ENSIGN GLOBAL COLLEGE

KPONG, EASTERN REGION, GHANA

FACULTY OF PUBLIC HEALTH

DEPARTMENT OF COMMUNITY HEALTH

DETERMINANTS OF COVID-19 VACCINE ACCEPTANCE IN ASUOGYAMAN DISTRICT OF THE EASTERN REGION OF GHANA

BY

EMMANUEL PARTEY

(217100201)

JULY, 2022

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A THESIS SUBMITTED TO THE DEPARTMENT OF COMMUNITY HEALTH,

IN THE FACULTY OF PUBLIC HEALTH, ENSIGN GLOBAL COLLEGE

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR

THE MASTER OF PUBLIC HEALTH DEGREE

JULY, 2022

DECLARATION

I hereby declare that; this project work is the result of my own original research towards the award of Master of Public Health degree and that no part of it has been presented for the awards of Master of Public Health degree in this College or elsewhere except where due acknowledgement has been made in the text.

Emmanuel Party	……	……
(217100201)	Signature	Date
Dr. Millicent Affori Boating	….……	……
(Supervisor)	Signature	Date
Dr. Stephen Minority	….……	……
(Head of Programme)	Signature	Date

DEDICATION

This research work is dedicated to the Almighty God for his wisdom, strength, guidance, mercy and grace to complete this work. I also dedicate it to my wife and Family for their encouragement and support.

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I wish to extend my profound gratitude to the President of the College, Proof Stephen Alder, Rd. Stephen Minority, Head of programs, my able lecturer and supervisor, Rd. Millicent Affori Boating and all the staff of the College for their technical support throughout my studies at the school. May God richly bless you all.

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- Mrs. Joyce Claudia Akolgo - District Nutrition Officer
- Mr. Evans Safo-Danquah - District Health Information Officer
- Mrs. Stella Dede Abebreser - District Pharmacist
- Mrs. Jessica Kassim - Administration & Human Resource Officer
- Mr. Enoch Appiah - Accountant
- Mr. Justice Yeboah - Field Technician

I say, God richly bless you.

LIST OF ABBREVIATIONS

AEFI	-	Adverse Events Following Immunization
AOR	-	Adjusted Odds Ratio
COVID-19	-	Coronavirus Disease 2019
CHPS	-	Community Based Health Planning and Services
COR	-	Crude Odds Ratio
DCE	-	District Chief Executive
DHMT	-	District Health Management Team
GHS	-	Ghana Health Service
HPV	-	Human Papilloma Virus
HBM	-	Health Belief Model
SATA	-	Statistical Software
USA	-	United State of America
VA	-	Vaccine Acceptance
VRA	-	Volta River Authority
WHO	-	World Health Organization

ABSTRACT

Introduction

Coronavirus disease 2019 was declared a pandemic in March 2020. Vaccination is an important tool in the global response to the COVID-19 pandemic. As vaccines for COVID-19 have been developed and deployed, one of the questions being asked is what determines its acceptance by the people in relation to past vaccine experience, knowledge on the disease, beliefs and understanding of the vaccine? This research was to assess determinants of COVID-19 vaccine acceptance in Asuogyaman district of the Eastern Region of Ghana.

Methodology

This was a quantitative cross-sectional study conducted in Asuogyaman District, Ghana between July and September 2022 with 365 randomly selected participants aged 15 years and older. Analysis was done using Stata 17.0 with Chi-square and multivariate logistic regression models with a p- value < 0.05 as the threshold of statistical significance.

Results

Out of the 365 study participants, 288 (78.90%) indicated their unwillingness to accept the COVID-19 vaccine. One key reason as identified was AEFI or the side effect of the vaccine after their 1st dose of the vaccine, more than half 117/166 (70.48%). Age and educational level were found to be associated with the COVID-19 vaccine acceptance. Persons aged 26-45years [AOR=0.31 (95% CI: 0.11, 0.92), p=0.034] 46-55years [AOR=0.20 (95% CI: 0.05, 0.87), p=0.032] were 69% times and 80% less likely to accept COVID-19 vaccine.

Conclusions

There is low knowledge level about Coronavirus disease in the district. There is also low COVID-19 vaccine acceptance in the area. Age, educational level and AEFI were the key factors identified.

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CHAPTER 1

INTRODUCTION

1.1 Background Information

The coronavirus is a disease transmitted by coronavirus 2 (SAR-CoV2) through breathing and it is an upper respiratory tract disease. It first appeared in Wuhan, the capital city of Chine around December 2019. The pandemic had effect on nearly all countries and has caused enormous mortality and economic burden in the world (WHO, 2021) In Ghana, two cases were detected simultaneously and recorded on 12 March 2020 at the Noguchi Memorial Institute in Accra. Asuogyaman district also recorded its first cases (10 cases) on April 14, 2020 (Directorate, 2021). Since then, the whole world including Ghana has been battling with the disease regarding its control. Countries try to adopt lockdown which also came with its challenges. It was not economically feasible especially, in developing Countries (Lytras & Tsiodras, 2021). Estimates show that the virus has reduced global economic growth by 2.7% as against 5.9% growth rate projected in 2021. The world's commercial activity was predicted to operate 60% less than its possible production level at least until 2024, indicating less general and specific economic well-being than before the pandemic. On an annual basis, the real GDP of the USA is estimated to have decreased by 3.4% in 2020 compared to 2019. In 2021 third quarter, the yearly growth rate of the US GDP increased to 2.0%, after it increased to 6.3% and 6.7% in the first two quarters of 2021(Sarıışık and Usta, 2021).

