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**SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA**



**ROLLOUT OF COVID-19 VACCINE:
PERCEPTION AND ACCEPTABILITY
OF VACCINE SAFETY AMONG HEALTH WORKERS AND
COMMUNITY MEMBERS IN HO MUNICIPALITY,
VOLTA REGION OF GHANA**

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**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF
GHANA, LEGON IN PARTIAL FULFILMENT FOR THE AWARD OF
MASTERS OF PUBLIC HEALTH (MPH) DEGREE**

MARCH, 2022

DECLARATION

I hereby declare that the work herein presented is my own original work, with the exception of works by others that have been duly acknowledged, and that this dissertation has never been presented in whole or in part for a degree at this or any other university, to the best of my knowledge.

Mr. Saviour Edem Vidzro

Date

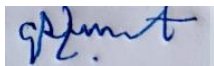


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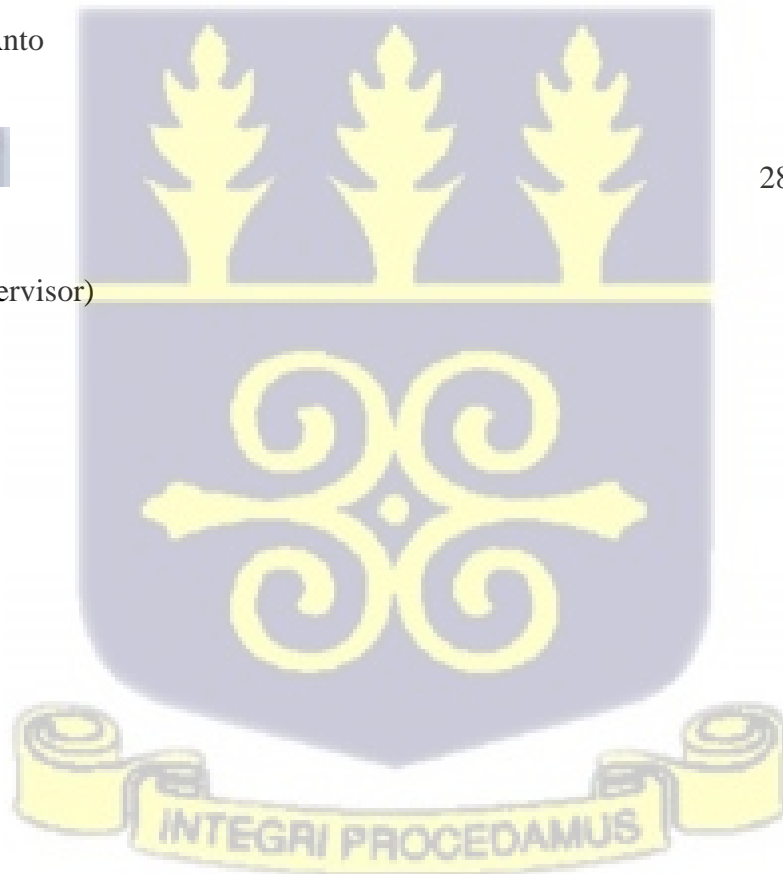
Prof. Francis Anto

Date



28/03/2022

(Academic Supervisor)



DEDICATION

I dedicate this work to the almighty God for his grace and mercies and how far he has brought me. In this one-year period of my studies



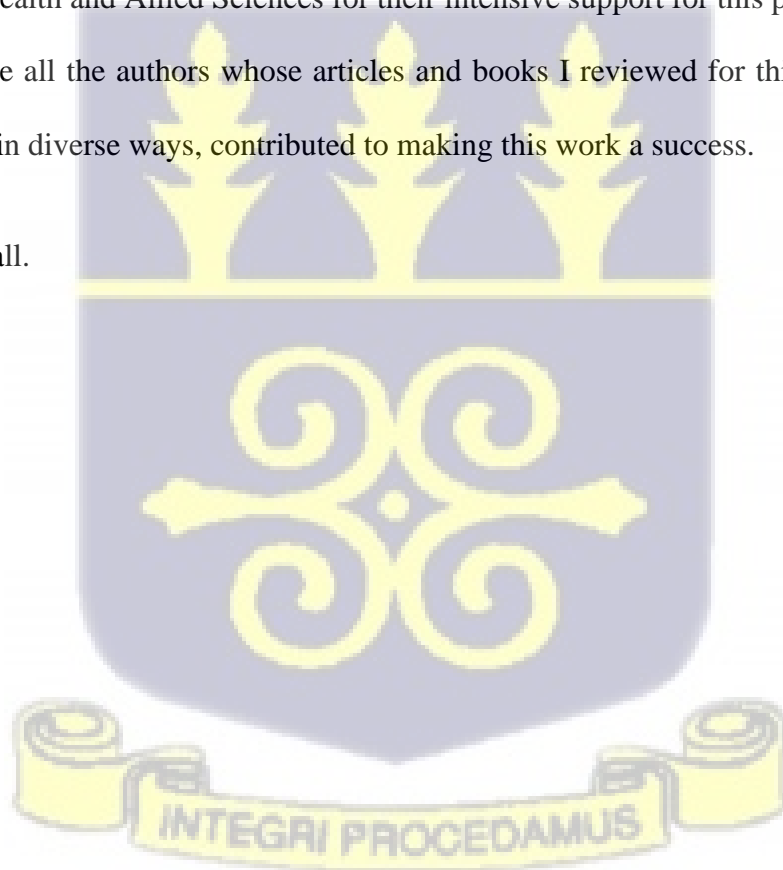
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This thesis would not have seen the light of day without the help of a number of people. First of all, I would like to thank the Almighty God for giving me the strength and ability to finish this research work. I would again say a big thank you to my supervisor, Prof. Francis Anto, of the University of Ghana School of Public Health Epidemiology department, for guiding and directing me each and every time the need is aroused.

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God bless you all.



ABSTRACT

Introduction: In March 2020, the Coronavirus Disease 2019 (COVID-19) was declared a pandemic. Several COVID-19 prophylactic vaccinations have been developed and deployed, but little is known about people's perceptions of safety, efficacy, and acceptance of the COVID-19 vaccines or the factors that influence their acceptance. Assessing community and health worker acceptance of the COVID-19 vaccine would aid researchers and policymakers in developing appropriate strategies to enhance vaccine uptake among health workers and the general population.

Objective: To determine the perceptions and factors associated with acceptability of Covid-19 vaccine among health workers and community members in Ho Municipality.

Methods: A mixed-methods (quantitative and qualitative) approach was used in a cross-sectional analytic study design. The research was conducted in Ho municipality among health staff and community members. Twelve (12) in-depth interviews (IDIs) with health workers were conducted to learn about their perceptions of the COVID-19 vaccine and the factors that influence its acceptability, while a questionnaire was used to collect data from 403 adult community members aged 18 and above in the Ho municipality on their perceptions and acceptability of the vaccine. For quantitative analysis, STATA analytical software version 16 was employed, while for qualitative analysis, Nvivo was used. Bivariate analyses were carried out using logistic regression on factors that were statistically significant with the willingness of respondents to accept COVID-19 vaccines.

Results: If a COVID-19 vaccine were made accessible in the municipality, five out of ten people were ready to accept it. Significant factors associated with COVID-19 vaccine acceptability include sex ($\chi^2=9.643$; $p=0.002$), age ($\chi^2=10.956$; $p=0.012$), and educational level ($\chi^2=47.331$; $p=0.001$) for health workers, most of them had already received the vaccine but were in doubt about its safety and efficacy.

Conclusion: Addressing sociodemographic variables of COVID-19 vaccination uptake may aid in achieving herd immunity by increasing vaccination uptake. To enhance the uptake of the COVID-19 vaccine in the municipality, targeted health education activities are required.



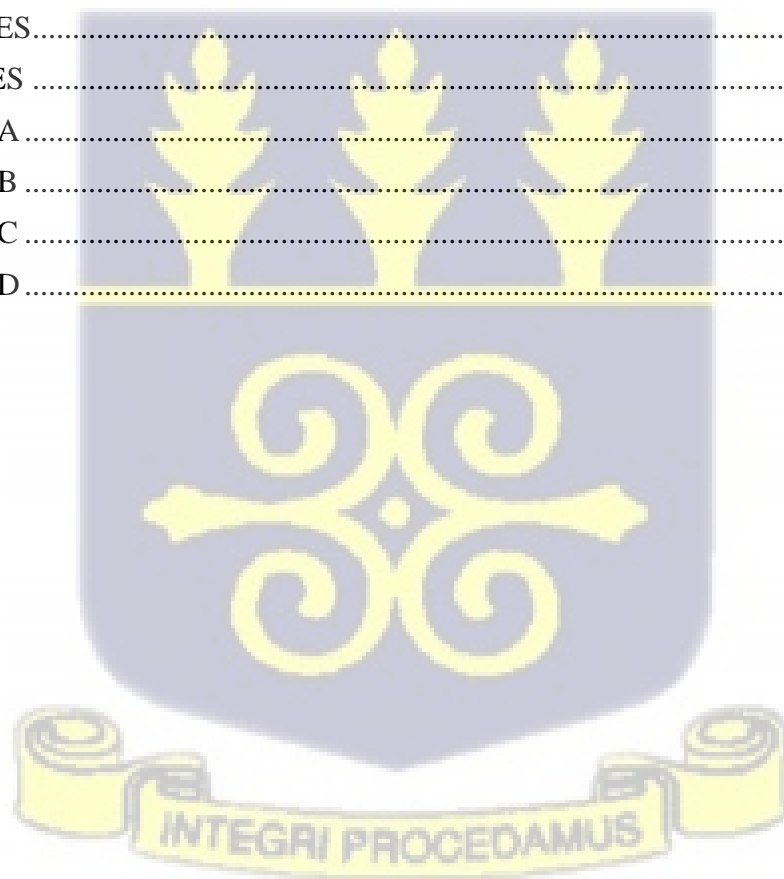
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LIST OF ABBREVIATIONS

COVID-19	-	Coronavirus disease 2019
IDIs	-	In-depth interviews
GHS	-	Ghana Health Service
GHS-ERC	-	Ghana Health Service – Ethical Review Board
PI	-	Principal Investigator
US	-	United States
RA	-	Research Assistant
WHO	-	World Health Organization



1.0 INTRODUCTION

1.1 Background

On March 11, 2020, the World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19) to be a pandemic (WHO 2019). Acute respiratory syndrome coronavirus-2 (SARS-CoV-2) causes COVID-19, with patients ranging from asymptomatic to severe respiratory distress and pneumonia (Zhou 2019). COVID-19 had caused 20 million illnesses and 700,000 fatalities worldwide by August 2020. COVID-19 has caused the greatest number of cases and deaths in the United States (US), with over 35 million cases and 625,363 deaths so far, with South Africa having the highest number of cases in Africa. Protective measures are critical in managing pandemics (Bish, 2010), but vaccination could be a critical safeguard in the fight against COVID-19. These vaccination programs can result in herd immunity without infecting a large proportion of the population. However, to get this level of immunity, a large enough fraction of the population must be vaccinated. Several COVID-19 preventive vaccinations are now being developed in a number of countries. However, several vaccines have been developed and implemented in a number of nations.

It is critical to investigate people's acceptance of the vaccination during the development phase. During the 2009 influenza A (H1N1) pandemic, vaccination acceptance was predicted to be between 50 and 64 percent of individuals in the United States who intended to acquire the 2009 H1N1 influenza vaccine (Gidengil, 2012; Maurer, 2009). It would be useful to know what is going on in Africa, particularly Ghana, in terms of the level of acceptance of this new vaccination. However, nothing is known regarding people's willingness to adopt the COVID-19 vaccine and

their perceptions of its acceptability. The COVID-19 vaccine's level of acceptance is particularly beneficial for making educated judgments and identifying tactics for improving acceptability.

According to studies from other nations, many factors influence the adoption of the COVID-19 vaccination. Perceptions of the disease, vaccine safety and efficacy, general vaccination attitudes, past vaccination history, doctors' recommendations, vaccination fees, and sociodemographic traits are among these factors (Lazarus 2020, Wang 2020). Some

Research has looked into the COVID-19 vaccine's acceptance rates and factors that influence them. In research conducted among Chinese healthcare personnel, the vaccination was found to have a high level (**86.2%**) of acceptance when compared to the general public of **76% acceptance (Biyun Xu et al., 2021)**. Echoru et al. (2020) did another study among Western Ugandans and found just average approval of 53.6% among the general population.

The perception and acceptability of the COVID-19 vaccine among health workers who will administer the vaccination and community members who will receive it at large are critical in this regard. The purpose of this study is to learn more about how health workers and community members in Ho feel about the COVID-19 vaccine.

1.2 Problem Statement

The COVID-19 pandemic has quickly impacted the lives of millions of people around the world (Rogers et al., 2020). The WHO has produced a guideline titled "Strategic Preparedness and Response Plan for COVID-19," which is an important aspect of the COVID-19 response strategy (WHO, 2019). COVID-19 transmission can be reduced or prevented in many countries, including Ghana, with timely and significant initiatives (Desalegn et al., 2021). Limiting human-to-human transmission, identifying and managing cases quickly, answering critical issues about clinical severity, improving public and health worker understanding, and speeding up the development of diagnostics, treatments, and potential vaccinations are all part of these initiatives.

The current COVID pandemic's multi-faceted devastating repercussions have fueled interest in discovering an effective and widespread prophylactic approach to stem the spread (Lin et al., 2020). A multinational effort has been underway for months to create a safe and effective COVID-19 vaccine. There are approximately 274 vaccine candidates in various stages of development in the research pipeline globally, with approximately 59 having entered clinical trials (Sanger et al., 2020). The public's reluctance to get vaccinated against specific diseases, particularly the current COVID-19 vaccine, has been noted as a major risk that may jeopardize vaccination programs' success. Vaccine apprehension has been identified as a serious public health issue impeding disease elimination and eradication efforts (Yang et al., 2019). Vaccine scandals and allegations concerning catastrophic side effects of vaccination have increased vaccination hesitation and skepticism in the country's immunization program over the previous decade (Yang et al., 2019). Given the sensitivity and international concern surrounding the COVID-19 pandemic, it is vital to guarantee that the highly effective COVID-19 vaccine is efficiently distributed and universally accepted by the general public in order to achieve greater coverage.

Distrust in Ghana's COVID-19-prevention methods, it appears, will not only raise vaccination reluctance, but will also diminish existing efforts to limit transmission. The COVID-19 vaccine is accessible for public usage, despite the availability of COVID-19 vaccines, the Volta region has vaccinated only 55,253 people representing 4.5% of a target of one million people. Over 12,780 doses of the vaccines have expired while the larger proportion of the target population is unvaccinated (VRHD-GHS, 2022). In a study conducted in Ghana, the Volta region was found to be the region with the lowest interest in COVID-19 vaccine uptake (32.50%) out of the 16 regions with North East (65.10%), having the highest vaccine uptake (Acheampong et al., 2021).

The low uptake of the COVID-19 vaccine can increase morbidity and mortality in the region, leading to a burden on the country's limited resources. To better understand and inform public health authorities on the ways to improve the uptake this study therefore seeks to explore health

workers' and the general public's perceptions of the COVID-19 vaccine and also identify factors associated with vaccine acceptability.

