.0 CHAPTER 5
5.1 DISCUSSION

The findings from this study are focused on the adolescents aged twelve (12) and above who are yet to get the covid-19 vaccine, these findings are useful for informing public health strategies for improving willingness and uptake of the Covid-19 vaccine among adolescents. The present study confirmed that there is not enough focus that has been placed on these adolescents which is a significant gap in knowledge that might have an impact on efforts to mitigate the spread of Covid-19 and build immunity. Having a public health strategy in place as the health professions are conducting outreach programs and offering vaccinations in various hospitals and clinics for this age group may increase willingness to receive the Covid-19 vaccine and come up with better effective ways to promote the vaccination and education on the benefits of being vaccinated.

The current study revealed that the majority of the pupils had basic knowledge of the Covid-19 virus and Covid-19 vaccine. These findings are consistent with the findings in other studies (Wong, 2022; Mudenda, 2022) which stated that knowledge is a perquisite for foaming positive attitude regarding getting the Covid-19 vaccine. Of interest is that pupils who had good knowledge regarding the vaccine where more willing to get the vaccine compared to those who had low knowledge as they proved most to portray hesitancy. More information about covid-19 is basic science and is expected to be strengthened in schools. The low knowledge from some participants can be attributed to not fully or clearly understanding the information disseminated to them. The results lead to a similar study by Dardas. (2020) which stated that overall, an impressive number of adolescents showed a good base of knowledge. However, it was interesting to find that the participants knew that the vaccine was meant to protect them from the virus but most of them did not have a clear understanding on how it worked.

Concerning the knowledge levels, the participants who had more information on the covid-19 and Covid-19 vaccinations were more willing to get the covid-19 vaccine compared to pupils who appeared to not know much about the disease and the vaccine. The implications of these findings are discussed in previous study results by Efendi. (2022) and a similar conclusion was reached by Wong. (2022) suggesting that adolescents with higher levels of knowledge about the disease and the Covid-19 vaccine, affected their intentions to get vaccinated compared to those who were

hesitant. These findings go beyond previous reports, showing that safety and efficacy of Covid-19 vaccines and the availability of information were the most commonly quoted variables that may increase adolescents' intendment to be vaccinated this is in line with similar studies done in the United States (Romer, 2022).

Some of the pupils that showed hesitancy to get the Covid-19 vaccine could be attributed to the reason that the virus is a novel disease and are concerned with the safety and effectiveness of the vaccine this result ties well with previous studies by Musonda. (2022) wherein some the students did not know much about the vaccine and showed concerns with the vaccine's safety and effectiveness. Dardas. (2022) further stated in his study that most of the adolescents had reported that television and social media were the main source of information and only a few reported receiving such information from their schools, however when comparing our results to those of previous studies, we must point out that the pupils did not only had the covid-19 vaccination information from the stated sources of information but many variables influenced their knowledge of the vaccine ranging from their respective schools, peers, guardians, social media, television and their respective communities. It was interesting that one of the participants considered the vaccine to cause infertility, thus we speculated that this could be due to misinformation form either fellow peers or circulations on social media, but further research will be needed to confirm this.

The present study also confirmed that, adolescents are uniquely susceptible to influence. The study showed that some participants were hesitant to get the vaccine due to parents' prohibition and of the lack of autonomy that they have in making their own decisions to get Covid-19 vaccine. This is in line with a study done by Olusanya. (2021) which stated that parents' hesitancy and refusal had caused a significant number of unvaccinated adolescents. However, we acknowledge that there are considerable discussions among authors (Olusanya, 2021; Hopfer, 2022; Morgan, 2021) as to parental prohibition and granting autonomous decision-making to adolescents, nevertheless, it is essential to address this concern as this would lead to a delay in the nations efforts to mitigate and contain the spread of the Covid-19 disease thus addressing parental hesitancy could be impactful. The study also found that vaccine hesitancy was related to the adolescents' parents and guardians' perception of ineffective vaccines and safety concerns. This is comparable to findings in Italy where a study showed that vaccine hesitancy could be linked to concerns about secondary effects and adverse events associated with vaccines (Zona, 2021). However, despite some of the

participants having a positive attitude towards the effectiveness of the covid-19 vaccination, some of the participants' guardians and parents had a negative attitude, we suggest that this could be attributed to the belief that the vaccine was not safe for the adolescents and conspiracy theories. Other variables that were not considered in our study include guardians' income (Kricorian, 2021), education level (Deng, 2023) and culture (Osur, 2022).