Indeed, the COVID-19 pandemic has really affected the world in terms of the infection and death rate which has also impacted negatively on the world economy (Malik et al., 2020). Every country tried to develop a new approach to limit rapid increase of cases depending on its settings and what was feasible for it (Saefulloh et al., 2021). The WHO, in line with

its mandate, gave a recommended protocol to guide countries to manage the spread until vaccines are developed to deal with the pandemic (Jebril, 2020). These protocols are: Social distancing, frequent washing of hands with running water, using hand sanitizers and wearing a mask in public places, etc.

Among all these, vaccines and social distancing were strongly recommended as the best way to control the rapid spread of the disease (Lytras & Tsiodras, 2021). However, for people to continue with their socio-economic activities, wearing of face masks became the order of the day. But the wearing of the face masks is not too comfortable and so, most people do not like wearing it and this has resulted in continuous spread of the disease (Ameme *et al.*, 2021). A lot of African Countries including Ghana were seriously affected physically, socially and economically.

Globally, as at 10th March 2022, total number of confirmed cases cumulatively was 443,895,854.

The total deaths were 5,993,901. The newly confirmed cases reported was 10,391854 and total new deaths was 52,740 (WHO, 2022a). As at 10th March 2022, the total number of confirmed cases recorded in Ghana was 168,457 with 1,459 deaths (WHO, 2022d). In Asuogyaman District, the picture is not different. In 2020, the total cases recorded was 41 with no death. In 2021, the total cases recorded rose to 810 with 12 deaths representing 1.5% of the total cases(Directorate, 2021).

On 1st march 2021, the first vaccine was deployed in Ghana Despite this breakthrough, studies have reported poor COVID-19 vaccine acceptance rates (Advisor, Hygiene and Kouassi, 2021). What might possibly be the reasons for the current acceptability rate? Given the poor vaccine acceptance rates in Ghana (Agyekum et al 2021). This work seeks to evaluate the determinants of coronavirus disease vaccine acceptance in Asuogyaman district of the Eastern Region of Ghana.

1.2 Problem Statement

The availability and accessibility of the vaccine for COVID-19 was proposed as the best approach for dealing with pandemics. According to this and taking into account the Expanded Program on Immunization, many Children around the world have been protected from many childhood killer diseases. By the end of 2021, approximately 81% of the children globally (105 million children) were given 3 doses of the pentavalent vaccine (DPT HipHeb), shielding them from communicable illnesses that could lead to stern disease, disability, and mortality in children. Other vaccine are; Men A 85%, Pcv3 80%, OPV3 85% 49%, Rota 49% etc (WHO, 2021). However, in the case of COVID-19 vaccine and its acceptability, the story seems quite different. As at 10th March. 2022, Ghana had recorded a total COVID-19 cases of about 160,028 and 1442 deaths (GHS 2022) due to the pandemic. The world including Ghana has experienced three waves of the covid-19 disease with different strains; Coronavirus, delta and Omicron (Adjaottor *et al.*, 2022). These waves have seriously affected the health and economy of many African countries including Ghana. Reflecting on this negative impact, the availability and accessibility of COVID-19 vaccine were suggested to be the most promising antidote to this pandemic, yet in the disposition of the vaccine, the poor acceptance rate especially in less developed countries has challenged the perceived benefits (Cuadros-González, 2021).

Globally, 67.2% of the population were given at least a dose of the vaccine for coronavirus disease as of March 2022. A total of 12.42 billion doses of the COVID-19 vaccine was given, and 5.79 million are given each day. Despite this, only 20.2% of the eligible population in developing countries in Africa were vaccinated with at least one dose (Vaccine Tracker, 2022). Since March 2021, Ghana received some COVID-19 vaccine to vaccinate the vulnerable groups in the country, the health workers and the security

personnel. This was because, the vaccine was not enough to cover many people. In July 2021, there were enough COVID-19 vaccine in the country to vaccinate the populace (GHS, 2021). However, with the availability of these types of the COVID-19 vaccine in the country, the infection still persists. As at March 2022, over 13 million doses of the vaccine were given in Ghana with only 28.5% of the population receiving at least one dose, while just 16.3% have been fully vaccinated (Alhassan *et al.*, 2022). Some of the available and approved COVID-19 vaccines are Astrazeneca, Johnson & Johnson, Pfizer, Moderna, Nuvaxovid etc (WHO, 2022c). The poor acceptance has contributed to persisting records of new cases and deaths in Ghana (WHO, 2022b). Ghana Health Service reported that, the region with lowest acceptance (30.1%) as at august 2022, was Eastern region where the study area is located (Ghana Health Service, 2022). As at April 2022, the percentage of people fully vaccinated in Asuogyaman (those who have received 2nd dose of COVID-19 vaccination) was 31.1% (ASG COVID-19 report 2022). This resulted in the continued spread of the disease and the expiration of the Covid-19 vaccine. To end this trend, there is a need to assess the determinants of these low acceptance rates in the district and also include a younger population in such a study in other to address the challenges. Therefore, this work seeks to investigate the potential factors influencing vaccine acceptance in the population aged 15 and above in Asuogyaman.