1.3 Justification

By regulating and preventing infectious diseases, vaccines have been an important tool for improving health outcomes and life expectancy Charlene and Plotkin (2020). Given the increasing morbidity and mortality linked to COVID-19, developing a safe and effective COVID-19 vaccine is a key first step in containing the pandemic. However, misinformation and conspiracy theories about COVID-19 vaccinations can have a significant impact on vaccine uptake once they are accessible. "Individuals accepting to receive vaccines notwithstanding the availability of immunization services" is how vaccine acceptance is defined. Currently, little is known about the acceptability of COVID-19 vaccine and the factors that determine its acceptability, despite the fact that such information is critical in developing methods to boost vaccine acceptability before a vaccine is available. As a result, the current study aims to better understand and advise public health authorities. We will also analyse factors that influence the adoption of COVID-19 vaccine among the general adult population and health workers in Ho Municipality.

1.4 Study Objectives

1.4.1 General Objective

To determine the Perceptions and factors associated with Acceptability of Covid-19 vaccine among Health workers and Community members in Ho Municipality.

1.4.2 Research Questions

1. What are the perceptions of covid-19 vaccine safety among Health workers and Community members in Ho Municipality?
2. What are the perceptions of covid-19 vaccine effectiveness among Health workers and Community members in Ho Municipality??

3. Are health workers and community members willing to receive the covid-19 vaccine?
4. What are the factors associated with covid-19 vaccine acceptability among Health workers and Community members in Ho Municipality?

1.5 Specific Objectives

1. To assess the perceptions of covid19 vaccine safety among health workers and community members
2. To assess the perceptions of covid-19 vaccine effectiveness among health workers and community members.
3. To determine the level of willingness to accept covid-19 vaccine among health workers and community members.
4. To determine factors associated with covid-19 vaccine acceptability among health workers and community members.



1.6 Conceptual Framework

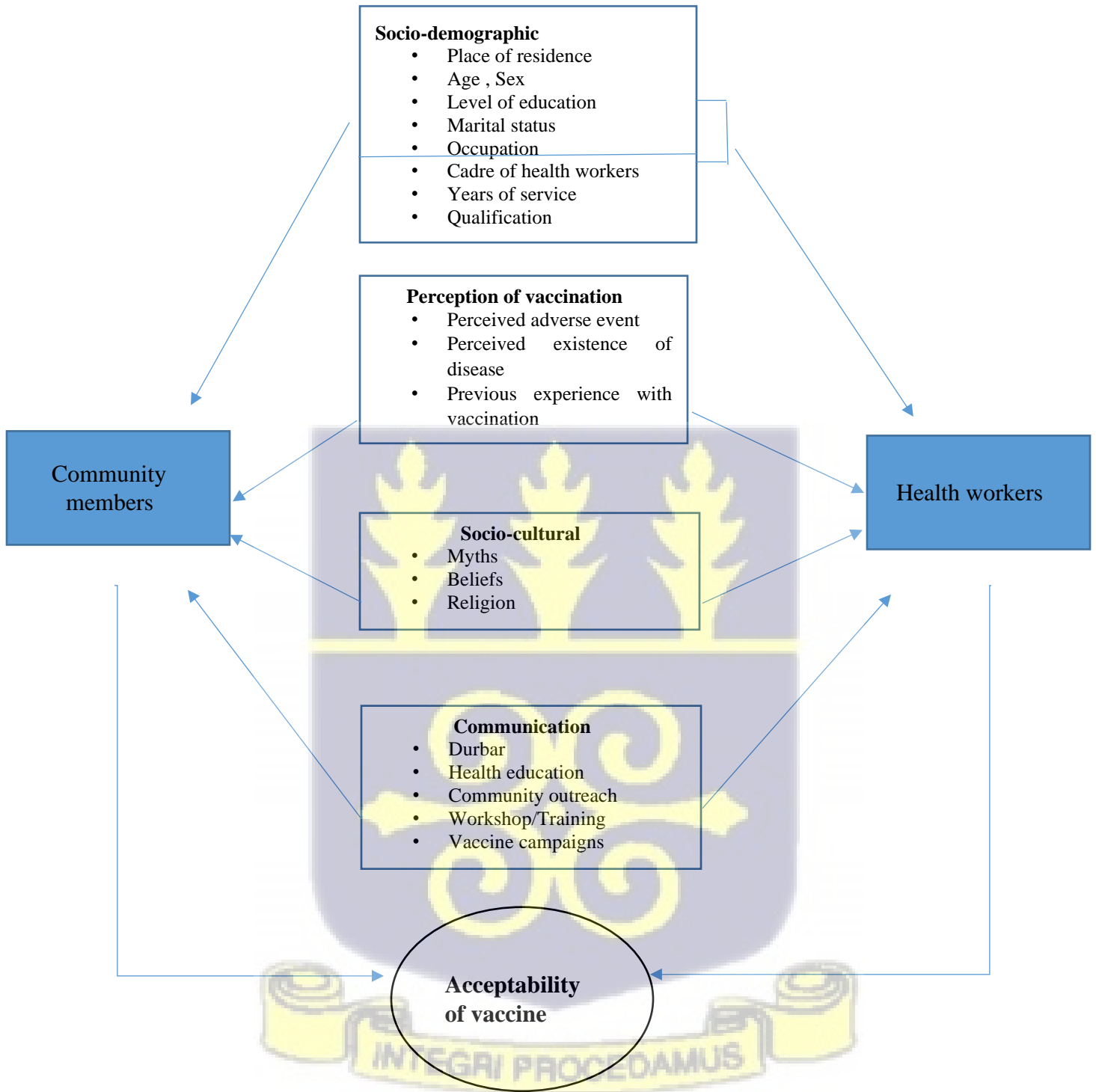


Figure 1: Conceptual framework

1.7 Narrative on the Conceptual Framework

The framework describes factors that independently influence vaccine safety. Four broad factors (socio-cultural, socio-demographic, communication about vaccination, and perception of vaccine) were identified as contributing to the outcome variable (acceptability of the Covid-19 vaccine).

The framework illustrates associations between these four factors of vaccine safety among health workers and community members. Socio-demographic factors that influence perceptions and acceptability are age, sex, marital status, educational level, occupation, place of residence, cadre of health workers, years of service, and qualification. It was observed that there was high vaccine acceptance among those aged 18–20 years, males, elites at tertiary level of education (degree or diploma), students, Muslims, married and rural dwellers having better odds and likeliness to accept vaccination. (Echoru et al., 2021). Perception of vaccination, perceived adverse events, the perceived existence of disease, and previous experience with vaccination influence an individual's acceptability of vaccine. This was observed in a study conducted by Mahmud et al., 2021 that having previous vaccination experience, perceived severity of infection and safety of the vaccine contributed to vaccine acceptance. Socio-cultural factors in the framework comprise myths and beliefs about vaccinations and the views of neighbors on vaccines; these factors contributed to covid-19 vaccine acceptance in a study conducted. Finally, communication about the COVID-19 vaccination will empower people to make evidence-informed choices about this vaccination and influence their perception of vaccination.



2.0 LITERATURE REVIEW

2.1 Introduction

Vaccination is a straightforward, safe, and efficient technique to protect people from disease before they become ill. The vaccine strengthens the immune system by utilizing the body's natural defenses to build resistance to specific illnesses (World Health Organization, 2021). The immune system reacts and recognizes the invading germ, such as a virus or bacteria, when one is vaccinated. Antibodies are proteins that the immune system produces spontaneously to fight disease. It detects and combats the sickness. If you are exposed to the germ again in the future, your immune system will promptly destroy it, preventing you from becoming ill. Our immune systems are programmed to recall information. We are usually protected against a disease for years, if not decades, after receiving one or more doses of a vaccination. Vaccines are extremely effective because of this. Rather of treating an illness after it has developed, vaccines protect us from being ill in the first place. The majority of vaccines are administered via injection, however others are administered orally or via nasal spray.

Despite the benefits of immunization, vaccination compliance has always been low. Uptake is a further barrier to successful vaccination, notably with the COVID-19 vaccine. There is a lot of skepticism about the COVID vaccine because of safety and efficacy concerns. Most people are hesitant to get the vaccine, and some even refuse to have it (Fisher et al., 2020). There are various barriers to vaccination adoption, including a lack of faith in public health authorities, government attempts to get the populace vaccinated, and vaccine safety rumors and falsehoods. Vaccine uptake rates vary greatly between continents and countries, with Africa having the lowest rates (Foster et al., 2017). Political decision-makers, immunization program managers, community and religious leaders, health workers, civil society organizations, media, and internet platforms all have an impact on vaccination uptake. The intention or willingness of an individual to get vaccinated has

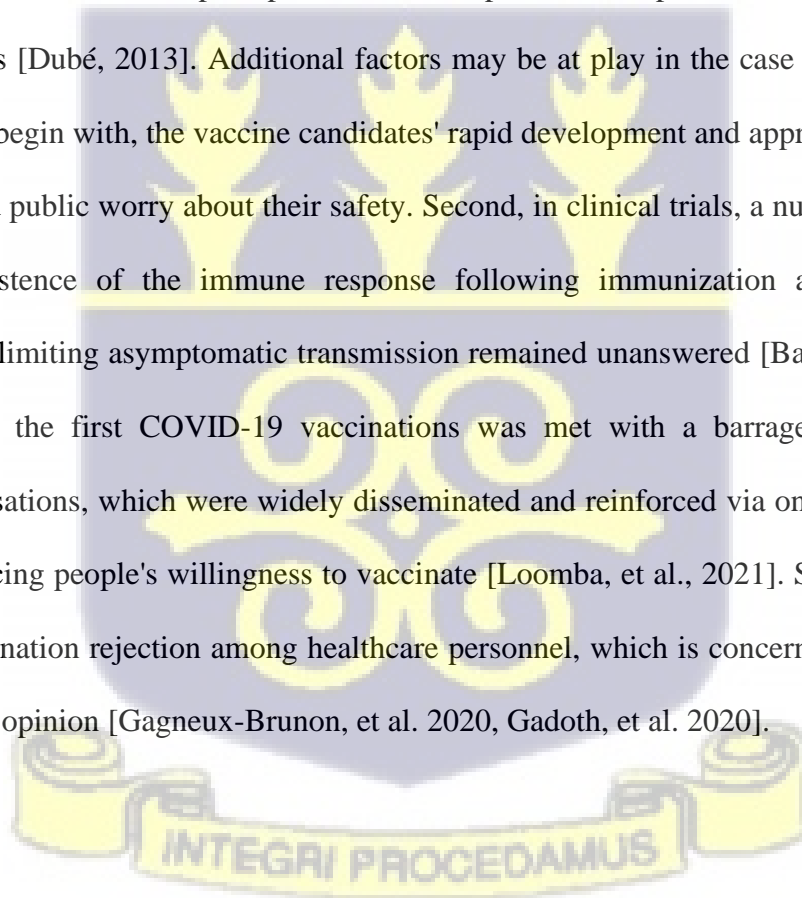
a significant impact on the success of vaccination programs. Previous global scandals, as well as a series of studies on vaccine-related adverse occurrences and side effects, have intensified skepticism and distrust (Dror et al 2020, Fisher et al 2020). Apart from these occurrences, a number of other factors combine to impact vaccination intentions. According to a statewide study done in China, 54.6 percent said they were likely to choose the COVID-19 vaccine over a certain yes (28.7%). (Lin et al., 2020). A study conducted in Malaysia, on the other hand, discovered a greater (94.3%) vaccination intent, with 48.2 percent being definite purpose (Wong et al., 2020). The vaccine's availability underscores the importance of its uptake. Recent research, however, have revealed varying levels of acceptance. According to a recent poll, barely 50% of Americans intend to obtain the vaccine. According to another study by Fisher et al 2020, just two-thirds of Americans will not receive the vaccination, and 25% say they will never receive it. The anticipated COVID-19 apprehension could be attributable in part to a large amount of misinformation, which is magnified by the already high levels of vaccine misinformation in general. In the United States, roughly 67% of 672 participants said they would take a COVID-19 vaccine if it was prescribed for them (Malik et al., 2020). According to a study of 788 persons in the United States, 60% of respondents were either definitely or probably likely to get a future COVID-19. A research performed in Australia found that 65 percent of people were willing to be vaccinated, with 27 percent saying they were "maybe." When respondents thought COVID-19 was less severe, they had less faith in science, were less ready to vaccine for influenza, and were female, they were more likely to be in the "maybe" group than the "yes" group. In a longitudinal study conducted in the same country, 59 percent stated they would definitely obtain the vaccine, whereas 29 percent expressed mild hesitancy, 7% expressed strong hesitancy, and 6% expressed resistance. Furthermore, a study conducted in an epidemic zone in China indicated that participants' willingness to accept the COVID-19 vaccine was lower in the third wave (34.8 percent) than in the first wave (44.2%). However, in a global survey done in 19 nations to assess the acceptability of the upcoming COVID-19 vaccine, this figure was substantially lower. In that study, 71.5 percent

of participants said they would be very or somewhat inclined to receive the COVID-19 vaccine. A cross-sectional study conducted in Uganda found a substantially lower acceptance rate, with only 53.6 percent willing to accept the COVID-19 vaccine (Echoru et al., 2020). The observed acceptance percentage was similar to that of an adult population in Kuwait, where 53.1 percent of those surveyed said they would accept a COVID-19 vaccine whenever it became available (Alqudeimat et al., 2021). This degree of tolerance is far lower than the COVID-19 pandemic's size. Other research, on the other hand, have found a substantially lower acceptance rate. According to a research conducted among the Middle Eastern population, the acceptance rate is 36.8% (Al-Qerem & Jarab, 2021).

2.2 Factors associated with the uptake of COVID-19 vaccine

The acceptance and coverage of large immunization programs are critical to their success. As a result, it's was vital to look into any elements that might be linked to the COVID-19 vaccine's uptake. According to some hypotheses, COVID-19 uptake is a cause-and-effect model, therefore its causes can be investigated from several angles. On the African continent, skepticism in the COVID-19 epidemic response has been ascribed to delayed response activities by several African governments and public health specialists [Gadoth, A.; 2020]. Several factors were linked to desire to get the COVID-19 vaccine in a study conducted among Kuwait's adult population. Male respondents were more inclined to accept the vaccine than female respondents in that study. Respondents who believed vaccination posed a health risk, on the other hand, were less likely to embrace immunization. Participants who had previously received an influenza vaccine were more inclined to accept the COVID-19 vaccine, according to the same study. As people's perceptions of their odds of contracting COVID-19 grew, so did their willingness to get vaccinated against it. In China, a nationwide investigation discovered a similar pattern of characteristics linked to the uptake of the COVID-19 vaccine. Perceptions that immunization reduces the risk of contracting COVID-19 and a lack of worry about efficacy were linked to vaccine uptake in the study.