The study also identified that some of participants showed a high level of negative attitude towards getting the Covid-19 vaccine, this can be attributed to the misinformation acquired on social and mass media platforms, this negative attitude was also found in studies conducted among young adults in Serbia, by Bluth. (2021) which stated that the negative attitude could be attributed to the information about the vaccination in the media, which is similar to our study as some of the participants attributed their hesitancy of get the Covid-19 vaccine to misinformation. However, social and mass media can positively be used to increase awareness regarding Covid-19 vaccines which can aid to positively change adolescents' attitude towards the vaccines including adopting a motivational approach when educating and disseminating information about the Covid-19 vaccine thus most likely increase the vaccine uptake and confidence in the effectiveness and safety of the vaccine.

The study also revealed that the negative attitude can also be attributed to the perception that the pupils considered themselves at lower risk of contracting the disease, only a few believed that the Covid-19 was a deadly disease and a number of participants perceived practicing the set Covid-19 golden rules such as observing personal hygiene and wearing masks the more effective in protecting themselves against the covid-19, and other participants suggested that it was a disease for the affluent and most at risk populations such as the elderly. These findings are broadly in line with a study done in China which state that vaccine hesitancy was associated to perceived lower risk perception (Reheti, 2022).

In terms of practices towards Covid-19, it was unfortunately observed during the study, that an impressive number of participants did not practice the covid-19 preventative measures, with only a few who fully adhered to the set guidelines. A good number of the participants were observed that they only wore facemasks and washed hands only when instructed by their teachers. Additionally, the low level of practicing the set golden rules such as frequent washing of hands, masking up, avoiding touching the face and physical distancing puts them more at risk as the

disease can be easily spread amongst themselves and their guardians via droplets. A similar conclusion was reached in a study that was conducted in the United States which showed that there was negligence among young adults towards practicing the Covid-19 golden rules (Edersheim, 2022). It is important to highlight that the low levels of practicing the Covid- 19 golden rules can be attributed to the adolescents having exploratory instincts and corresponding risky behavior. However, self-control among children is not absent thus the need to educated them on the importance acquiring the Covid-19 vaccine.

Limitations of the study was that firstly, it was conducted in Livingstone, which may not accurately represent the wider population of adolescents in Zambia. secondly the study had limited sample size which may affect the generalization of findings. Thirdly, the study only focused on the adolescents of 12 years and above in primary schools which may not reflect the knowledge, attitudes and practices of the older children in secondary and tertiary schools, and lastly, the study maybe prone to self-reporting biases as the study may rely on participants' self-reporting their knowledge, attitude, and practices on covid-19 vaccine. This can be subject to bias such as social desirability bias, where participants may give responses, they think are more socially acceptable rather than the truth. Nonetheless, despite this we believe that the findings are solid, and offer additional national research.

6.0 CONCLUSION

In conclusion, the study explored the knowledge, attitudes, and practices on Covid-19 vaccines among adolescents in primary schools. As more vaccines are distributed to combat Covid-19 disease, it is important to understand knowledge, attitudes and practices regarding Covid-19 vaccinations among adolescents in primary schools. Attitudes among adolescents towards the Covid-19 vaccinations vary. It is also important to promote a positive attitude towards the vaccination so that vaccination of pupils in in primary schools becomes a social norm. Additionally, understanding the knowledge, attitudes and practices of adolescents in schools regarding the vaccines is critical to the success of immunization campaigns against Covid-19. It is important to prioritize adolescent vaccination and ensure that young people are to, protected from Covid-19 by addressing their specific concerns, countering misinformation and emphasizing on safety and effectiveness.

7.0 RECOMMENDATIONS

1. Encourage Open Dialogue - Creating a safe and non-judgmental environment for adolescents to openly discuss their concerns and fears about the vaccine. Listening to their opinions and validating their emotions.