1.3 Rational of Study

Coronavirus disease continue to be a headache for the world leaders regarding its effects on the world's economy (Roy, 2020). If vaccine remain the only hope to protect the populace from this pandemic and its devastating effect, yet many people are not ready to receive the vaccine, then, it is a problem and therefore there is the need to explore the factors contributing to the non-acceptance of the vaccination. Although, few studies have been done to addressed this topic with more interest in intention or possibility for acceptance, this study, however, would add to the worth of data on the current acceptance rate and the associated determinants.

This study therefore, seeks to explore the determinants and to come out with factual and informed recommendations to the Ghana Health services including the Asuogyaman district Director to help them avert this menace. Also, the result of this study will inform Ghana Government, Donor Partners, Stakeholders and Public Health Officials to develop policies and plan effective strategies and messages to promote the vaccine acceptability in our communities in Ghana.

1.4 Conceptual Framework

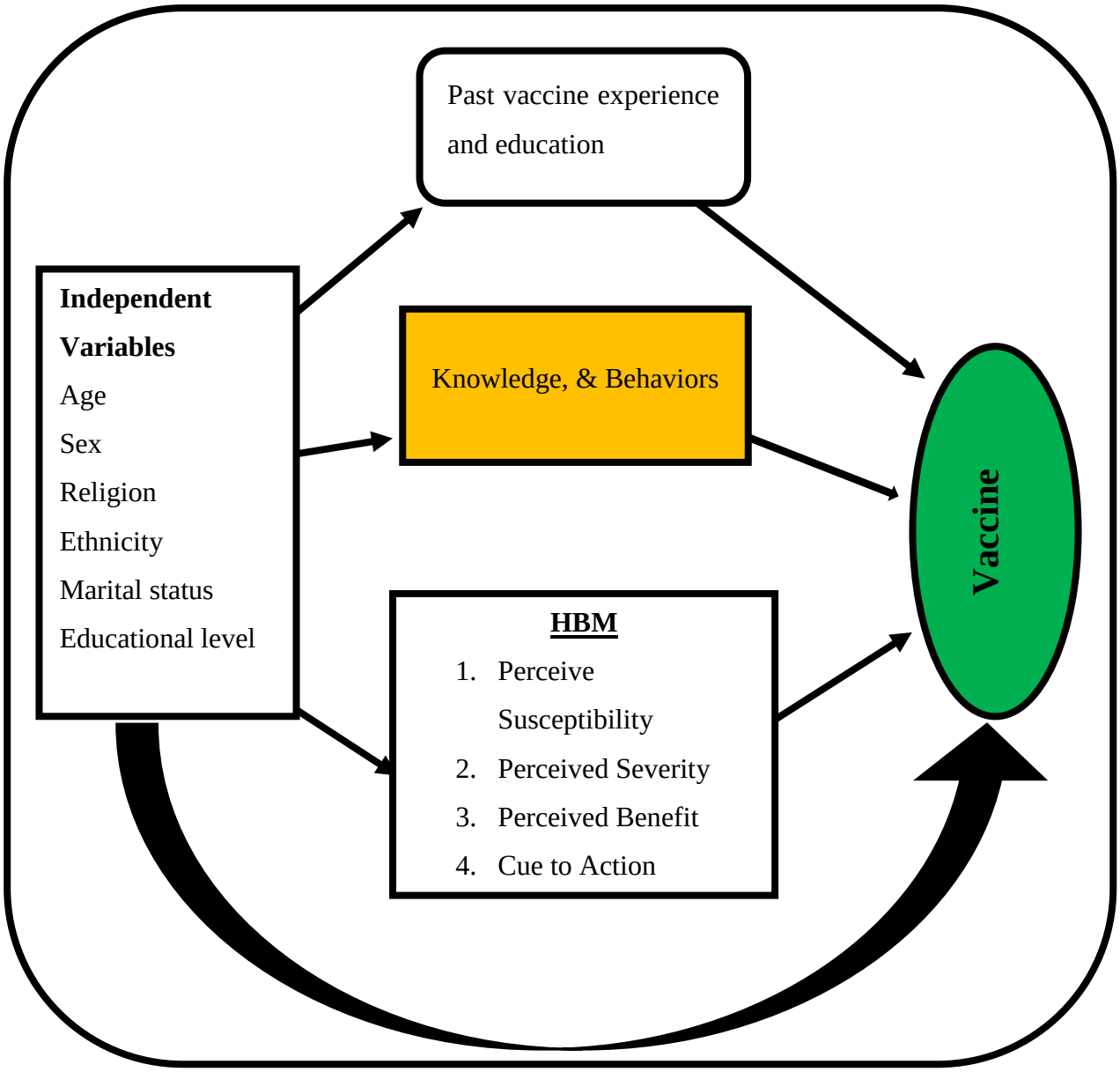


Figure 1. Conceptual Framework of Determinants of COVID-19 Vaccine Acceptance

SOURCE; Adopted from Okai and Abekah Nkrumah 2022, and modified

This Conceptual framework was adopted and modified. The sociodemographic characteristics were constant but the dependent variables were modified. The modified dependent variables were; Past vaccine experience, Knowledge and Behaviour and the Health Belief Model.