A study done in Australia, on the other hand, showed comparable but disparate outcomes. Females, low-income individuals, those who reported an exaggerated risk of COVID-19, populists, and those with a higher level of religious identification were all less likely to choose any COVID-19 vaccine in their study. Another study conducted in the same country yielded comparable but disparate results. Seale and colleagues (2021) discovered that being a woman, having a chronic disease, and having private health insurance all enhanced the likelihood of receiving the COVID-19 vaccine. Being a clerical/service/sales worker in China has a significant impact on willingness to accept the COVID-19 vaccine. Vaccine uptake, however, is threatened in several ways. Vaccine aversion is influenced by a variety of factors, including prior vaccine experience, degree of education and awareness, risk perception and trust, perceived importance of vaccination, and subjective norms [Dubé, 2013]. Additional factors may be at play in the case of the COVID-19 vaccination. To begin with, the vaccine candidates' rapid development and approval in less than a year has sparked public worry about their safety. Second, in clinical trials, a number of questions about the persistence of the immune response following immunization and the vaccines' effectiveness in limiting asymptomatic transmission remained unanswered [Baldo, 2021]. Third, the approval of the first COVID-19 vaccinations was met with a barrage of scientifically unfounded accusations, which were widely disseminated and reinforced via online social media, potentially reducing people's willingness to vaccinate [Loomba, et al., 2021]. Some studies have also found vaccination rejection among healthcare personnel, which is concerning since it could influence public opinion [Gagneux-Brunon, et al. 2020, Gadoth, et al. 2020].



2.3 Perception of vaccine efficacy

In some circumstances, several interactions have occurred as a result of the introduction of novel health interventions such as vaccination. A polio vaccine campaign, for example, was rejected in a village in northern Nigeria due to religious leaders' incorrect perceptions of its efficiency (Jegede, 2007). A similar situation was observed in Ghana, where residents protested a government-sponsored mass deworming operation (Dodoo et al., 2007). In both cases, the ineffective implementation was due to a misinterpretation of the programs' ability to accomplish the desired result (Febir et al., 2013). As a result, it's easy to see how one's impression of efficacy influences one's understanding of an infection and acceptance of vaccination as a means of preventing it.

High levels of perceived susceptibility to infection, according to the Health Belief Model, increase the likelihood of adopting and embracing disease-prevention strategies (Tarkang & Zotor, 2015). This wide range of indications emphasizes the necessity of analyzing people's attitudes and habits before implementing a disease-specific health intervention, such as the COVID-19 vaccine. It is critical that governments assess levels of demand and acceptance of the COVID-19 vaccination in order to assure community readiness. This is to ensure that both the general people and healthcare practitioners are prepared (Seale et al., 2021). People regard COVID-19 as a life-threatening disease, according to many studies, hence demand for the vaccination is likely to be high. When it comes to deciding whether or not to accept a vaccination, however, vaccine effectiveness concerns may outweigh the perceived illness risks. Some studies also indicated the vaccine refusal within the healthcare workers, which is particularly problematic as it may impact the general public's decision [Gagneux-Brunon, et al 2020, Gadoth, et al 2020].

2.4 Perception of Vaccine Safety

Despite the fact that immunization has been fairly successful across the country, with over 80% national coverage since its beginning, poor immunization remains. Limited fear of adverse effects,

awareness of immunization, misinformation about vaccine safety, and mistrust of health care personnel have all been blamed for low immunization coverage. Concerns regarding vaccine side effects are known to generate anxiety and have a negative impact on vaccination decisions [Namuigi, 2005]. These concerns have been observed in both developed and underdeveloped countries. Although several potential therapies appear to have produced more or less encouraging results several months after the outbreak of COVID-19, no specific treatment for severe forms of COVID-19 has gained medical consensus, despite several potential therapies appearing to have produced more or less encouraging results. With so many limitations in place to keep the disease from spreading, vaccine development has intensified in order to limit the potential for viral damage to the general population. Many people have questioned whether faster vaccine development can be done safely while avoiding possibly adverse vaccine effects not only in the near term, but also in the medium and long term. Various rivalry are currently raging over the development and sale of a vaccine as quickly as possible (Craven 2020). On August 11, 2020, the Russian Federation's Ministry of Health approved one candidate vaccination, Sputnik-5 (Craven 2020). These rapid vaccine development efforts show that safety testing was completed in one year, a far shorter time frame than the customary 12-15 years typically associated with the commercialization of a vaccine (Calina et al. 2020).

It's difficult to see how mid- and long-term safety testing for the proposed vaccination (or any vaccine or medicine) could be done in such a short amount of time. As a result, the focus of this research.



3.0 METHODOLOGY

3.1 Study design

Using a mixed-methods (quantitative and qualitative) approach, a cross-sectional analytic study was conducted. This design was used to determine the perceptions and factors associated with the acceptability of the COVID-19 vaccine. The study was conducted in Ho municipality among health workers and community members. In-depth interviews (IDIs) with health workers were conducted to understand their perceptions and factors associated with the acceptability of the COVID-19 vaccine. Using structured questionnaires, quantitative data was collected among adult community members aged 18 and above within the Ho municipality on their perception and acceptability of the vaccine.

3.2 Study setting

Ho Municipality lies between the Adaklu and Agotime-Ziope Districts to the South, Ho West District to the North and the Republic of Togo to the East. The municipality has a land area of 2,361 square kilometers, accounting for 11.5 percent of the Volta Region's total land area. The municipality's population is 177,281, with 83,819 males and 93,462 females. A total of 110,048 people live in urban areas, accounting for 62.1 percent of the population, with 37.9% (67,233 people) living in rural areas. Ho Municipality has 31,832 dwellings, accounting for 8% of the total number of houses in the Volta Region. The average number of people per residence is 5.6. Hokpeta, Dutasor, Norvisi, Sokorde, and Ho central subdistricts are the five sub-districts that make up the municipality. In terms of health, the district has one regional hospital that also functions as a teaching hospital, a municipal hospital, a polyclinic, a health center, and five private health facilities, as well as additional neighbouring health facilities.



Figure 2: Map of Ho municipality

3.3 Study population

The study population was made up of two main components: it included all community members aged 18 years and above in the Ho Municipality, on the one hand, and health workers representing various health facilities within the municipality were included in the study population.

3.4 Variables

The main dependent variable was participant’s Covid-19 vaccine acceptance

Additional dependent variable was participant encouraging others to accept the covid-19 vaccine

Table 1: Definition and Operationalization of Variables

Dependent variable	Type of variable	Scale of measurement
Vaccine Acceptability	Categorical	Nominal
Independent variables	Type of variable	Scale of measurement
Age	Categorical	Nominal
Sex	Categorical	Nominal
Religion	Categorical	Nominal
Marital status	Categorical	Nominal
Place of residence	Categorical	Nominal
level of Education	Categorical	Nominal
Occupation	Categorical	Nominal
Employment status	Categorical	Nominal
Perceived adverse event	Categorical	Nominal
Previous experience with vaccination	Categorical	Nominal
Myths	Categorical	Nominal
Religion	Categorical	Nominal
Communication	Categorical	Nominal



3.5 Sampling

3.5.1 Sample Size Determination

The sample size was calculated using Yamane's formula. With a 95 percent confidence level and a 5% margin of error,

$$n = \frac{N}{[1+N(e)^2]} \quad \text{Equation (3.1)}$$

Where n= the sample size,

N= total population (students)

e = margin of error (5%)

The sample used for this study was computed using

N = 177281 (Total Population)

e = 0.05

Therefore, n =
$$\frac{177281}{[1+ 177281 (0.05)^2]}$$

$$n = \frac{177281}{443.205} = 399.997 = 400$$

Thus, the number of questionnaire to be administered was estimated at 400.

3.5.2 Determining the Sample Size within Each Sub-district

Because of the uneven number of community's population, proportional stratification was used to select the required number of respondents from each sub-district.

Table 2: Population from each sub-district

Sub-district	Population
Hokpeta (N_1)	15955
Dutasor (N_2)	23047
Norvisi (N_3)	16664
Sokode (N_4)	19324
Ho Central	102291
Total	177281

If n_h is the sample to be drawn from “ h ”, n is the total sample drawn from all the strata; N_h is the total population for stratum “ h ” and N is the total population.

$$\text{Then, } \frac{n_h}{n} = \frac{N_h}{N}$$

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

Equation (3.2)

$$N = 177,281$$

$$N = N_1 + N_2 + N_3 + N_4$$

Where the subscripts 1,2,3,4 represents Hokpeta, Dutasor, Norvisi, Sokorde and Ho central respectively.

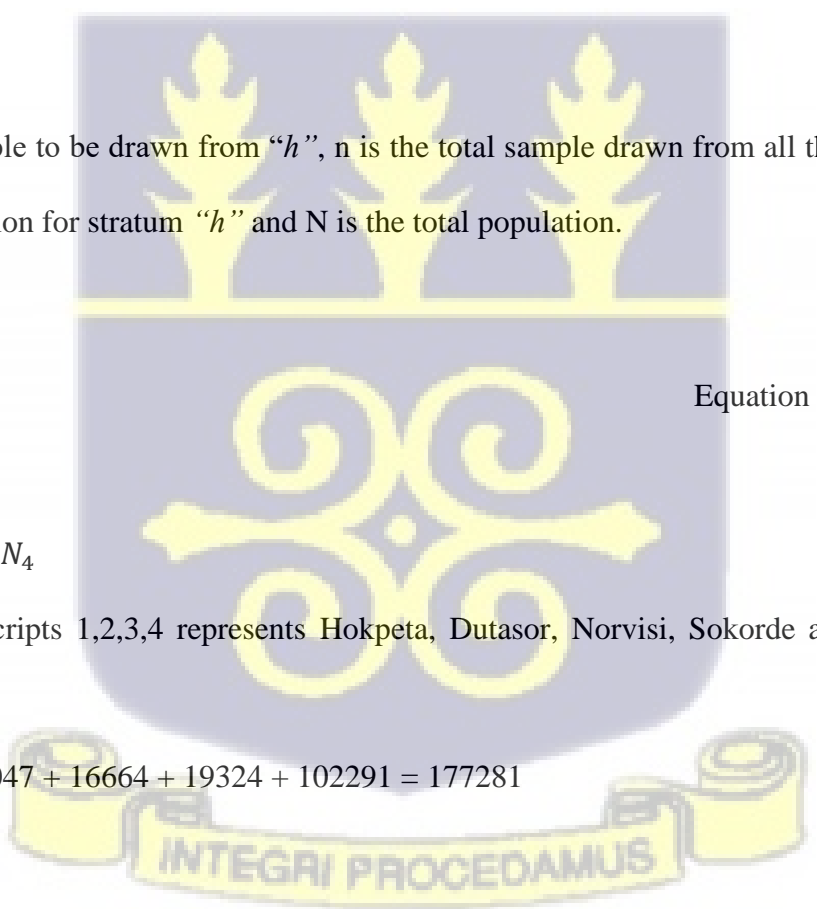
$$N = 15955 + 23047 + 16664 + 19324 + 102291 = 177281$$

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

$$n = 400$$

$$n_1 = 400 \times \frac{15955}{177281} = 35.99 = 36$$

$$n_2 = 400 \times \frac{23047}{177281} = 52.0 = 52$$



$$n_3 = 400 \times \frac{16664}{177281} = 37.59 = 38$$

$$n_4 = 400 \times \frac{19324}{177281} = 43.60 = 44$$

$$n_5 = 400 \times \frac{102291}{177281} = 230.799 = 231$$

The samples needed from stratum one, two, three, four and five are 36, 52, 38, 44 and 231 respectively and simple random sampling was used to select these sizes from each stratum.

In order to ensure that each community member in the entire municipality has an equal chance of selection, the researcher would use a probability sampling method known as stratified sampling.

This method would be adopted to select the respondents from the five sub-districts, namely Hokpeta, Dutasor, Norvisi, Sokorde, and Ho central sub-district. Hokpeta with 15955 population, Dutasor has 23047, Norvisi has 16,664 Sokorde with 19324 and Ho central has 102291. Because of the uneven distribution of the community's population, proportional stratification would be used to select the required number of respondents from each sub-district. Sample sizes of 36, 52, 38, 44, and 231 respondents from Hokpeta, Dutasor, Norvisi, Sokorde, and Ho Central, respectively, would be selected to fill out the questionnaire.

3.5.3 Qualitative phase

Qualitative interviews for the health staff were based on purposive sampling of fifteen (12) individual health workers. The study participants were health workers from health facilities in Ho municipality who had either received or not received the vaccine. Final sample sizes for the qualitative were determined after saturation was reached.

3.6 Inclusion and Exclusion criteria

3.6.1 Health workers

With health workers, an effort was made to include various cadres of health workers from different facilities within the district. Health workers unwilling to participate or outside of the district were excluded from the study.

3.6.2 Community level

Individuals age 18 years and above were included in the study. However, community members below 18 years or individuals unwilling to participate in the study were excluded.

3.7 Data Collection Instrument

3.7.1 Quantitative

Survey questionnaire was used for quantitative data collection, a closed ended type of questionnaire was administered; the questionnaire was in three sections.

Section A: Dealt with the socio-demographic characteristics of respondents

This section covered the Place of residence, Age, Sex, Level of education, Marital status, Occupation, Cadre of health workers, Years of service and Qualification

Section B: This section covered the Perception of vaccination. For the purpose of this study, perception is the way vaccine is regarded, understood and interpreted which contributes to acceptability.

Section C: This section covered the Socio-cultural factors that contribute to vaccine acceptability. These were Beliefs and Religion.

3.7.2 Qualitative

Individual in-depth interviews (IDIs) with health workers were conducted using an interview guide. Permission was requested to record and transcribe interviews later. An in-depth interview with health workers explored perceptions and factors associated with the acceptability of the COVID-19 vaccine.

3.7.3 Quality Control

Quality control was ensured in the different aspects of the study. To ensure reliability, PI engaged experienced research assistants. The research assistants were well trained before data collection.

During training, the quantitative data collection tools were translated into the local language in the study area and re-translated into English. This was to ensure that the context was not lost. During the training, the data collection instruments were pre-tested in a context with similar characteristics to the study district. Following pre-testing, the tools were revised.

The Principal Investigator (PI) double-checked quantitative data for errors, blanks, and mistakes and were corrected in the field. To confirm the accuracy of transcripts, PI listens to tapes at random and compares them to transcripts.

3.7.4 Study Procedure

Quantitative data was collected using survey questionnaires installed onto tablets using Red Cap software. Interview guides were used to conduct the in-depth interviews. Copies of the letters of ethical approval and letters requesting permission were submitted to the Municipal Director of Health Services, Ho. After permission was obtained, health workers were purposively selected from health facilities within the five sub-districts in the municipality to participate in the qualitative data collection. Quantitative interviews were conducted within these same 5 sub-districts using a simple random sampling technique to identify respondents who are 18 years of age or older. Two teams were constituted for the data collection. Team A was in charge of gathering quantitative data, while Team B was in charge of gathering qualitative data. Once written informed consent was obtained, permission was sought from the respondents to conduct the interview. Permissions were also sought from health workers to digitally record the IDIs. If this is declined, notes will be taken during the interview.

Research assistants were recruited from among an existing pool of well-trained research assistants that had previously been involved in other research projects carried out. They were proficient in English and Ewe. A 3-day training was held to train them to collect data. During data collection, the research team strictly adhered to COVID-19 protocols by wearing nose masks, using hand sanitizers, and observing social distancing.