2. Focus on Personal Benefits - Highlight the personal benefits of vaccination, such as reduced risk of severe illness or hospitalization, rather than just the public health benefits.

3. Address Safety Concerns - Address concerns about the safety of the vaccine by providing scientific evidence, explaining the rigorous testing and approval process, and sharing any reported adverse events.

4. Provide Accessible Information - Provide accessible and easy-to-understand information about the vaccine through social media, school and other appropriate channels to reach adolescents.

5. Encourage Peer Support - Encourage peer support through group discussions, and school clubs to help adolescents feel more comfortable and confident in their decision to get vaccinated.

6. Consider Family Involvement - Involve parents and family members in the decision-making process and ensure they have access to accurate information about the vaccine. This can help increase trust and support for vaccination among adolescents

Funding statement

This research received no external funding

Informed Consent statement

After the pupils carried the questionnaire home for approval by their guardians and parents, the participants were given full disclosure of the study's goals and informed permission was sorted.

Conflict of interest

The author declares no conflict of interest.

References

Abebe, H., Gebretsadik, A., Azage, M., & Gebremedin, A. (2021). Understanding of COVID-19 Vaccine Knowledge, Attitude, Acceptance and Determinants of COVID-19 Vaccine Acceptance Among Adult Population. Ethiopia. Infection and drug resistance, 14, 2015-2025. https://doi.org/10.2147/IDR.S312116.

Alemayehu, A. (2022). Covid-19 Vaccine Acceptance and Determinant Factors among General Public in East Africa: A Systematic Review and Meta-Analysis. Health services research and managerial epidemiology, *9*, 23333928221106269. https://doi.org/10.1177/23333928221106269.

Bluth, M. (2021). *Students' views on Vaccination against Covid-19 virus and trust in Media information about vaccine.* [online website]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8704984/. [Accessed on 4th April, 2023].

British Broadcasting Network. (2021). *Covid-19 vaccinations: African nations miss WHO targets* [online]. Available from: https://www.bbc.com. [Accessed on 23rd September, 2022].

Bronfenbrenner, U. (2006). The Ecology of Human Development: Experiments by nature and design. Cambridge: Harvard University Press.

Centers for Disease Control and Prevention. (2021). *Basics of covid-19.* [Online]. Available from: https://www.cdc.gov. [Accessed on 20th August, 2022].

Centers for Disease Control and Prevention. (2021). *Vaccines and Immunization* [online]. Available from: https://www.cdc.gov. [Accessed on 24th September, 2022].

Centers for Disease Control and Prevention. (2021). *Taking on covid-19 in Zambia* [Online]. Available from: https://www.cdc.gov. [Accessed on 5th September, 2022].

Centers for Disease Control and Prevention. (2022). *Covid-19 symptoms.* [Online]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html. [Accessed on 7th September, 2022].

Centers for Disease Control and Prevention. (2022). *How covid-19 spreads.* [Online website] Available from: https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html. [Accessed on 7th September, 2022].

Cucinotta, D. Vanelli, M. (2020). *WHO declares covid-19 a Pandemic.* [Online website]. Available from: https://www.pubmed.ncbi.nlm.nih.gov. [Accessed on 20th August, 2022].

Dardas, L. A. (2020). *Developing an understanding of adolescents' knowledge, attitudes and practices towards Covid-19.* [Online]. Available from: https://www.journals.sagepub.com. [Accessed on 30th March, 2023].

Deng, J. S. et al. (2023). *Parental hesitancy against Covid-19 vaccination for children and associated factors in Taiwan.* [Online]. Available from: https://www.bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15158-0. [Accessed on 5th May, 2023].

Edersheim, J. D. (2020). *Why young adults are so bad at social distancing.* [online]. Available from: https://www.usatoday.com. [Accessed on 7th April, 2023].

Efendi, D., Astuti, E. P., Fitri, A. Y., & Wulandari, L. P. (2022). *The role of knowledge, attitude, confidence, and sociodemographic factors in Covid-19 vaccination adherence among adolescents in Indonesia.* [online]. Available from: https://www.mdpi.com. [accessed on 4th April, 2023].

Hopfer, S. (2022). *Adolescent Covid-19 vaccine decision making among parents in south California.* [Online]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/pmc8998887/. [Accessed on 25th April, 2023].