According to (Anon, (2021), conceptual framework is a simplified structural image of an expected association between variables and its outcome. The variables are just the characteristics of interest one wants to study. In the framework above, Religion, Ethnicity and educational level of the socio-demographic variables that plays a significant role in the individual's understanding, adoption and acceptance of a proposed health intervention.

Religious trust and commitment also play a major role regarding a recommended health intervention. It is clear that, adequate information about the vaccines also influences its acceptability directly or indirectly.

1.5 Research Questions

- Can individuals past vaccine experience affect his/her subsequent vaccine acceptance?
- What is the knowledge level of the people about the Coronavirus disease?
- What are the factors influencing people's COVID-19 vaccine acceptance?

1.6 General Objective

To discover the determinants of coronavirus vaccine acceptance in Asuogyaman district of the Eastern Region of Ghana

1.7 Specific Objectives

- To determine effect of past vaccine experience (AEFI) on vaccine acceptance?
- To determine the knowledge level of the people of Asuogyaman about the Coronavirus disease.
- To explore the factors motivating the coronavirus vaccine acceptance in the district.

1.8 Profile of the Study Area

Asuogyaman District is among the thirty-three districts in the Eastern Region of Ghana. Before it was calved in 1988, it was then part of Kaoga District and capital was then at Somanya. It has an projected area of 1,507 square kilometres and forms 5.7% estimated area Eastern Region of Ghana with Atimpoku being capital. Currently, the District has a total population of 103,382**.** The district share boundaries at the North by the Afram Plains District to the South by North Tongu District West by Manya Krobo District, to the East by South Dai District.

1.8.1 Physical Features

The landscape of the area is generally undulating, with the following islands - Tatabum, Krobo Kyei, Bulu, Adomi and Kpegyei. Major water bodies include Volta River and Lake, Adobo River, Opotoku River, Baware, Anyinase River and Bubuakan. Indeed, due to the fact that the main settlements are located on both sides of Lake Volta, the name Asuogyaman was adopted for the Region ("Asuogya" - Water and "man" - state). The average annual rainfall is about 1130 mm with a bimodal distribution and a maximum daily amount of about 67 mm. The interval between May-June constitutes the main wet season, with the secondary wet season occurring between September-November.

Map 1 **Asuogyaman District Map**

1.8.2 Political and Administrative Structures

The Governing structure consists of the traditional council and the political ruling. These are the District Assembly and Chieftaincy. The District Assembly is headed by the District Chief Executive, political leader and assisted by the District Coordinating Director. There are six sub-regions in the region. There are currently 23 Assemblymen who are supporting the DCE to run the district. Traditional council operation usually cantered on chieftaincy with its essential ethnic groups - Akwamus, Anums and Boso. So, in all, the district has three Traditional leaders. All these traditional councils have one paramount Chief as their leader.

1.8.3 Economy and Living Condition

Agriculture is the main commercial activity of the area, with maize, cassava and plantain being the main crops. Fishing was mainly the occupation by the Battors. There is banana and vegetable growing company in the area that cultivate the for export (eg green pepper). There are other industrial activities in Akosombo, with ATL, Volta Hotel, Volta River Authority and Volta Lake Transport Company Limited being the major businesses.

. The district now has one of the finest and comfortable recreational centres; Royal Senchi, Bridge view Hotel and Penisulla Hotel. The Asuogyaman district has huge potential for investment, especially in tourism, agriculture and industry. There are also fish farms along the lake in areas such as Marine, Kudi Kope, Asikuma, Sedorm and Atimpoku with Asikuma also holding the largest fish market in the district.

1.8.4 Healthcare Services

The district has to a total of Thirty (30) health facilities in six sub-districts. The break done of the health facilities is as follows:

Table 1 **Health Facilities by Ownership**

Hospital	1	VRA
Health centres	11	GHS
CHAG clinic	1	Salvation Army
Individual's clinic	4	Hedwig's clinic and NAAB's clinic, Destiny Amegbe Clinic
Weighing centres	94	GHS
Community Base Health Planning and Services	35 functional	GHS