3.8 Data Management

3.8.1 Qualitative Data

Interviews were recorded and transcribed verbatim. After the transcript has been typed, a second person listens to the audio again and fills in the blanks. All portions of in-depth interviews were coded after this was completed. The primary issues coming from the transcripts of both data gathering approaches were used to create a data matrix. The data was then organized into themes. Nvivo version 12 was used to import the data. In light of the evidence from the data, the themes that emerge from the data were used to construct a framework to characterize factors that are related to each other.

3.8.2 Quantitative Data

Every day, the survey data was examined for blanks, errors, and inconsistencies, and they were all remedied. STATA version 16 was used to clean and validate the data (STATA Corporation, College Station, Texas). The demographic parameters were analyzed using descriptive statistics such as frequency, mean, and standard deviation.

Various associations between variables were presented graphically and critically analysed to ensure clarity and accuracy. Basic cross-tabulation and appropriate statistical tests were carried out to establish associations between variables and trends. Analysis was done at two different levels. The relevance of the socio-demographic parameters influencing COVID-19 vaccination uptake was determined using the Chi-square test. The strength of the relationship of factors that were significant in the Chi-square test was determined using a binary logistic regression analysis. Significance was determined at a 95% confidence interval. To determine if the COVID-19 vaccine was safe, three variables (Risk of covid-19 vaccine uptake, Safety of covid-19 vaccine and Adequate safety information on covid vaccine) were used to determine the extent to which the perception level of respondents about the safety of the COVID-19 vaccine was Each variable was coded as 1 (No), 2 (Don't know), and 3 (Yes). All three variables were summed up to arrive at a

combined safety variable measured on the Likert scale from 3–9, where 3 "Very bad" 4 "Bad" 5 "Somewhat bad" 6 "Neutral" 7 "Good" 8 "Very good" 9 "Excellent"

3.9 Ethical Consideration

3.9.1 Ethical Clearance

Ethical approval to conduct this research was obtained prior to the commencement of the study from the Ethics Review Committee of the Ghana Health Service (GHS) (Protocol ID: GHS-ERC 033/11/21). Administrative permission was sought from regional and district directors of health services in the district.

3.9.2 Informed Consent Process

The regional health directorates and district health directors were informed about the objectives of the study, and permission was sought and taken from the district heads by the principal investigator before administering questionnaires or conducting interviews in the health facilities. The consent forms were drafted in English, and all other standard ethical issues were duly followed during the process. Study participants were assured of confidentiality. An informed consent form was read out in the appropriate language (local or English) to them, outlining the risks and benefits of being interviewed and giving them the opportunity to decline to be interviewed or to discontinue the interview at any time. Participation was entirely at the discretion of the participants. To express their willingness to participate in the study, those who gave consent were asked to sign or place their thumbprint on the consent form.

3.9.3 Potential risks and Benefit

The participants were not harmed in any way as a result of the study; rather, the findings can be used to improve Ghana's health services and enhance vaccine uptake.

3.9.4 Privacy and confidentiality

The information provided was kept confidential and solely used for the purposes of the study. Respondents' names were not mentioned in any of the quotes. In addition, all interviews were

done in a private setting to reduce participants' uneasiness with the matters being discussed.

Interviewees were not compelled to provide their names, and no identifiers other than a serial number were recorded.

3.9.5 Voluntary Participation/ Withdrawal

The study's participation was entirely optional, and participants could opt out at any time throughout the interview. There was no cost associated with opting out of the study.

3.9.6 Compensation

There was no financial benefits or any other material benefits to participants after the interviews and survey.

3.9.7 Data storage and usage

The interviews were tape-recorded and not shared with anybody outside of the research team. The information provided was kept private and solely used for the purposes of the study. The PI kept all of the information gathered, and only the PI had access to it. The information gathered during the in-depth interviews was transcribed and coded. The audiotapes will be appropriately removed from all gadgets when the report is written, and in any case within three years of the study's completion.

3.9.8 Conflict of interest

In no element of the study was there a conflict of interest.

3.9.9 Adherence of Covid-19 Protocol

During data collection, the research team strictly adhered to COVID-19 protocols by wearing nose masks, dropping hand sanitizers into participants' hands, and observing social distancing.

3.9.10 Dissemination of Results

The findings of the study will be presented to the municipal health directorate and seminars. The findings of this study will also be published in high-impact peer-review journals.

4.0 QUANTITATIVE RESULTS

4.1 Demographic Characteristics of Respondents

A total of 411 community members aged 18 years and above within Ho municipality were recruited into the study. Data on 403 are presented as eight participants had incomplete data. Males formed 50.62% (204/403) with 199 (49.38) being females. The mean age of participants was 33.4 years, majority 136/403 (33.75%) were age 18-26 years followed by 133/403 (33.0%) aged 27-35years. A total of 369/403 (91.56%) respondents were Christians and 18/403 (4.47%) Muslims (Table 1a).

A greater proportion of the respondents 121/403 (30.02%), attained junior high education and 88/403 (21.84%) attained primary education. With regards to employment 143/403 (35.48%) were unemployed with 103/403 (25.56%) being traders (Table 1b). Majority of the respondents were single 262 (65%) with 115(28.54%) being married. A higher percentage of respondents 283/403 (70.20%) are from communities in an urban sub-district (Ho central and Dutasor). One hundred and twenty (29.8%) of respondents reside in rural sub district (Hokpeta, Norvisi and Sokode) (Fig. 1).

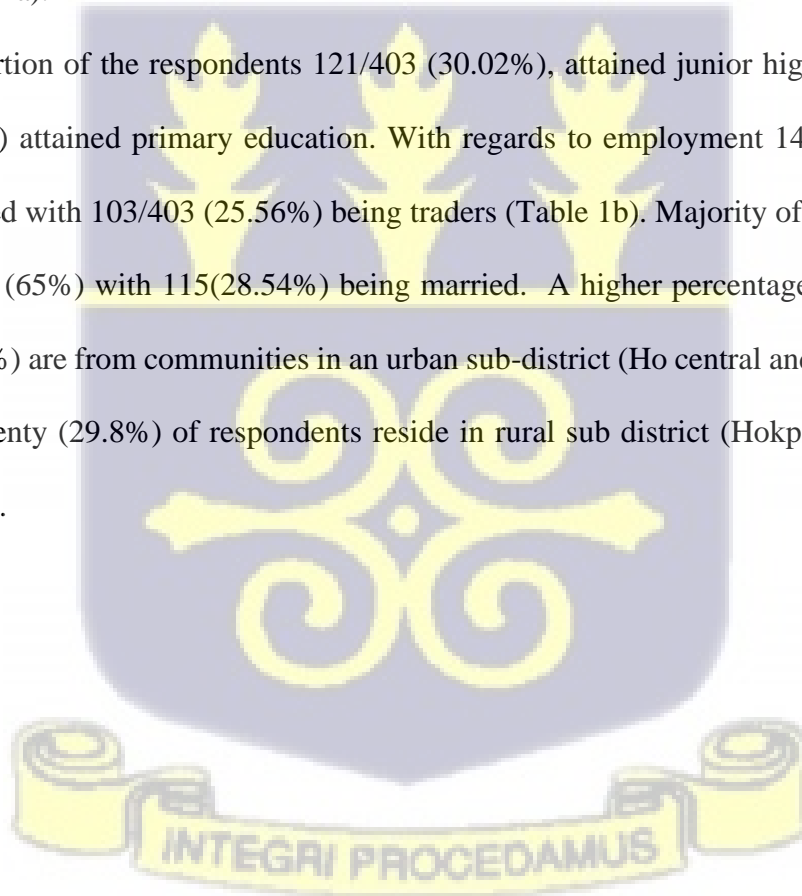


Table 3a: Socio-demographic characteristics of study participants (N=403)

Variable	No.	%
Sex		
Male	204	50.62
Female	199	49.38
Age (years)		
18-26	136	33.75
27-35	133	33.00
36-44	56	13.90
45-53	78	19.35
Marital Status		
Married	115	28.54
Divorced	13	3.23
Widowed	262	1.99
Single	8	65.01
Co-habiting	5	1.24
Education		
None	11	2.73
Primary	88	21.84
Middle School	43	10.67
Junior High School	121	30.02
Senior High	66	16.38
Vocational/Technical	16	3.97
Tertiary	58	14.39
Ethnicity		
Ewe	276	68.49
Ga	9	2.23
Dangme	5	1.24
Akan	82	20.35
Others	31	7.69
Religion		
None	10	2.48
Christian	369	91.56
Islam	18	4.47
Traditional	6	1.49
Residency Type		
Urban	120	29.80
Rural	283	70.20

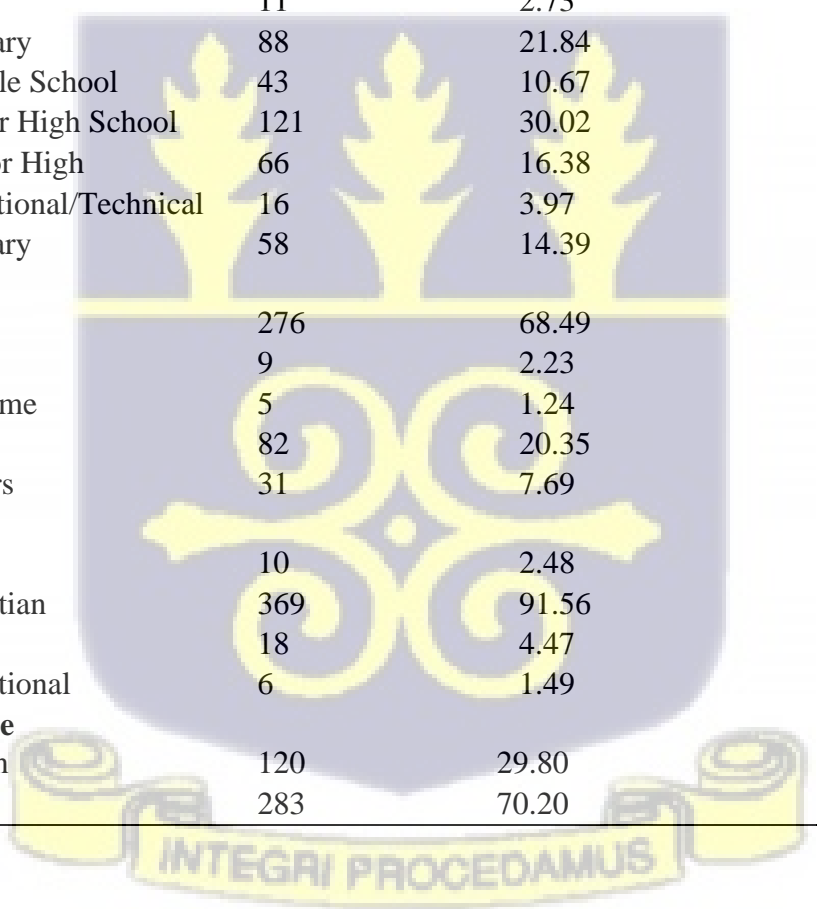


Table 3b: Socio-demographic characteristics of study participants (N=403)

Variable	No.	%
Occupation		
Unemployed	143	35.48
Farming	16	3.97
Public/civil servant	51	12.66
Artisan	44	10.92
Trading	103	25.56
Apprentice	12	2.98
Others	34	8.44

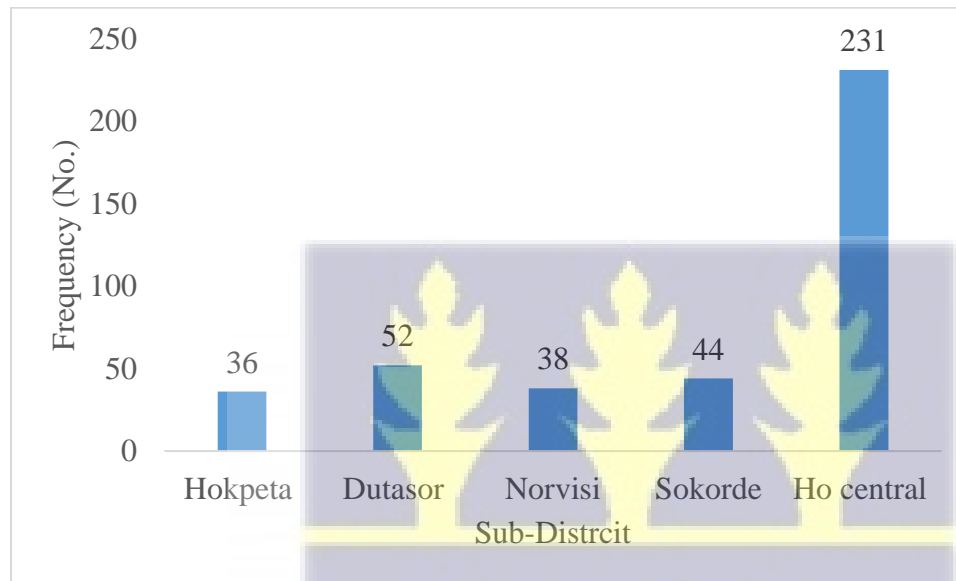


Fig.3 Distribution of Respondents by Sub-district

4.2 Perceptions on safety of COVID-19 vaccines

Respondents were assessed on their perceptions concerning safety of covid-19 vaccines. Most respondents 269/403 (79.59%) indicated covid-19 vaccine have side effects whiles 35/403 (10.36%) don't know if the vaccine has any side effects or not. 148/403 (36.72%) indicated that they would be risking their life with uptake of covid-19 vaccine therefore it was not safe for them, meanwhile 234/403 (58.06%) also indicated they will not risk their lives with uptake of the vaccine, whiles 35/403 (10.36%) said they did not know if they would be risking their lives or not.

One hundred and seventy three respondents (42.93%), however indicated that covid-19 vaccine was not safe while 162/403 (40.20) said it was safe, 68/403 (16.87%) did not know if the vaccine was safe or not.

With respect to safety information on vaccine which contributes to respondents perception, majority 261/403 (64.76%) indicated that there was inadequate safety information about the vaccine while 115/403 (28.54%) indicated that information provided for vaccine safety is adequate.

An overall (combined) measure of perception about the safety of COVID-19 vaccines (generated using i. whether one will be risking their lives by not taking the vaccine, ii. whether the COVID-19 vaccines are safe, and iii. the existence of adequate safety information about the vaccines, measured on a Likert scale of very bad, bad, somewhat bad, neutral, good, very good, and excellent), revealed that 58.6% (very bad, bad, and somewhat bad) indicated that the vaccine was not safe, 34.9% (good, very good, and excellent) indicated that the vaccine was safe, while 6.5% (neutral) were not sure if the vaccine was safe or not. (Fig. 4).