Kricorian, K. (2021). *Covid-19 vaccine hesitancy: misinformation and vaccine perceptions of vaccine safety.* [Online]. Available from: https://www.tandfonline.com. [Accessed on 11th May, 2023].

Mennechet, F. (2020). Coping with COVID-19 in Sub-Saharan Africa: What Might the Future Hold. *Virologica Sinica*, *35*(6), 875–884.

Ministry of Health. (2022). *statement of covid-19 in zambia.* [Online website]. Available from: https://www.moh.gov.zm. [Accessed on 28th August, 2022].

Morgan, L. (2021). *Covid-19 Vaccination of Minors without Parental Consent.* [online website]. Available from: https://www.jamanetwork.com/journals/jamapediatrics/fullarticle/2782024. [accessed on 28th April, 2023].

Olufunke, A. (2022). Culturally relevant covid-19 vaccine acceptance strategies in sub-Saharan Africa. *the lancet global health,* 10(8), pp. 1090-1091.

Olusanya, O., Oladokun, R. E., & Adedokun, S. T. (2021). *Addressing parental vaccine hesitancy and other barriers to childhood/adolescent Vaccination uptake during the covid-19 pandemic.* [online]. Available from: https://www.frontiersin.org/articles/10.3389/fimmu./2021.663074/full. [Accessed on 8th April, 2023].

Osur, J. O., Chengo, R., Mulinga, E. et al. (2022). *Determinants of Covid-19 vaccine behavior intentions among the youth in Kenya: A cross-sectional study.* [Online]. Available from: https://www. archpublichealth. biomedcentral.com. [Accessed on 13th may, 2023].

Razai, M. S., Doerholt, K., Ladhani, S. N., Oakeshot, P., & Harwood, R. (2021). Covid-19 vaccination hessitancy. BMJ*,* 373:8292, p.1138.

Reheti, P. (2022). *Covid-19 vaccine hesitancy among adolescents: cross-sectional school survey in four Chinese cities prior to vaccine availability.* [Online]. Available from: https://www.mdpi.com. [Accessed on 20th April, 2022].

Robinson, E., Jones, A., Lesser, I., & Daly, M. (2021). international estimates of intended uptake and refusal of covid-29 vaccine. *vaccine,* 29(15) pp. 2024-2034.

Roma, D., Gao, R., & Singh, P. (2022). *Misinformation about vaccine safety and uptake of Covid-19 vaccines among adults and 5-11- years-old in the United States.* [online]. Available from: https://www.sciencedirect.com. [Accessed on 13th April, 2023].

Sallam, M. (2021). Covid-19 vaccine hesitancy worldwide: a concise systematic review of vaccine acceptance rates. Vaccines, 9(2), 160. https://doi.org/10.3390/vaccines9020160

Scherer, A. M., Gedlinske, A. M., & Parker, M. M. (2021). Acceptability of Adolescent Covid-19 Vaccination Among Adolescents and Patents of Adolescents. *Mortal weekly,* 70 pp.997-1003.

Shereen, M., Khan, S., Kazmi, A., Bashir, N., & Siddique, R. (2020). COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. *Journal of advanced research*, Volume 24, pp. 91-98.

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). *Saturation in qualitative research: exploring its conceptualization and operationalization*. Qual Quant, 52(4), 1893–1907. Published online September 14, 2017. doi:10.1007/s11135-017-0574-8. PMID: 29937585. PMCID: PMC5993836.

United Nations. (2021). *Covid-19 Vaccines administered in Africa* [online]. available from: https://news.un.org/ [Accessed on 23rd September, 2022].

Wake, A. D. (2021). The Acceptance Rate Towards COVID-19 Vaccine in Africa: A Systematic Review and Meta-analysis. *Global pediatric health*, 8, 2333794-211048738. https://doi. Org/10.1177/2333794x211048738

Wong, W. H. S., Chan, R. S. M., Cheung, A. W. L., & Wong, C. K. H. (2022). *Adolescents' attitudes to the Covid-19 vaccine.* [online]. Available from: https://www.sciencedirect.com. [Accessed on 15th April, 2023].