1.8.5 The Healthcare Structure

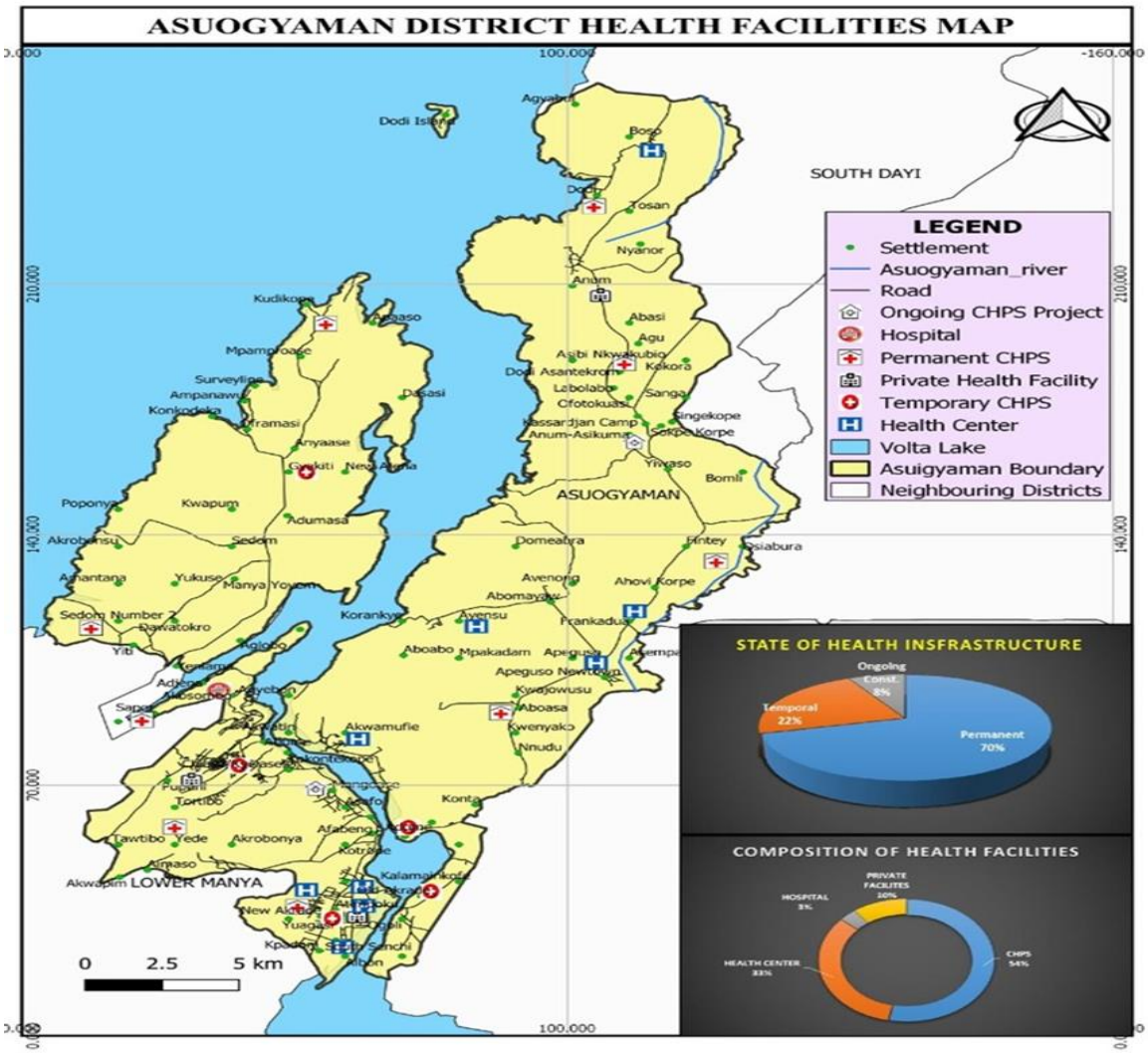
The district is divided into 6 Sub districts and has 146 communities. The name of the sub districts are; Akosombo, Atimpoku, Senchi, Akwamufie-Apeguso, Anum-Boso and Adjena-Gyakiti.

The district has three main and these are;

- The District Health Administration
- The Sub-district and
- The Community Based Health Planning and Services (CHPS)

Table 2 ***Population indices and Communities***

No	Sub district	Population	0-11 Months	No. of Communities
1	Adjena/Gyakiti	16,494	646	46
2	Akosombo	11,069	343	14
3	Atimpoku	13,186	517	11
4	Senchi	13,144	515	14
5	Akwamufie/Apeguso	26,416	1,035	30
6	Anum/Boso	23,073	904	30



Map 2 Asuogyaman Health facility Map

(Asuogyaman **DHMT Annual report– 2021**)

1.9 The Scope of Study

Misinformation and Misconceptions about the nature, role and safety of vaccine in a particular period affects subsequent vaccine uptake in any vaccine related interventions. According to (Tay *et al.*, (2015), dissemination of adequate and accurate vaccine information are required for optimal delivery of HPV vaccines in Singapore. The WHO has identified vaccine hesitancy as a threat to global health in 2019 and called for efforts to curb the challenge. Therefore, this study aimed to inquire people's knowledge about coronavirus disease, previous vaccination experience, and possible factors contributing to the coronavirus vaccine acceptance in Asuogyaman district.

1.10 Organization of Report

The report consist of six chapters and the organization is as follows; The first chapter has the following; the background of the study, problem statement, objectives of the study, rationale of the study, the study area profile, Scope of study. The second chapter which is the literature review consists of the following variable of interest as sub-topics. Respondents' Prior vaccine experience, respondents' Level of knowledge about coronavirus disease, and Reasons Related with the coronavirus vaccine acceptance. Chapter three is Methodology and it consist of the following subtopics; The study methods and design, Data collection techniques and tools, Study population, Study variables, Sampling and sampling techniques, Pretesting, Data handling, Data analysis, Ethical Consideration, Limitations of the study and Assumptions.

Chapter four deals with the results of the study, main effect on the study variables. Chapter five is about discussions. Here key variables are linked to the literature review and argued to either support or contradict other research results. Finally, the sixth chapter contains the conclusions and recommendations.