Table 4: Perceptions about safety of COVID-19 vaccines

Variable	No.	%
Adverse Events of covid-19 vaccine		
Side effect	269	79.59
No side effect	34	10.06
Don't know	35	10.36
Risk of covid-19 vaccine uptake		
Risk Life with vaccine uptake	148	36.72
Don't risk life with vaccine uptake	234	58.06
Don't know	21	5.21
Trust in health Institution /Gov't for type of vaccine purchased		
Trust type of vaccine purchased	127	31.51
Don't Trust type of vaccine purchased	212	52.61
Don't Know	64	15.88
Safety of covid-19 vaccine		
Vaccine is Safe	162	40.20
Vaccine not safe	173	42.938
Don't know	68	16.87
Adequate safety information on covid vaccine		

Adequate information	115	28.54
Inadequate information	261	64.76
Don't know	27	6.70

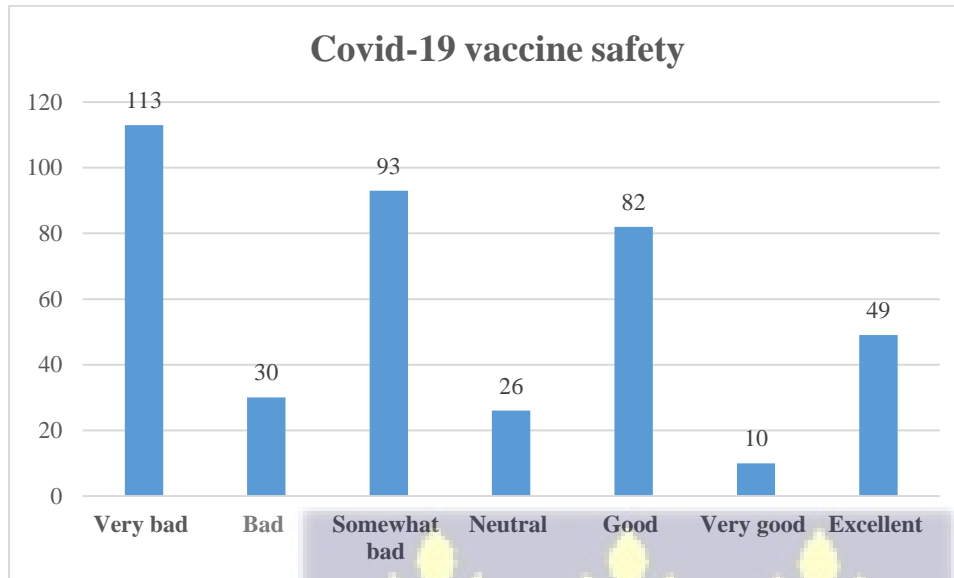


Figure 4: Overall perception about the safety of COVID-19 Vaccines.

4.3 Perceptions about efficacy of COVID-19 vaccines

Perceptions about efficacy of covid-19 vaccines was assessed. Majority of respondents 232/403 (57.60%) indicated that there are other effective ways to prevent covid-19 than vaccinations while 126/403 (31.3%) indicated covid-19 vaccines are effective for reducing the incidence of covid-19. 192/403 (47.64%) stated covid-19 vaccine does not provide protection against covid therefore the vaccine was not effective while 152/403 (37.72%) indicated the vaccine was effective and protects against covid-19.

Majority of respondents 107/403 (70.39%) indicated that the vaccine provides moderate protection against covid while few respondents 10/403 (6.58%) indicated minimum protection. With regards to reducing the incidence of covid 272/403 (67.49%) indicated it was possible to reduce the incidence of covid-19 (Table 5).

Table 5: Perceptions about efficacy of COVID-19 vaccines

Variable	No.	%
Ways to prevent covid-19		
Through Preventive measures	232	57.6
With vaccine	126	31.3
Don't know	45	11.17
Preventive measures		
Through preventive medication	28	12.07
Observing the Covid protocols	182	78.45
Stay home if you feel any symptoms	19	8.19
Effectiveness of covid-19 vaccine		
Provides Protection	152	37.72
Don't Provide Protection	192	47.64
Don't Know	59	14.64
Level of protection Covid-19 vaccine provides		
Maximum Protection	25	16.45
Moderate Protection	107	70.39
Minimum Protection	10	6.58
Don't Know	10	6.58
Reduction of incidence of covid-19 with vaccination		
Possible	272	67.49
Not Possible	131	32.51

4.4 Willingness to accept the COVID-19 vaccines

Majority of community members (57%) were willing to accept covid-19 vaccine if it was available within the municipality. Whiles 62% stated that they would encourage family/friends/relatives to get vaccinated. (Table 6).

Table 6: Willingness to accept the COVID-19 vaccines

Variable	No.	%
Vaccine Acceptability		
Accept	230	57.07
Will not Accept	173	42.9
Encourage others to get vaccinated		
Encourage others to accept	251	62.28
Will not encourage others to accept	152	37.7

4.5 Bivariate analysis of willingness to accept COVID-19 vaccine (self) and socio-demographic characteristics

A chi-square test of association between demographic factors and willingness to accept covid-19 vaccine among study participants was performed. From the results, Sex of respondents was significantly associated with willingness to accept covid-19 vaccine ($\chi^2=9.643$; $p=0.002$). Respondent's age was significantly associated with willingness to accept covid-19 vaccine ($\chi^2=10.956$; $p=0.012$).

The willingness to accept covid-19 vaccine among married respondents 67/115 (58.3%) was higher compared to singles 151/262 (57.5%), marital status was however not significantly associated with willingness to accept the vaccine ($\chi^2=2.119$; $p=0.714$). Educational level of respondents was significantly associated with willingness to accept covid-19 vaccine. ($\chi^2=47.331$; $p=0.001$). Willingness to accept the vaccine was higher among Muslim 11/18 (61%) compared to respondents with no religion 2/10 (20%) but respondent's religion was not significantly associated with willingness to accept the vaccine. ($\chi^2=5.980$; $p=0.113$).

With regards to respondent's perception of risking their life for vaccine uptake, it was significantly associated with willingness to accept the vaccine ($\chi^2=66.87$; $p=0.001$). Perception of efficacy of the vaccine was also significantly associated with willingness to accept the vaccine ($\chi^2=71.59$; $p=0.001$). Additionally, the reduction of incidence of covid-19 with the vaccine was significantly associated with willingness to accept the vaccine ($\chi^2=35.58$; $p=0.001$) (Table 7a&b).

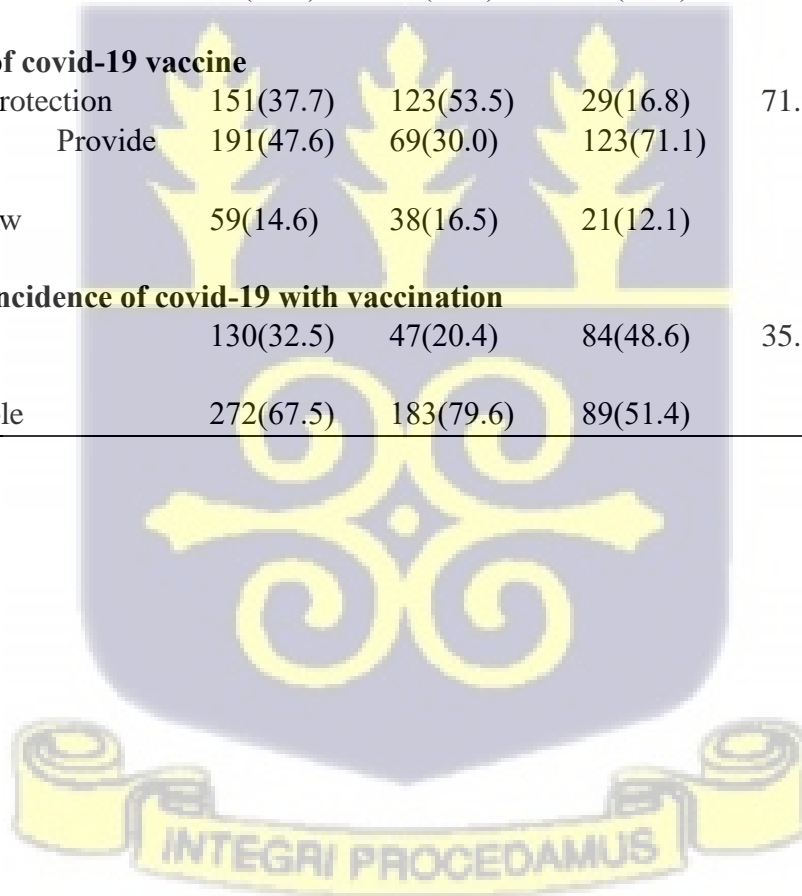


Table 7a: Bivariate analysis of Participant's (self) willingness to accept COVID-19 vaccine and socio-demographic characteristics

Variable	N (%)	Yes (%)	No (%)	χ^2	P-value
Sex					
Male	203 (50.6)	101 (43.9)	103 (59.5)	9.643	0.002
Female	200 (49.4)	129 (56.1)	70 (40.5)		
Age					
18-26 years	136(33.7)	65(28.3)	71(41.0)	10.956	0.012
27-35 years	133(33.0)	90(39.1)	43(24.9)		
36-44 years	56(13.9)	31(13.5)	25(14.5)		
45-53 years	78(19.4)	44(19.1)	34(19.7)		
Marital status					
Married	115(28.5)	67(29.1)	48(27.7)	2.119	0.714
Divorced	13 (3.2)	5(2.2)	8(4.6)		
Widowed	8 (2.0)	4(1.7)	4(2.3)		
Single	262(65.0)	151(65.7)	111(64.2)		
Co-habiting	5(1.2)	3(1.3)	2(1.2)		
Education					
None	11(2.7)	1(0.4)	10(6)	47.331	<0.001
Primary	88(21.8)	47(20.4)	41(23.7)		
Middle School	43(10.7)	35(15.2)	8(4.6)		
Junior High	121(30)	68(29.6)	53(30.6)		
Senior High	66(16.4)	28(12.2)	38(22)		
Technical	16(4)	4(1.7)	12(6.9)		
Tertiary	58(14.4)	47(20.4)	11(6.4)		
Religion					
None	10(2.5)	2(0.9)	8(4.6)	5.980	0.113
Christian	369(91.6)	214(93)	155(89.6)		
Islam	18(4.5)	11(4.8)	7(4)		
Traditional	6(1.5)	3(1.3)	3(1.7)		
Occupation					
Unemployed	143(35.5)	73(31.7)	70(40.5)	15.099	0.010
Farming	16(4)	7(3)	9(5.2)		
Public/Civil Servant	51(12.7)	37(16.1)	14(8.1)		
Artisan	44(10.9)	19(8.3)	25(14.5)		
Trading	103(25.6)	68(29.6)	35(20.2)		
Apprentice/others	46(11.4)	11(25.9)	20(11.6)		

Table 7b: Bivariate analysis of Participant's (self) willingness to accept COVID-19 vaccine and socio-demographic characteristics

Variable	N (%)	Yes (%)	No (%)	χ^2	P-value
Risk of covid-19 vaccine uptake					
Risk Life with vaccine uptake	148(36.7)	123(53.5)	25(14.5)	66.87	<0.001
Don't risk life with vaccine uptake	234(58.1)	95(41.3)	139(80.3)		
Don't know	21(5.2)	12(5.2)	9(5.2)		
Trust in health Institution /Gov't for type of vaccine purchased					
Trust type of vaccine purchased	127(31.5)	111(48.3)	15(9.2)	69.84	<0.001
Don't Trust type of vaccine purchased	211(52.6)	92(40.4)	119(68.8)		
Don't Know	64(15.9)	26(11.3)	38(22.0)		
Effectiveness of covid-19 vaccine					
Provides Protection	151(37.7)	123(53.5)	29(16.8)	71.59	<0.001
Don't Provide Protection	191(47.6)	69(30.0)	123(71.1)		
Don't Know	59(14.6)	38(16.5)	21(12.1)		
Reduction of incidence of covid-19 with vaccination					
Possible	130(32.5)	47(20.4)	84(48.6)	35.58	<0.001
Not Possible	272(67.5)	183(79.6)	89(51.4)		



4.6 Bivariate analysis of willingness to accept COVID-19 vaccine (other) and socio-demographic characteristics

Willingness of respondents to encourage others to accept covid-19 vaccine was high among females compared to males. ($\chi^2=6.143$; $p=0.013$) this was statistically significant. Respondents aged 27-35 years willingness to encourage others to accept vaccine was higher 97/133 (73%) compared to respondents aged 36-44 years 31/56 (55.9%) this relation was statistically significant ($\chi^2=11.238$; $p=0.011$). Respondents' willingness to encourage others to accept the vaccine was not statistically significant in terms of their marital status ($\chi^2=0.927$; $p=0.921$). In relation to their educational level respondent's willingness to encourage others to accept the vaccine was statistically significant ($\chi^2=26.480$; $p=0.001$).

With regards to their religion, willingness to encourage others to accept the vaccine was higher among Christians (63.41%) as compared to those with no religion though religion was statistically significant ($\chi^2=10.208$; $p=0.017$). Again, willingness to encourage others to accept the covid-19 vaccine was less (54.5%) among unemployed respondents as compared to employed respondents but this was not statistically significant ($\chi^2=9.556$; $p=0.089$).

Respondent's perception of risking life for vaccine uptake, efficacy of the vaccine and the vaccine reducing incidence of covid-19 as factors to consider in encouraging others to accept the vaccine were respectively statistically significant ($\chi^2=91.82$; $p=0.001$), ($\chi^2=68.73$; $p=0.001$), ($\chi^2=71.70$; $p=0.001$) (Table 8a&b).