World Health Organization. (2022). *WHO Covid-19* [online]. Availaible from: https://covid19.who.int/. [Accessed on 5th September, 2022].

World Health Organization. (2022). *Covid-19 vaccine* [online]. Available from: https://www.who.int. [Accessed on 25th September, 2022].

World Health Organization. (2022). *Interim statement on covid-19 vaccination for children* [online]. Available from: www.who.int/. [accessed on 24th September 2022].

World Health Organization. (2020). *World Health Organization Covid-19 Dashboard.* [Online]. Available from: https//covid-19.who.int/. [Accessed on 5th September, 2022].

World Vision. (2020). *Covid-19 and its impacts on children's education in Zambia* [online]. Available from: https://www.wvi.org/. [Accessed on 25th September, 2022].

Zambia Statistics Agency & Ministry of Health Zambia. (2018*). Zambia Demographic Health Survey*. Lusaka: Zambia.

Zona, S., Ruggiero, F., Coppola, N., & Borrelli, A. (2021). *Anti-Covid-19 Vaccination for adolescents.* [online]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8618373/. [Accessed on 3rd April, 2023].

APPENDICES

APPENDIX A: STUDY TIMELINE

Activity	Responsibility	October-November	December-January	January-March	April - June
Finalize research Proposal and Submit to the School	Researcher				
Ethical clearance From UNILUS-REC					
Preparation of study tools, travel to data collection cite	Researcher				
Data collection and Management	Researcher and Research assistants				
Data entry, data Cleaning and Data analysis	Researcher and Research assistants				

Draft report writing	Researcher				
Submission of first draft report and finalization					

APPENDIX B: BUDGET

BUDGET CATEGORY	COST
Personnel • Data collection assistants • Secretarial services	K900
Travel cost • Livingstone • Data collection cites	K900
Supplies and stationery • Questionnaire photocopying • Printing • Audio recording tools • Pens and pencils	K550
Contingency funds	K1500

Total cost	K3850

NATIONAL HEALTH RESEARCH AUTHORITY

Lot No. 18961/M, off Kasama Road, Chalala, P.O. Box 30075, LUSAKA

Tell: +260211 250309 | Email: znhrasec@nhra.org.zm | www.nhra.org.zm

Ref No: NHRA000049/24/01/2023 **Date:24th January 2023**

The Principal Investigator,
Bertha Diana Nyirenda ,
UNILUS,
Lusaka, Zambia.

Dear Ms Nyirenda,

Re: Request for Authority to Conduct Research

The National Health Research Authority is in receipt of your request for ethical clearance and authority to conduct research titled **"Knowledge Attitude And Practices On Covid-19 Among Adolescents Of Selected Primary Schools In Livingstone, Zambia ."**

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA bi-annually from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours sincerely,
Acting Director/Chief Executive Officer

Ms Sandra Chilengi-Sakala,
National Health Research Authority

SCHOOL OF MEDICINE AND HEALTH SCIENCES LEOPARDS HILL CAMPUS
Plot No. 37413, Off Alick Nkhata Mass Media. P. O Box 36711, Lusaka.
Phone: +260211258505, 258409 Fax +260211233409; Cell +260976075850,961917862,
E-mail:unilus@zamnet.zm,ictar@zamnet.zm

SCHOOL OF MEDICINE AND HEALTH SCIENCES RESEARCH ETHICS COMMITTEE

Ref no: IORG0010092-2023/016

Date: 15th DECEMBER, 2022

BERTHA DIANA NYIRENDA - BSPH19217395

Re: RESEARCH TITLE: KNOWLEDGE ATTITUDE AND PRACTICES ON COVID-19 VACCINE AMONG ADOLESCENTS OF SELECTED PRIMARY SCHOOLS IN LIVINGSTONE, ZAMBIA

The above research was submitted to the research ethics committee for review. The study has no major ethical problems and is approved subject to the following:

1. The study cannot be changed without express permission of the UNILUS Research ethics committee
2. Approval from the Lusaka District health Management or equivalent health authorities should be sought.
3. The study tools should be added.
4. An informed consent form should be attached and filled by all study participants (If dealing with primary data)
5. The risks and benefits should be included in the consent form.
6. Ensure before commencement that approval is sought from ZNHRA

Congratulations and the committee wishes you success in your work.