CHAPTER 2

LITERATURE REVIEW

2.1 Past Vaccine Experience (Adverse Event Following Immunization)

Adverse event after vaccination (AEFI) is defined as any untoward medical event following immunization that is not necessarily causally related to the vaccine. It can disrupt vaccination programs, reducing public confidence in vaccinations and affecting vaccination coverage (Russell et al., 2018). There are two types of AEFI. Serious and non-serous. Serious AEFI is an AEFI that meets one or more conditions as follows: deadly condition leading to hospitalization, continuation of present hospitalization, substantial infirmity or inability, a hereditary abnormality or genetic defect, fatal outcome, etc., 2021). Policymakers and program managers understanding of past vaccine experience (AEFI), its risk factors and how it varies from one type of Vaccine to the other is very essential in promoting vaccine related interventions within a population. It helps the stakeholders and partners to re-strategize, re-allocate resources, re-package behaviour change communication messages and implement appropriate intervention programs that addresses the underlining and immediate determinants of AEFI (Labban, Thallaj and Labban, 2020).

In a study conducted on adverse event after immunization in Spain by Egoavil et al., 2018, about 1.2% of the AEFI exposure were serious, 44.58% (362/812) with 29% non-serious AEFIs were reported.

There was no mortality in the period of the study. This according to the authors, negatively affected the HPV vaccine intake among girls age 14-15 during the vaccination period in Syria due to their previous vaccine exposure and experience. In Italy, a study was conducted on raising coronavirus vaccine acceptance; a investigation report indicated that, the previous refusal to vaccinate was the main distinction indicator in addition to risk of

contamination. Out of 518 participants, 51.2% said they would receive the coronavirus vaccine, and 17.7% (n = 179) said, they would never receive the vaccine. In contrast, 10.6% of respondents said they were very unlikely to get the vaccine. Other key elements of reluctance were as follows: people with age between 35 and 54, women, low education level, poverty and absenteeism. People's worry about the coronavirus vaccine had to do with safety (54%) and efficiency (27%). In all, 68.9% of the respondents said, they trust the vaccine, while 31.1% reported hesitation. (Reno *et al.*, 2021). However, a study reports that, more information about vaccine safety and expected side effects is needed to increase positive attitude towards the COVID-19 vaccination exercise (Greyling, 2022). In a survey conducted in Malaysia concerning people's readiness to avail themselves to receive the additional dose of the coronavirus vaccination, majority (98.6%) of respondents said they will receive the additional dose even though, there were some forms of AEFI during their first jabs. Some few people (4.7%) registered their worry regarding their acceptance of the second dose of the vaccination, primarily because of uncertainty about safety of the vaccine. At the end, 77.5% of the people received their second dose of the vaccination. Of these, 76.8% have had adverse event following immunization. The overall attitude towards vaccination against COVID-19 program was encouraging. (Elnaem *et al.*, 2021).

2.2 Knowledge Level and Perception of Coronavirus Disease.

The novel coronavirus or COVID 19 is the new strain of coronaviruses that affects humans.

The signs and symptoms range from respiratory ailment and possible acute and continuous pneumonia and some organ malfunctioning. The symptoms are fever, cough, breathing difficulties, muscle pain and tiredness (Labban, Thallaj and Labban, 2020). Similar to all other countries recorded significant level of ignorance, reports and distortion among the public at the beginning of the Pandemic (Agusi *et al.*, 2020). Other studies indicated that,

age, sex, location, educational level, occupation, anticipation of future infection with the coronavirus disease, how deadly the disease is, being previously vaccinated after 18 years, having a higher knowledge about coronavirus disease and its effects were significantly associated with COVID-19 vaccines acceptance (Platt and Warwick, 2020). In the study, it came out that, the coronavirus vaccine hesitancy was due to low knowledge level in the Country and also their perception towards Coronavirus disease (Mahmud *et al.*, 2021).

A study among Health Care Providers in Kenya and Ethiopia also indicated that, although the reported attitude and the covid-19 vaccine acceptance were inconsistent, age, Sex, educational level, working experience, knowledge in infection prevention, and sources of information were associated with their knowledge level. However, it was clear that, high educational level, absence of long-lasting illnesses and high knowledge about the Coronavirus disease were positively connected with the coronavirus vaccine acceptance among the workers (Tegegne *et al.*, 2021).

Other study among students in India also proves that, 70% of learners in tertiary institutions a high knowledge of the and signs and symptoms of the coronavirus disease, the means of spread and preventive actions, and 66% knew of its management. (Singh and Sewda, 2020).

Another study was conducted in Vietnam on the people's attitude and knowledge about the coronavirus disease which form main factors in controlling coronavirus disease among adult has it that, there was high knowledge about the coronavirus disease prevention 92.2% among the Vietnamese. Sixty-eight percent of the people had good attitude towards the preventive measures in coronavirus disease, and 75.8% implemented all the measures to prevent the spread of the virus including vaccination. Socio-demographic characteristics and fear were strongly related with practices aimed at preventing coronavirus disease. The Married respondents with high knowledge levels were likely to follow all the preventive

measures including vaccination (Nhu *et al.*, 2020). Participants had good knowledge about the disease and preventive measures and were willing to comply with the WHO recommendations including vaccination (Perception, Geana and Ph, 2020).