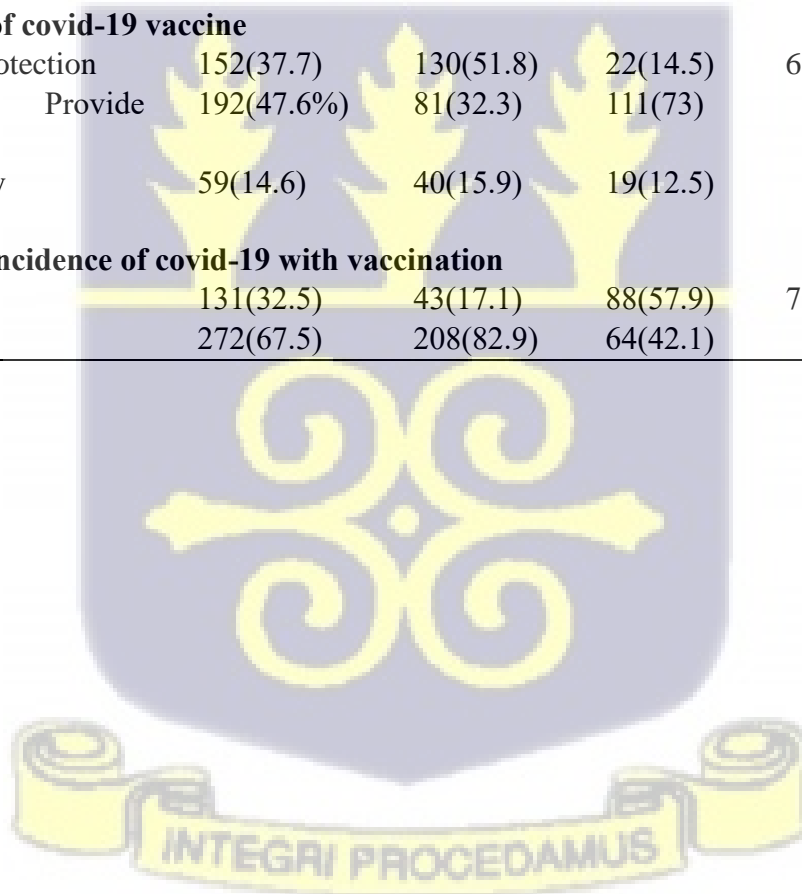


Table 8a: Bivariate analysis of Participants willingness to encourage others to accept COVID-19 vaccine and socio-demographic characteristics

Variable	N (%)	Yes (%)	No (%)	χ^2	P-value
Sex					
Male	204(49.4)	114(45.8)	89(58.6)	6.143	0.013
Female	199(49.4)	136(54.2)	63(41.4)		
Age					
18-26 years	136(33.7)	76(30.3)	60(39.5)	11.238	0.011
27-35 years	133(33.0)	97(39.0)	35(23)		
36-44 years	56(13.9)	31(12.4)	25(16.4)		
45-53 years	78(19.4)	46(18.3)	32(21.1)		
Marital status					
Married	115(28.5)	70(27.9)	44(29.6)	0.927	0.921
Divorced	13(3.2)	9(3.6)	4(2.6)		
Widowed	8 (2.0)	6(2.4)	2(1.3)		
Single	262(65.0)	163(64.9)	98(65.1)		
Co-habiting	5(1.2)	3(1.2)	1.3(2)		
Education					
None	11(2.7)	6(2.4)	5(3.3)	26.480	<0.001
Primary	88(21.8)	49(20)	39(26)		
Middle School	43(10.7)	28(11.2)	15(9.9)		
Junior High	121(30)	80(31.9)	41(27)		
Senior High	66(16.4)	32(12.7)	34(22.4)		
Technical	16(4)	6(2.4)	10(6.6)		
Tertiary	58(14.4)	49(19.9)	8(5.3)		
Religion					
None	10(2.5)	2(0.8)	8(5.3)	10.208	0.017
Christian	369(91.6)	234(93.6)	134(88.2)		
Islam	18(4.5)	9(6)	9(3.6)		
Traditional	6(1.5)	5(2.0)	1(0.7)		
Occupation					
Unemployed	143(35.5)	78(31.1)	65(42.8)	9.556	0.089
Farming	16(4)	11(4.4)	5(3.3)		
Public/Civil	51(12.7)	37(15.1)	13(8.6)		
Servant					
Artisan	44(10.9)	26(10.4)	18(11.8)		
Trading	103(25.6)	71(28.3)	32(21.1)		
Apprentice/other	46(11.4)	27(10.8)	19(12.5)		

Table 8b: Bivariate analysis of Participants willingness to encourage others accept COVID-19 vaccine (other) and vaccine efficacy

Variable	N (%)	Yes (%)	No (%)	χ^2	P-value
Risk of covid-19 vaccine uptake					
Risk Life with vaccine uptake	148(36.7)	136(54.2)	12(7.9)	91.82	<0.001
Don't risk life with vaccine uptake	234(58.1)	101(40.2)	133(87.5)		
Don't know	21(5.2)	14(5.6)	7(4.6)		
Trust in health Institution /Gov't for type of vaccine purchased					
Trust type of vaccine purchased	127(31.5)	117(46.6)	10(6.6)	70.38	<0.001
Don't Trust type of vaccine purchased	212(52.6)	102(40.6)	110(72.4)		
Don't Know	64(16)	32(12.7)	32(21.1)		
Effectiveness of covid-19 vaccine					
Provides Protection	152(37.7)	130(51.8)	22(14.5)	68.73	<0.001
Don't Provide Protection	192(47.6%)	81(32.3)	111(73)		
Don't Know	59(14.6)	40(15.9)	19(12.5)		
Reduction of incidence of covid-19 with vaccination					
Possible	131(32.5)	43(17.1)	88(57.9)	71.70	<0.001
Not Possible	272(67.5)	208(82.9)	64(42.1)		



4.7 Logistic regressions on factors associated with willingness to accept COVID-19 vaccines

4.7.1 For those who would accept the vaccine themselves (Self)

Bivariate analyses was carried out using logistic regression on factors that were statistically significant with willingness of respondents to accept covid-19 vaccines in the chi-square test of association.

The results indicated that the odds of accepting covid-19 vaccine was 1.8 times more likely in females compared with males (OR=1.8 [95% CI=1.001-3.543], $p=0.05$) this association was statistically significant for the crude odds ratio. Also the odds of accepting covid-19 vaccine was 2.5 times more likely among respondents aged 27-35 years compared to respondents aged 18-26 years (OR=2.5 [95% CI=1.158-5.464], $p=0.020$) therefore this association was statistically significant. For marital status the odds of accepting covid-19 vaccine was 0.135 times less likely in divorced respondents compared with married respondents (OR=0.135 [95% CI=0.021-0.873], $p=0.036$) this association was statistically significant.

The odds of a respondents accepting covid-19 vaccine was 17.713 times more likely among respondents with at least primary education compared with respondents without education (OR=17.713 [95% CI=1.094-286.868], $p=0.043$) the association was statistically significant. For religion, the odds of a respondents accepting covid-19 vaccine was 3.098 times more likely in Christians compared with respondents with no religion (OR=3.098 [95% CI=0.484-19.824], $p=0.232$) the association was not statistically significant. With regards to vaccine effectiveness of covid-19 vaccine, the odds of a respondents accepting covid-19 vaccine was 0.351 times less likely in respondents who said the vaccine provides protection compared with respondents who said the vaccine does not provide protection (OR=0.351 [95% CI=0.171-0.722], $p=0.004$) the association was statistically significant (Table 9a&b).

4.7.2 For Respondents who would encourage (others) to accept the vaccine

Again Bivariate analyses was carried out using logistic regression on factors that were statistically significant with willingness of respondents to encourage others to accept covid-19 vaccines in the chi-square test of association.

From the results it was indicated that the odds of respondents encouraging others to accept covid-19 vaccine was 1.744 times more likely in females compared with males (OR=1.744 [95% CI=0.819-3.714], p=0.149) this association was not statistically significant. The odds of encouraging others to accept covid-19 vaccine was 1.657 times more likely among respondents aged 27-35 years compared to respondents aged 18-26 years (OR=1.657 [95% CI=0.674-4.073], p=0.271) therefore this association was not statistically significant. For Marital status, the odds of encouraging others to accept covid-19 vaccine was 3.01 times more likely in divorced respondents compared with married respondents (OR=3.01 [95% CI=0.314-28.807], p=0.340) this association was however not statistically significant.

The odds of encouraging others to accept a covid-19 vaccine was 0.415 times less likely in respondents with at least primary education compared with respondents without education (OR=0.415 [95% CI=0.053-3.255], p=0.403) the association was not statistically significant. For religion, the odds of respondents encouraging others to accept covid-19 vaccine was 2.165 times more likely in Christians compared with respondents with no religion (OR=2.165 [95% CI=0.267-17.525], p=0.469) the association was not statistically significant. With regards to vaccine effectiveness, the odds of respondents encouraging others to accept covid-19 vaccine was 0.357 times less likely in respondents who said the vaccine provides protection compared with respondents who said the vaccine does not provide protection (OR=0.357 [95% CI=0.152-0.837], p=0.018) the association was statistically significant (Table 9a&b).

Table 9a: Logistic regressions of Factors associated with willingness to accept COVID-19 vaccines

Variable	Self			Someone		
	OR	95% CI	P-value	OR	95% CI	P-value
Sex						
Male	1.00			1.00		
Female	1.883	1.001-3.543	0.050	1.744	0.819-3.714	0.149
Age						
18-26	1.00					
27-35	2.516	1.158-5.464	0.020	1.657	0.674-4.073	0.271
36-44	1.857	0.589-5.855	0.291	0.308	0.084-1.131	0.076
45-53	1.803	0.545-5.962	0.334	0.330	0.0899-1.214	0.095
Marital Status						
Married	1.00			1.00		
Divorced	0.135	0.021-0.873	0.036	3.01	0.314-28.807	0.340
Widowed	0.547	0.005-0.617	0.019	5.029	0.524-48.307	0.162
Single	0.967	0.423-2.209	0.936	0.310	0.115-0.834	0.020
Co-habiting	0.376	0.009-15.474	0.606	0.437	0.004-44.809	0.726
Education						
None	1.00			1.00		
Primary	17.713	1.094-286.868	0.043	0.415	0.053-3.255	0.403
Middle School	110.04	5.484-2207.813	0.002	0.212	0.234-1.928	0.169
Junior High	16.30	0.994-267.395	0.051	0.541	0.069-4.187	0.556
Senior High	10.34	0.616-173.599	0.104	0.237	0.029-1.878	0.173
Technical	8.509	0.369-195.738	0.181	0.338	0.301-3.685	0.373
Tertiary	44.69	2.554-782.187	0.009	1.632	0.183-14.549	0.661
Religion						
None	1.00			1.00		
Christian	3.098	0.484-19.824	0.232	2.165	0.267-17.525	0.469
Islam	6.375	0.615-66.134	0.121	0.395	0.023-6.073	0.505
Traditional	5.0378	0.388-65.355	0.216	28.134	1.219-648.98	0.037

Table 9b: Logistic regressions of Factors associated with willingness to accept COVID-19 vaccines

Variable	Self			Someone		
	OR	95% CI	P-value	OR	95% CI	P-value
Occupation						
Unemployed	1.00			1.00		
Farming	0.277	0.058-1.331	0.109	9.966	1.525-65.116	0.016
Public/civil servant	1.805	0.635-5.130	0.268	1.908	0.585-6.226	0.284
Artisan	0.474	0.152-1.479	0.199	3.956	1.067-14.676	0.040
Trading	0.973	0.403-2.353	0.952	1.681	0.608-4.651	0.317
Apprentice	0.704	0.274-1.808	0.466	1.109	0.358-3.447	0.858
Risk of covid-19 vaccine uptake						
Risk Life with vaccine uptake	1.00			1.00		
Don't risk life with vaccine uptake	0.285	0.145-0.565	0.000	0.098	0.0408-0.238	<0.001
Don't know	0.690	0.176-2.714	0.596	0.320	0.079-1.289	0.109
Trust in health Institution /Gov't for type of vaccine						
Trust type of vaccine purchased	1.00			1.00		
Do not Trust type of vaccine purchased	0.425	0.192-0.943	0.035	0.303	0.114-0.806	0.017
Don't Know	0.309	0.114-0.839	0.021	0.164	0.050-0.547	0.003
Effectiveness of covid-19 vaccine						
Provide Protection	1.00			1.00		
Don't Provide Protection	0.351	0.171-0.722	0.004	0.357	0.152-0.837	0.018
Don't Know	0.996	0.359-2.761	0.995	2.213	0.675-7.255	0.190
Reduction of incidence of covid-19 with vaccination						
Possible	1.00			1.00		
Not Possible	0.389	0.129	0.005	0.131	0.064-0.268	<0.001

4.8 QUALITATIVE RESULTS

Twelve health workers participated in the interview. Most participants were females (n=7), with (n=5) males. They had an average age of 32 years with majority of participants having a diploma as the highest level of education. With regards to total number of years of service most participants had served more than 5 years in the health service. There were mental health nurses, nurse specialist, staff nurses, enrolled nurses and public health nurses involved in the qualitative study. Most health workers had already received the covid-19 vaccines while a minority were either against or unsure of whether to receive the vaccine or not to.

The thematic analysis resulted in three main themes in relation to the research question and objectives. The first theme refers to health workers perceptions of covid-19 vaccine safety, the second theme refers to health workers perceptions of covid-19 vaccine efficacy, the third theme looks at willingness to accept the vaccine, and finally factors associated with covid-19 vaccine acceptability.

4.8.1 Perceptions of covid-19 vaccine safety among health workers

For some participants the vaccine is safe and they do not think there is any doubt about safety as far as this covid-19 vaccines are concern, they also believe it went through the standard authorities and got approved so it safe. Some also felt there was sufficient evidence available to demonstrate the short-term safety of the covid-19 vaccines moreover the known side effects were not different from those that arise from other vaccines.

Contrary to these views some had reservation on safety even after receiving at least a dose of the vaccine. One said, **“Hmmm we have taken it, we pray to be safe, we can’t tell what the future holds for us, things were done in a hurry, it was an emergency, something had to be done. Under this circumstance you cannot be sure”** (participant #1, nurse specialist, male)

Additionally, some health workers believed that the vaccines did not go through all the trial stages hence safety was in doubt. One said **“You know vaccines take a longer time to develop but the hurried nature of the vaccine... it didn’t go through the various stages. I think it’s an emergency, something needs to be done and that’s what they did, they would definitely realize the mistake and know what should be taken out, you can never have it perfect”** (participant #8, midwife, female)

Another health worker said **“I think the vaccine didn’t go through all the necessary processes of development, what series of clinical trials have been done to fully give us that conviction that this thing is potent and doesn’t have side effect”** (participant #11, enrolled nurse, male)

4.8.2 Perceptions of covid-19 vaccine efficacy

Generally health workers were divided about covid-19 vaccine efficacy, some believe the vaccines were produced purposely to fight the virus, protect us and more importantly boost our immune system therefore it was important to trust the scientific evidence on vaccine efficacy, they stated that the data available from clinical trials was convincing so the vaccines were effective in reducing the severity of infections based on the low number of patients required to be hospitalized and given treatment at the intensive care unit but were quick to mention that the vaccine may not be effective in isolation. They argued that the other prevention and control measures needs to be considered before the vaccine could perform fully.

Contrary to this view some indicated that they can’t testify for effectiveness of the vaccine, one health worker said **“This vaccine is new to us so I can’t really tell if it is efficacious or not, so we are just hoping that whatever it was meant to do would do that”** (participant #12, public health nurse, male)

Another respondent said **“for efficacy I can’t tell because some of the people who got COVID were vaccinated before they had the infection again.”**

4.8.3 Vaccine acceptability

Most health workers had already received the covid-19 vaccine and explained that the main reason why they accepted the vaccine was mainly because they are health workers who were exposed to a lot of patient, therefore they were entreated to take the vaccine. Some were also of the view that vaccination would accelerate the easing of some covid-19 restrictive measures, such as limiting movement and observing safety protocols. One said **“am working in a hospital exposed to so many people, I don’t know who is who we get close to almost everybody so I had to protect myself with the vaccine” (participant #2, enrolled nurse, female)**

On the other hand some were reluctant in receiving the vaccine. They mentioned lack of vaccine safety as one of the key reasons for not accepting the vaccine. Some were also unwilling to accept the vaccine due to concerns of adverse events. One said **“I don’t think I need this vaccine I don’t know if it is safe or not so I won’t take it. I don’t know what would motivate me to take it. It just like common cold that we all experience so why are we worried. (Participant #4, nurse specialist, female)**

Other health workers were willing to receive vaccine that requires one dose for full protection. They are not willing to receive any vaccine that requires more than one dose. **“Me I want Johnson and Johnson one shot, you would not hear people complaining about it, if I don’t get that I won’t take any vaccine. I will continue taking my vitamin-C, I can’t go through that pain twice. (Participant #9, enrolled nurse, female)**

By and large, in balancing the risk of being vaccinated against the risk of suffering severe illness from covid-19, health workers were generally prepared to accept the risk associated with vaccination to minimize their risk of severe disease from covid-19.