Prof Kasonde Bowa
MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)
Chairman- UNILUS REC
Professor of Urology and Consultant Urologist
Executive Dean
University of Lusaka and University Teaching Hospital School of Medicine and Health Sciences.

SCHOOL OF MEDICINE AND HEALTH SCIENCES LEOPARDS HILL CAMPUS

Plot No. 37413, Off Alick Nkhata Mass Media. P. O Box 36711, Lusaka.
Phone: +260211258505, 258409 Fax +260211233409; Cell +260976075850,961917862,
E-mail:unilus@zamnet.zm,ictar@zamnet.zm

Date: 15th DECEMBER, 2022

……

……..

……..

PERMISSION FOR **BERTHA DIANA NYIRENDA - BSPH19217395** TO CONDUCT A RESEARCH STUDY AT YOUR FACILITY/ INSTITUTION/ORGANIZATION

Reference is made to the above subject matter

The University of Lusaka, School of Medicine and Health Sciences here by requests for permission for **BERTHA DIANA NYIRENDA** Public Health Student to conduct research at your facility/ institution/ organization, entitled; **KNOWLEDGE ATTITUDE AND PRACTICES ON COVID-19 VACCINE AMONG ADOLESCENTS OF SELECTED PRIMARY SCHOOLS IN LIVINGSTONE, ZAMBIA.** The research is in partial fulfillment of the requirements for the degree of Bachelor of Science Public Health. This is purely for academic purposes and information gained in such a way will not be used in the public domain without prior authorization from the institutions/ organizations involved.

The research topic has been cleared by the University of Lusaka, School of Medicine and Health Sciences Research Ethics Committee as per the attached copy. Data collection is expected to be done from **1st January, 2023 to 31st March, 2023**.

The University of Lusaka avails itself of this opportunity to review to your office the assurances of its highest considerations and looks forward to your timely and favorable response.

Prof Kasonde Bowa
MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)
Chairman- UNILUS REC
Professor of Urology and Consultant Urologist
Executive Dean University of Lusaka and University Teaching Hospital School of Medicine and Health Sciences.

SCHOOL OF MEDICINE AND HEALTH SCIENCES LEOPARDS HILL CAMPUS

Plot No. 37413, Off Alick Nkhata Mass Media. P. O Box 36711. Lusaka.
Phone: +260211258505, 258409 Fax. +260211233409; Cell +260976075850,961917862.
E-mail:unilus@zamnet.zm,iclar@zamnet.zm

Date: 15th DECEMBER, 2022

.....

.....

.....

PERMISSION FOR **BERTHA DIANA NYIRENDA - BSPH19217395** TO CONDUCT A RESEARCH STUDY AT YOUR FACILITY/ INSTITUTION/ORGANIZATION

Reference is made to the above subject matter

The University of Lusaka, School of Medicine and Health Sciences here by requests for permission for **BERTHA DIANA NYIRENDA** Public Health Student to conduct research at your facility/ institution/ organization, entitled; **KNOWLEDGE ATTITUDE AND PRACTICES ON COVID-19 VACCINE AMONG ADOLESCENTS OF SELECTED PRIMARY SCHOOLS IN LIVINGSTONE, ZAMBIA.** The research is in partial fulfillment of the requirements for the degree of Bachelor of Science Public Health. This is purely for academic purposes and information gained in such a way will not be used in the public domain without prior authorization from the institutions/ organizations involved.

The research topic has been cleared by the University of Lusaka, School of Medicine and Health Sciences Research Ethics Committee as per the attached copy. Data collection is expected to be done from 1st **January, 2023 to 31st March, 2023.**

The University of Lusaka avails itself of this opportunity to review to your office the assurances of its highest considerations and looks forward to your timely and favorable response.

Prof Kasonde Bowa
MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)
Chairman- UNILUS REC
Professor of Urology and Consultant Urologist
Executive Dean University of Lusaka and University Teaching Hospital School of Medicine and Health Sciences.

31.05.2023
Recommended
PDO/DHO FYA

FYA - HRMD
Ag. DHD