2.3 Factors influencing the COVID-19 vaccine acceptance

Understanding the determinants of acceptance of coronavirus disease vaccine will guide public health Officers, and development partners take informed decisions and formulate visible policies that will enhance the COVID-19 vaccine uptake (Sevidzem Wirsiy *et al.*, 2021). A study conducted in Italy among University students, it was noticed that, 91.9% of university students in Central and Southern Italy had received the vaccine against COVID-19. More than 80% had correct answers to questions about the site of the administration of the COVID-19 vaccine. However, only 63.8% recognized the correct types of Covid-19 vaccines available. Knowledge was found to be associated with sociodemographic characteristics and acceptance of vaccination against COVID-19 ($p < 0.05$). In all, the acceptance of the coronavirus vaccine was identified to be connected to people with previous vaccinations (Gall *et al.*, 2021).

In another survey in UK, 64% of the respondents said, they were not going to be vaccinated against the coronavirus disease. Twenty-seven percent (27%) were not sure to accept the vaccine and be vaccinated, 9% said they were will never receive the vaccine. Over all, personal characteristics, previous vaccinations, and beliefs about COVID-19 disease were the factors influenced the COVID-19 vaccine acceptance among the people (Sherman *et al.*, 2021).

The acceptance of the coronavirus vaccine increased with increasing vaccine efficacy. In the study, it was identified that older age, previous COVID-19 test, concern about being

infected or re-infected with the Coronavirus disease, having a chronic illness were some of the important factors identified to influenced the vaccine acceptance.

The vaccine acceptance in Mozambique was relatively high among health workers, but significantly lower in the rest of the population (Dula *et al.*, 2021).

In Kano of Nigeria, the picture looks somehow different. Although majority of respondents felt that, the vaccination could reduce the risk of COVID-19 infection (70.3%, n = 313), over three quarters are concerned about side effects, efficacy and safety; while more than half were concerned about rumours related to COVID-19 vaccine as being used for sterility and population control and as such did not accept the vaccination (Iliyasu *et al.*, 2021).

In a study conducted in Ashaiman about the determinant of COVID-19 acceptance, at least 50% of the participants registered unwillingness to receive the COVID-19 vaccine. The best model for predicting the acceptance of the COVID-19 vaccine was the demographic characteristics of gender and ethnicity as predictor variables(Afakorzi and Manortey, 2022).

CHAPTER 3

METHODOLOGY

3.1 Introduction

This section of the chapter has to do with the method through which the research was conducted. It touches on the following areas; research methods and design which talk more about how the research was conducted to meet the aims and objectives of the research, the data collection tools and techniques which also talks more about how the data was collected, the study population, the study variables and their definitions, sample size calculation and sampling techniques, pretesting, data handling, data analysis, Ethical clearance issues, research limitations and assumptions.

3.2 Research Methods and Design

This study aimed at describing the factors contributing to the COVID-19 vaccine acceptability in Asuogyaman District. It was a quantitative study which adopted simple random sampling method in selecting the study participants. It was a quantitative study that provided opportunity for one-time assessment of the possible factors associated with coronavirus vaccine acceptance in Asuogyaman district.

3.3 Data Collection Techniques and Tools

A closed-ended electronic questionnaire was used for the data collection. The data was collected with electronic application known as kobo collect. Four people were hired and oriented to facilitate the data collection process. The questionnaires were administered to respondents aged 15 years and above at homes within the district. The questionnaire covered socio-demographic characteristics of the study participants, knowledge on

COVID-19 as a disease, participant past vaccine experience (AEFI) and other possible factors contributing to the coronavirus vaccine acceptance in the district.

3.4 Study Population

The participants included all persons aged 15 years and above living within Asuogyaman district irrespective of when the person came to the district. All those aged below 15 years and were not eligible for covid-19 vaccination were automatically not part of the study. Also, the study excluded all persons who were eligible but had no interest to contribute to the study.

3.5 Study Variables and definition

The outcome variable of interest for this study is COVID-19 vaccine acceptance. In this study, it is defined as when an individual has received two doses of the vaccine and booster and coded as '1'. Those who have not received any dose and those who have received just one dose of the vaccine are defined as NOT accepting the vaccine and coded as '0'. The independent variables included past vaccine experience, knowledge and socio demographics. With regards to knowledge level, average of all the variables was run to get the percentage with good or poor knowledge. Ten (10) questions were used to assess knowledge with responses including strongly agree (SA), agree (A), disagree (D) and strongly disagree (DA) of the knowledge level was generated as mean score based on the scores of the responses (SA=1, A=2, D=3, SD=4). Therefore, Good knowledge was average score of 2.6 and above, Poor knowledge was average score below 2.6.

The definition and measurement of the independent variables are presented below;

- Age of participants.
- Gender: this is coded ‘1’ for female participants and ‘0” for male participants
- Marital status; it was coded ‘0” as single, ‘1’ as married and ‘3’ as others.
- Educational level; this coded as “0” as No formal education, “1” as Primary level, “2” as JHS. “3” as SHS, “4” as Tertiary.
- Occupation; this is coded as “0” for self-employment, “1” as Government worker, “2” as others.
- Ethnicity; This is coded as “0” as Ewe, “1” as Akan, “2” as others
- Religion; this coded as “0” as Christian, “1” as Islamic, “2” as Traditional

With regards to the Health Belief Model (HBM), the variables were embedded in the set of questions that was used to assess the knowledge level. The HBM was assessed as follows;

- All those who agreed to question “12” was indicative of their perceived susceptibility to the disease.
- All those who agreed to questions “15, 16” were indicative of their perceived severity of the disease.
- All those who agreed to questions “14, and 21” were indicative of their cue to action to get vaccinated with the vaccine.