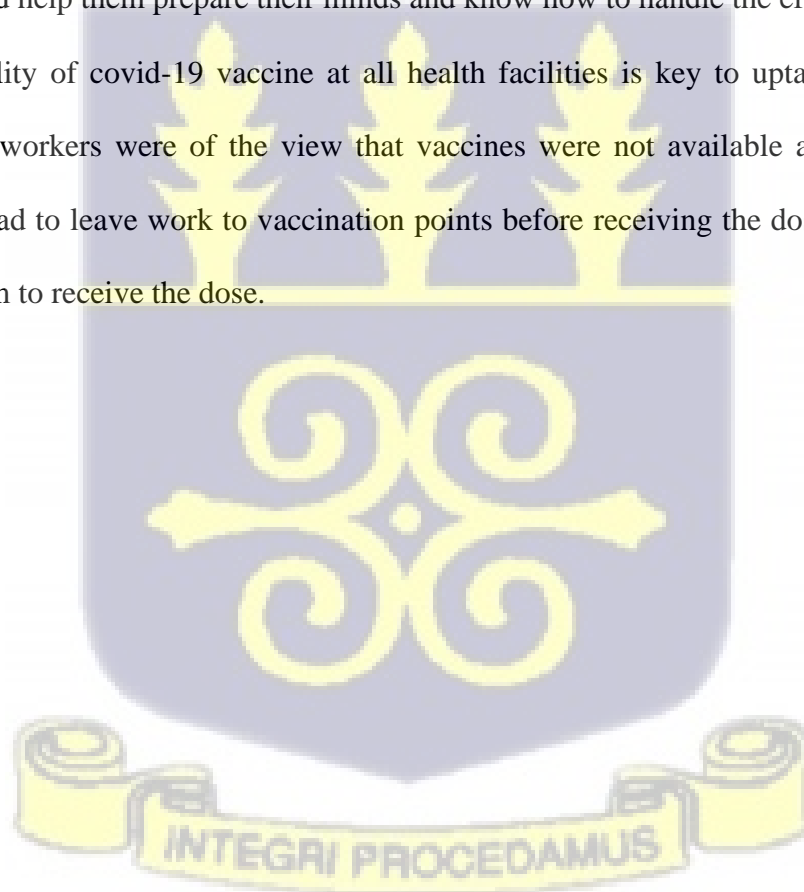
4.8.4 Contextual factors associated with covid-19 vaccine acceptability

Health workers have different factors being crucial for vaccine acceptance, mainly lack of information available on the covid-19 vaccines. They indicated that there are a lot of misinformation about the covid vaccine which makes them uncertain about decisions on covid vaccine. Therefore lack of information was a contributing factor to vaccine acceptance.

Most health workers indicated continues education is the key factor that can help them receive the vaccine. This would make them take an informed decision and help educate clients as well.

Some health workers were of the view that expected adverse events after receiving the covid does should be explained clearly to them to know what to look out for when people receive the dose. This would help them prepare their minds and know how to handle the effect.

Finally availability of covid-19 vaccine at all health facilities is key to uptake of the covid vaccine, health workers were of the view that vaccines were not available at their facilities therefore they had to leave work to vaccination points before receiving the dose, this makes it difficult for them to receive the dose.



5.0 DISCUSSION

5.1 Introduction

Many vaccinations have been produced, and several vaccine candidates are in development, with positive results in various clinical trials (Sagheer et al 2021). Countries have given their approval for specific vaccines to be used in vaccination campaigns. Ghana's government and health service have begun the COVID-19 vaccine campaign, signalling their commitment to ending the pandemic. Despite the fact that Ghana's health care provides a variety of vaccination services, the unique nature of the COVID-19 vaccination roll-out reveals a number of bottlenecks in the country's vaccine attitudes and acceptability. The perceptions of COVID-19 vaccination safety, effectiveness, and acceptability among health workers and community members aged 18 and up in Ho municipality are presented in this study. The findings show that sociodemographic factors influence COVID-19 safety, efficacy, and perceptions towards vaccination roll-out.

5.2 Perceptions of COVID-19 Vaccine Safety

In this study, 59% of respondents believe the COVID-19 vaccines currently being rolled out in Ghana are unsafe, which is higher than a study in China that found 48% of respondents delaying COVID-19 vaccination to confirm the vaccine's safety, indicating their concerns about the vaccine's safety (Wang J. 2020). When it comes to safety by sex, males are more likely than females to feel that the COVID-19 vaccine is harmful (66.18 percent vs. 50.75 percent), which contradicts Katherine et al(2022) findings indicating females are more likely to believe that the COVID-19 vaccine is unsafe.

In this study, the majority of respondents who perceived that the COVID-19 vaccine was not safe were rural dwellers, which is higher but similar to what was found in the US against urban dwellers (27.6% vs. 15.3%) by Katherine et al. (2022). The reason for this could be that communication on

COVID-19 vaccinations is mainly performed within urban areas. According to the CDC, individuals living in rural areas are more likely to die from COVID-19 than those living in urban areas, with death rates of above 1 per 100,000 compared to 0.6 per 100,000 in urban populations, indicating that dangerous vaccinations lead to low uptake. These disparities are most likely due to the strain on rural hospitals, which are often small and understaffed.

Additionally, the majority of community members were aware of the associated side effects of the COVID-19 vaccine, but some were willing to risk taking the vaccine. With regard to receiving adequate COVID-19 safety information, which contributed to the perception of safety, only 28% agreed that there was enough safety information about the vaccine.

Overall, it can be said that most community members perceive the COVID-19 vaccine as unsafe. This is not different among health workers as well; in-depth interviews have shown that health workers were in doubt of vaccine safety even after receiving at least dose. Furthermore, health workers' concern leading to uncertainty was attributed to the fact that vaccines supplied did not go through all the trial stages; hence, safety was in doubt. Addressing this issue through communication will promote confidence in the vaccine, as indicated in a study by Dror et al (2020), is critical.

With regard to trust in the health system and government in providing the safe vaccine for the general population, the results from this study show that most respondents (52.6%) did not trust COVID-19 vaccine safety. Larson et al. (2018), in their study measuring trust in vaccination, highlighted that vaccine-related trust is a multidimensional construct involving factors such as trust in the healthcare system, science, and government. In the qualitative study, some health workers trusted in government for vaccine safety because some respondents have ready taken the vaccine.

5.3 Perceptions of COVID-19 vaccine effectiveness

Study participants were assessed on the perception of COVID-19 vaccine effectiveness; approximately half believed that there are better ways to prevent COVID-19 than vaccines, specifically by observing preventive protocols, using medications, and staying at home. Furthermore, only 3 of 10 participants believed that the COVID-19 vaccine protects against COVID-19 and that the level of protection is moderate. Unawareness of vaccine effectiveness could be attributed to limited education associated with COVID-19 in the municipality. In the qualitative study, health workers were of the view that the COVID-19 vaccine is not effective, and they did not have enough education to ascertain the effectiveness of the vaccine.

Participants in urban areas had greater perceived COVID-19 vaccine efficacy rates than those in rural areas. This is similar to a study by Stefania et al. (2021), which found that urban areas have a higher perception of COVID-19 vaccine efficiency than rural ones. This link could be due to the fact that city inhabitants are more aware of COVID-19 prevention than rural dwellers.

This study also found that educated respondents were more likely to perceive that COVID-19 vaccines would effectively control and prevent COVID-19 than those with lower or no formal education. This is consistent with a study by Roy Rillera Marzo et al. (2022), which found educated participants who perceived the COVID-19 vaccine to be effective.

Finally, most participants in this study indicated that the COVID-19 vaccine was not effective, and this was contrary to a multi-country study among the general adult population that believed the COVID-19 vaccine would effectively control and prevent COVID-19.

5.4 Willingness to accept the vaccine and associated factors

In the current study, approximately 5 in 10 people were willing to accept the COVID-19 vaccine, while approximately 62% were willing to recommend the COVID-19 vaccine to others. This is lower than the 64.5% reported in Malaysia (Mohamed et al., 2021) and 63.4% in Lebanon (Hanna et al., 2022). Findings from this study were, however, similar to an earlier study conducted in

Ghana, where 54.1% were willing to accept the COVID-19 vaccine (Lamprey et al., 2021). In the qualitative study, most health workers 7 in 10 were willing to accept the vaccine, which shows a relatively high vaccine acceptance rate among health workers in the region compared to community members, similar to an earlier study in Ghana among health workers by Robert et al (2021) reported that 70% of health workers accepted the vaccine, which was relatively high among health workers in Nigeria (Enitan, et al 2020), DRC (Nzaji et al, 2020) and outside the sub-region, such as France (Verger et al, 2020). This is also contrary to a study in Hong Kong that found that 40% of nurses accepted the vaccine (Wang et al 2020).

The reason for low-level acceptance in this study could be due to uncertainty associated with the COVID-19 vaccine in the country and limited education. In the bivariate analysis, several factors were associated with vaccine acceptance. Younger age, widowed participants, level of education, risking one's life, and not trusting the government predicted vaccine acceptance. Participants aged 27-35 years were more likely to accept the COVID-19 vaccine compared to a much younger age group (18-26 years). This study is the first to report that a younger age group is associated with the uptake of the COVID-19 vaccine. The reason for this observation could be because participants in this age group are of school-going age and hence could be exposed to avenues and means of information that might have positively influenced their perception of COVID-19. To corroborate the findings of this study, a study that was conducted among college students observed that the students were more likely to engage in vaccine trials because they had basic knowledge (Britt & Englebert, 2018). Further analysis showed that widowed and divorced participants were less likely to accept the COVID-19 vaccine. This is contrary to what was observed in Ohio, where the odds of accepting the COVID-19 vaccine were reduced among those who were never married (Haile et al., 2022). The found link can be explained in part by the fact that widowed participants are more likely to be elderly and hence have limited access to information, resulting in reduced acceptance. According to certain research, married people have better health experiences and results than single or previously married people.

The results showed that participants who were not willing to risk their lives were less likely to accept the COVID-19 vaccine. This study is the first to report risking life to take the vaccine as a predictor of COVID-19 vaccine acceptability in Ghana. The reason for this observation could be ascribed to the uncertainty of the effectiveness and safety of vaccines leading to less confidence in opting for uptake. This can also be alluded to the physiological orientation towards the vaccine due to political perceived affiliations, as reported by other studies (Lindholt et al., 2021). Participants who knew that the COVID-19 vaccine may not protect them against infection were also less likely to accept the vaccine. This is consistent with other studies that reported knowledge and awareness of vaccine effectiveness predicting vaccine acceptance in Ethiopia (Mesesle et al, 2021) and India (Dara et al., 2021). Furthermore, participants who did not believe the pandemic could be mitigated with the vaccine and did not trust the government were less likely to accept the COVID-19 vaccine than their counterparts. This finding is similar to what was reported in Saudi Arabia, where trust in the health care system is strongly associated with vaccine acceptance (Alqahtani et al, 2022) and other countries (Trent et al., 2021).

In the qualitative study, it was observed that sex and ownership of the health facility where the health worker works are contributing factors to vaccine uptake. It was found that female health workers were more likely to receive the vaccine than male health workers, as was reported in the quantitative study. This finding is similar to a study in Congo by Ditekemena (2021), where female health workers were more likely to receive the vaccine. It was also found that health workers were more likely to receive the vaccine at their facilities (Robert et Al. 2021) found similar results in Ghana.

Despite the important findings highlighted in this work, there were some limitations; since covid-19 vaccine is not mandatory so far, those who got the covid-19 vaccine were considered among the accepting group regardless of whether they were hesitant or forced as health workers prior to vaccination. The study may not be representative of the national reactions to the covid-19 vaccine as it didn't include studies from all regions of the country. But the study did have some significant

advantages. First, because participants came from each sub-district within the Ho municipality, the sample is more likely to yield results that may be generalized to the entire municipality or to the region.



6.0 Conclusion

This study examined vaccine acceptance among community members and health workers in Ho municipality. Five out of ten community members aged 18 and above were found willing to accept the COVID-19 vaccine if it was made generally available within the municipality. Six out of 10 study participants were willing to encourage others to accept the COVID-19 vaccine.

Also, the results show differences in COVID-19 vaccine acceptance in some socio-demographic characteristics. For instance, there is low vaccine acceptance among younger age groups, while females are more likely to receive the vaccine than males. Additionally, there were no significant associations found between willingness to accept the COVID-19 vaccine and marital status or religion. Participants' perceived risk of vaccine uptake and trust in the health system were found to be significant predictors of willingness to accept the COVID-19 vaccine.

Only a more effective and well-funded public education campaign will be able to increase vaccine uptake. In light of the fact that the majority of health professionals believe the COVID-19 vaccination to be ineffective and unsafe, it is crucial to allay their concerns and give them greater leverage as advocates of a successful vaccine deployment.

6.1 Recommendations

COVID-19 vaccine education must be stepped up among community members with lower educational levels, particularly among younger groups, with a special focus on men. A public awareness effort stressing the socioeconomic benefits of COVID-19 vaccination could boost vaccination rates. Stakeholder participation should be effective in promoting vaccination uptake.

In order to promote vaccine acceptability, governments should take steps to provide proper understanding, good attitudes, and views about COVID-19 vaccines.

To sum up, I advocate conducting a qualitative study to determine why community members are not getting a complete dose of the COVID-19 vaccination, which would result in herd immunity.

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Appendix A

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

**INFORMATION AND CONSENT FORM FOR STUDY
PARTICIPANTS – QUANTITATIVE INTERVIEWS**

Section A- BACKGROUND INFORMATION

Title of Study:	Roll out of covid-19 vaccination: Perception and factors associated with Acceptability of Covid-19 vaccine among Health workers and Community members in Ho Municipality, Volta Region of Ghana
Principal Investigator:	Edem Vidzro, University of Health & Allied Sciences, Ho, e-mail – evidzro@uhas.edu.gh , tel: +233 242230259
Site Principal Investigator	Edem Vidzro, University of Health & Allied Sciences, Ho, e-mail – evidzro@uhas.edu.gh , tel: +233 242230259
Certified Protocol Number	

Section B– PARTICIPATE INFORMATION SHEET

General Information about Research

The overall purpose of this study is to determine the Perceptions and factors associated with Acceptability of Covid-19 vaccine among Community members in Ho Municipality. You have been selected to partake in the study because you reside in Ho municipality in the Volta Region of Ghana.

If you agree to participate in this study, we will kindly request you to respond to some questions during an interview in order to document your very valuable perceptions and acceptability of vaccine safety among community members. The interview will last for approximately 30 minutes.

Benefits/Risks of the study

The study does not anticipate any potential risk. However, if any of the questions makes you uncomfortable, you do not have to respond. There are no direct benefits for your participation, although you will contribute critical information to the acceptability of Covid-19 among community members in Ho Municipality.

Confidentiality

The interview is strictly confidential so your responses will not be shared with anyone. Your name and personal information will not be given to anyone or linked with the information provided during the interview. The data we collect may be published. All the information you

provide will be kept in a locked file and your name will never be used in any research report that comes from this study. You have every right to access information you have provided after the study.

Compensation

No compensation will be given for participation in the study.

Funding Information

This is a student work and there is no funding for it

Voluntary Participation and Withdrawal from Study

Your opinions on perceptions and acceptability of Covid-19 vaccine safety among community members are very essential to this study. Your consent to participation in this study is completely voluntary and you can decline consent or withdraw at any time during the study. There will be no consequences or penalty if you decline consent or decide to withdraw from participating in this study.

Outcome and Feedback / Data

The findings of this study will be shared with you and other stakeholders for policy decision-making. All data will be securely kept under lock. The data will be stored for a period of five years after which it will be destroyed.

Adherence of Covid-19 Protocol

During data collection, the research team will strictly adhere to Covid-19 protocols by Proving nose masks, dropping hand sanitizers in participants' hands and observing social distancing.

Contact for Additional Information

In case of any questions and clarification, please contact the following persons;

Principal Investigator

Name: Edem Vidzro

Institutional affiliation:

Department of Epidemiology and Disease Control
School of Public Health
College of Health Sciences
University of Ghana.

Email Address: evidzro@uhas.edu.gh

Tel Number: 0242230259

If you have any questions about your rights as a research participant in this study you may contact the Ghana Health Service Administrator of the Ethics Review Committee, at ethics.research@ghsmail.org or 0503539896.

Section C- PARTICIPANT AGREEMENT

"I have read or have had someone read all of the above, asked questions, received satisfactory answers regarding participation in this study, and am willing to give consent to participate in this study. I will not have waived any of my rights by signing this consent form. Upon signing this consent form, I will receive a copy for my personal records."

Name of Participant

Signature or mark of Participant

Date

If participant cannot read and or understand the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the participants. All questions were answered and the participant has agreed to take part in the research.

Name of witness

Signature of witness / Mark

Date

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's Name.....

Signature.....

Date.....



GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

**INFORMATION AND CONSENT FORM FOR STUDY
PARTICIPANTS – QUALITATIVE INTERVIEWS**

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If you agree to participate in this study, we will kindly request you to respond to some questions during an In-depth-interview in order to document your very valuable perceptions and acceptability of vaccine safety among health workers. The discussion will last for approximately 30-45 minutes. To make sure we follow exactly what you tell us, we will be recording the whole interview on a digital recorder. These recordings will then be typed up, word-for-word for report.

Benefits/Risks of the study

The study does not anticipate any potential risk. However, if any of the questions makes you uncomfortable, you do not have to respond. There are no direct benefits for your participation, although you will contribute critical information to the acceptability of Covid-19 among health workers in Ho Municipality.

Confidentiality

The interview is strictly confidential so your responses will not be shared with anyone. Your name and personal information will not be given to anyone or linked with the information provided during the interview. The data we collect may be published. All the information you provide will be kept in a locked file and your name will never be used in any research report that

comes from this study. You have every right to access information you have provided after the study.

Compensation

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The findings of this study will be shared with you and other stakeholders for policy decision-making. All data will be securely kept under lock. The data will be stored for a period of five years after which it will be destroyed.

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Name of Participant

Signature or mark of Participant

Date

If participant cannot read and or understand the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the participants. All questions were answered and the participant has agreed to take part in the research.

Name of witness



Signature of witness / Mark

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study.
All questions and clarifications raised by the participant have been addressed.

Researcher's Name.....

Signature.....

Date.....



Appendix C

Roll out of covid-19 vaccination: Perception and Acceptability of vaccine safety among Community members in Ho Municipality, Volta Region of Ghana

BACKGROUND DEMOGRAPHICS

COMMUNITY.....
District.....

Sub-

Date of Interview: / / (DD/MM/YYYY)

Time Interview Started: (24HR CLOCK)

SECTION A: RESPONDENT BACKGROUND CHARACTERISTICS

NO.	QUESTIONS	RESPONSES	
1	How old are you? (completed Years)	_____ years	
2	Sex	Male.....1 Female.....2	
2	What is your marital status?	Married.....1 Divorced.....2 Widowed.....3 Single.....4 Co-habiting.....5	
3	What is your highest level of education?	Primary school.....1 Middle School.....2 Junior High School.....3 Senior High School.....4 Vocational/Technical School.....5 Tertiary.....6 None7 Other (specify).....96	

4	What is your ethnicity?	Ewe.....1 Ga.....2 Dangme3 Akan.....4 Other (specify).....96	
5	What is your religion?	Christian1 Islam2 Traditional.....3 None.....4 Other(specify).....96	
6	Residency Type	Urban.....1 Rural.....2	
7	What is your occupation?	Unemployed.....1 Farming.....2 Public/Civil Servant.....3 Artisan.....4 Trading.....5 Apprentice.....6 Unemployed.....7 Fishing.....8 Other, Specify.....96	

SECTION B: KNOWLEDGE AND PRACTICES ABOUT COVID-19

8	What are the common symptoms of Covid-19? <i>(Allow Multiple responses)</i>	Fever.....1 Dry cough.....2 Tiredness.....3 Difficulty breathing.....4 Chest pains5 Aches and Pains6 Sore throat.....7 Don't Know.....88 Other, specify..... 96	If DK skip to 11
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9	Have you ever felt any of these symptoms of Covid-19	Yes.....1 No.....2 Don't remember..... 3 Don't Know.....88	If no/DR/DK skip to 11
10	Where did you seek care when you had these symptoms	Health Facility.....1 The Pharmacy.....2 Chemical shop.....3 Traditional Medicine/Herbalist.....4 Home Remedy.....5 Didn't seek care.....6 Don't Know.....88	
11	What do you usually do to protect yourself from getting infected with Covid-19?	Wear Nose mask1 Observe Social Distancing2 Regularly washing of hands3 Using Hand Sanitizer4 Don't Do anything5 Other, specify.....96	
AWARENESS AND PERCEPTION ABOUT COVID-19 VACCINES.			
12	Have you experienced any event after vaccination in the past?	Yes.....1 No.....2 Don't Remember.....3 Don't Know.....88	If No/DR/DK skip to 15

13	If Yes, what was the event	Headache.....1 Redness of Sight.....2 Pain.....3 Swelling.....4 Itching.....5 Vomiting.....6 Don't Know.....88 Others, specify.....96	
14	Would this event discourage you from getting any Vaccine?	Yes.....1 No.....2 Don't Know.....88	
15	Have you heard about the newly discovered covid-19 vaccine	Yes.....1 No.....2 Don't Know.....88	IF NO SKIP TO 17
16	Do you think the newly discovered Covid-19 vaccine may have side effect	Yes.....1 No.....2 Don't Know.....88	
17	Do you think that if everyone in the community maintains the preventive measures the covid-19 pandemic can be eradicated without vaccination	Yes.....1 No.....2 Don't Know.....88	

18	Do you believe that there are other better ways to prevent COVID-19 than vaccines	Yes.....1 No.....2 Don't Know.....88	If No/DK skip to 20
19	If yes, which other ways can Covid-19 be prevented	Through preventive medication.....1 Observing the Covid protocols.....2 Stay home if you feel any symptoms.....3 Others (specify).....96	
20	Who do you think should have been vaccinated	Those who have not yet been infected.....1 People infected with Covid-19.....2 Newly recovered from covid-19.....3 Everyone.....4 Don't Know.....88 Others (specify).....96	
21	Who's supposed to be vaccinated first	General Public.....1 Health workers.....2 Public/Private employee.....3 Teachers/Students.....4 Businessmen who travel in and out.....5 Others (specify).....96	
22	Do you think the vaccination should be administered free of charge.	Yes.....1 No.....2 Don't Know.....88	

23	Would you afford the vaccine at your own expense if it was not provided freely by the government	Yes.....1 No.....2 Don't Know.....88	
24	Does your religion influence your decision for taking the Covid-19 vaccine	Yes.....1 No.....2 Don't Know.....88	
25	Do you think you will be risking your health for not receiving the vaccine?	Yes.....1 No.....2 Don't Know.....88	
26	Do you trust the health service/Government on the type of Covid-19 vaccine been provided?	Yes.....1 No.....2 Don't Know.....88	
27	Do you think Covid-19 vaccines should be made compulsory	Yes.....1 No.....2 Don't Know.....88	If No/DK Skip to Q29

28	If yes, Why should it be made compulsory	To prevent death.....1 To protect people from Covid.....2 Because vaccines are safe.....3 Other Specify.....88	
29	Do you think covid-19 vaccine provides protection against covid	Yes.....1 No.....2 Don't Know.....88	
30	What level of protection do you think Covid-19 vaccine provides	Maximum Protection.....1 Moderate Protection.....2 Minimum Protection.....3 No Protection.....4 Don't Know.....88	
31	Do you believe covid-19 vaccine is safe for you and the general population	Yes.....1 No.....2 Don't Know.....88	



SECTION C: COMMUNICATIONS ON VACCINATION

32	Do you hear of vaccination in this community	Yes1 No.....2 Don't know.....88	If No/DK skip to Q34
33	If yes, how do you hear about vaccination in this community? <i>(Allow Multiple responses)</i>	Radio1 Television2 Health workers3 Posters4 Family members5 Church/Mosque.....6 School7 Workshop/Training8 Community Outreach.....9 Information van.....10 Health volunteers.....11 Other (Specify).....96	
34	What is the most common information source you listen for information about vaccines?	Radio1 Television2 Health workers3 Posters4 Family members5 Church/Mosque.....6 School7 Workshop/Training8 Community Outreach.....9 Information van.....10 Health volunteers.....11 Other (Specify).....96	
35	Have you heard any rumor on Covid-19 vaccination	Yes.....1 No.....2 Don't Know.....88	If No/DK skip to Q39



36	<p>If Yes, what kind of rumor have you heard about Covid19 Vaccine? Multiple Response</p>	<p>Vaccine not safe.....1 Meant to reduce the population.....2 May cause infertility.....3 Was meant for politicians to make money.4 Could make you sick of covid.....5 Vaccine was rushed and there wasn't enough testing.....6 Others (specify).....96</p>	
37	<p>When you heard the rumor on covid-19 vaccination, did you ask or discuss with anyone.</p>	<p>Yes.....1 No.....2 Don't Know.....88</p>	
38	<p>If Yes, who did you discuss the rumor with Multiple Response</p>	<p>Friends.....1 Family members.....2 Neighbors.....3 Colleagues.....4 Religious groups.....5 Don't Know.....88 Other specify.....96</p>	
39	<p>What is the best way to inform members of this community about the new Covid-19 Vaccine?</p>	<p>Radio1 Television2 Health/Education workers3 Posters4 Family members5 Church/Mosque.....6 School7 Workshop/Training8 Community Outreach.....9 Information van.....10 Health volunteers.....11 Other (Specify).....96</p>	

40	In your opinion, which educational materials best convey health messages to people in this community? <i>(Allow Multiple Response)</i>	Banners1 T-shirts2 Leaflets.....3 Posters/pictures.....4 Charts5 Booklets6 Other (Specify).....96	
41	What kind of communication will you want to receive about this new vaccine Multiple Response	Issues on eligibility.....1 Issues on safety.....2 Number of shots to be taken.....3 Level of protection.....4 Other specify.....88	
42	Do you think there is adequate safety information about the Vaccine	Yes.....1 No.....2 Don't Know.....88	

SECTION D: VACCINE ACCEPTABILITY

43	Will you accept to take the vaccine if it is available in the municipality?	Yes.....1 No.....2	If no skip to 45
50	What factors will motivate you to accept this new vaccine for Covid-19? Multiple Response	Readily available vaccine.....1 An improvement in health providers attitude.....2 Enough education on the vaccine.....3 Proximity to vaccination center.....4 Other specify.....96	
51	What can be done to make all community accept this new vaccine safely? Multiple Response	Adequate public education.....1 Proximity.....2 An improvement in health providers attitude.....3 Follow up by health providers.....4 Readily available vaccine.....5 Other(specify).....96	

46	Will you encourage family/friends/relatives to get vaccinated	Yes.....1 No.....2	
47	It is possible to reduce the incidence of covid-19 with vaccination?	Yes.....1 No.....2	
48	Do you feel social pressure to get the vaccine?	Yes.....1 No.....2	
49	What would prevent you from accepting Covid-19 vaccine?	Traditional beliefs.....1 Level of education.....2 Inadequate health information.....3 Distance of vaccination center.....4 Rumors5 Don't know.....88 Other (specify).....96	
52	What other suggestions do you have for a successful COVID-19 vaccination?	

Thank you for your time.



Appendix D

Qualitative Data Collection Tool

Roll out of covid-19 vaccination: Perception and Acceptability of vaccine safety among Health workers in Ho Municipality, Volta Region of Ghana

Date of interview: ____ / ____ / ____

Basic information

Age of respondent:

Sex of respondent:

Qualification:

Total working years as a health worker (current position): _____

Cadre of health worker

SECTION A: AWARENESS OF COVID-19

Q1. Can you please tell me how you heard of Covid-19? *Probe for the various sources*

Q2 What are the common signs and symptoms of covid-19? *Probe for have you felt any of these signs and symptoms within these COVID period? And what was done about it.*

Q3. What do you do to protect/prevent yourself from COVID infection? *Probe for the various ways of protection, etc.*

Q4. Among the things that you do to protect yourself from COVID, which ones would you recommend has been very effective for you?

KNOWLEDGE AND PERCEPTIONS ON COVID-19 VACCINE

Q5 Please tell me what you know about Covid-19 vaccine. *Probe for effectiveness of the vaccine*

Q6. Please tell me what you know about COVID-19 vaccine protection? *Probe for level of protection and reasons*

Q7. Please tell me what you know about COVID-19 vaccine safety? *Probe for how safe the vaccine is*

Q8. What are some of the covid-19 vaccine adverse event you know about? *Probe for the events and what was done about it as a facility, would the event influence your decision to get another vaccination etc.*

Q9 What are some of the rumours you heard about COVID-19 vaccination? *Probe: what kinds of rumour and how has it affected uptake of the vaccine among health workers?*

Q10. What do you do as a health worker to promote COVID-19 vaccination at your facility?

Q11. What is your perception about the vaccine made compulsory among health workers? *Probe for reasons*

Q12. What is your view on Government decision on the type of vaccines being purchased among all vaccine produced in the world?

Probe for Do you trust the Gov't on the vaccine procured.

Communication on vaccination

Q13 What kind of communication have you received on COVID-19 vaccination?

Probe for source of communication, particular communication, training etc.

Q14 Do you think there are adequate communication about COVID-19 vaccine among health workers? *Probe have that influenced uptake of the vaccine*

Q15 what is the best way to communicate to health workers about covid-19 vaccination?

Probe for: which educational materials can best convey messages on health workers vaccinations etc.

Vaccine Acceptability

Q16. What is your decision on taking the COVID-19 vaccine?

Probe, what informed your decision to take or not to take the vaccine, Did you experience and adverse event after vaccination (if vaccine was taken)

If Not vaccinated, why didn't you receive the vaccine? What would make you receive the vaccine?

Q17. What factors would enable all health workers accept the vaccine?

Q18. Do you feel pressured as a health worker to receive the COVID vaccine? **Probe** why

Q19. What can be done to make all health workers receive the vaccine?