The definition and measurement of the independent variables are presented below;

- Age of the respondent in years.
- Gender: this is coded as ‘1’ for the female respondents and for ‘0” male respondents
- Marital status; this is coded ‘0” as single, ‘1’ as married and ‘3’ as others.

- Educational level; this coded as “0” as No formal education, “1” as Primary level, “2” as JHS. “3” as SHS, “4” as Tertiary.
- Occupation; this is coded as “0” for self-employment, “1” as Government worker, “2” as others.
- Ethnicity; This is coded as “0” as Ewe, “1” as Akan, “2” as others
- Religion; this coded as “0” as Christian, “1” as Islamic, “2” as Traditional

With regards to the Health Belief Model (HBM), the variables were embedded in the set of questions that was used to assess the knowledge level. The HBM was assessed as follows;

- All those who agreed to question “12” was indicative of their perceived susceptibility to the disease.
- All those who agreed to questions “15, 16” were indicative of their perceived severity of the disease.
- All those who agreed to questions “14, and 21” were indicative of their cue to action to get vaccinated with the vaccine.

3.6 Sampling techniques and Sample size calculation

Simple random sampling is sampling method of randomly selecting samples in a study population. Only one person who qualified from a house was rolled into the study. This was to avoid cluster effect. Out of the six Sub districts, two were randomly selected for the study. In each of the two Sub districts, three (3) Communities each were randomly selected for the study irrespective of the location. For the respondents, their selection was based on quota system depending on the population of each selected Community. Below is a simple diagram that further explains the techniques.

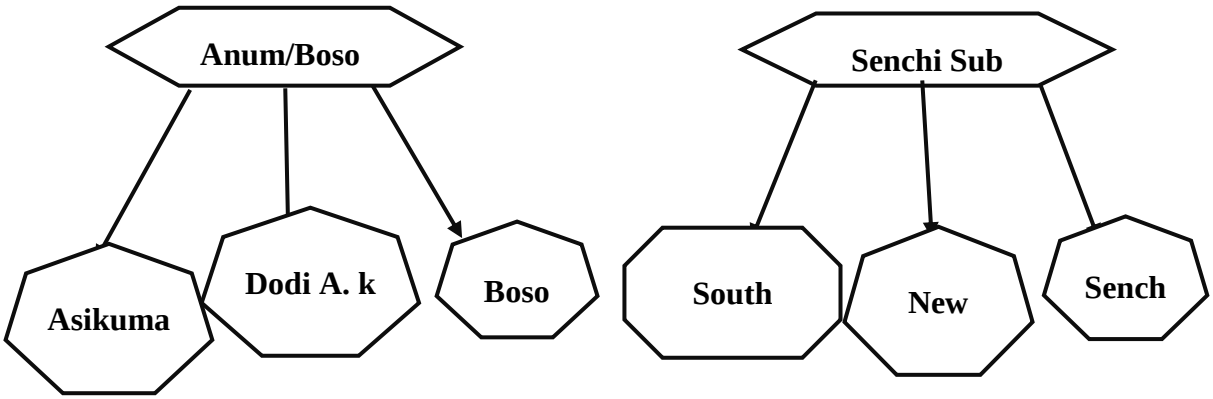


Figure 3.1 Name of Sub Districts and Communities

In each of the Community, the first house was randomly selected by spinning a pen cover in the middle of the Community. The first house was selected base on the direction of the head of the pen cover. In the house, a respondent was randomly selected to be part of the study. In houses with more than one eligible possible study participant, we randomly selected and enrolled one into the study. After the first house, every other house was entered. In Dodi Asantekrom, the data collection was extended to Ajabui, the nearest Community until I got all the respondents allocated to that area.

The sample for the study was a subset of the population that was selected to kind of give conclusions or predictions to the entire population in the district. The sample size was estimated based on the current vaccination coverage in the district which is 31.5%. Cochran formula was used to calculate the sample size as shown below;

$$n = \frac{Z^2 \times pq}{e^2}$$

n = sample size (Cochran, 1977)

Z = the z-score of 95% confidence interval equivalent to 1.96

p = Proportion of people fully vaccinated which is equals to 0.315

$\boldsymbol{q}$ = Proportion of people who are not vaccinated which is equal to 1-0.31 = 0.69

$\boldsymbol{e}$ = Margin of error set at 5% (0.05)

Therefore,

$$n = \frac{(1.96)^2 \times (0.32 \times 0.69)}{(0.05)^2} = 339$$

A non-response rate of 10 % resulting to about 34 respondents was added to the minimum sample size to get 373 participants. Number of participants per each community were allocated as follows;

- Boso Sub district (**23,073**) - 247
  - ✓ Asikuma - 142
  - ✓ New Dodi - 18
  - ✓ Dodi Asantekrom - 49
  - ✓ Ajabui - 17
- Senchi Sub district (**13,144)** - 118
  - ✓ New Akrade - 32
  - ✓ South Senchi - 54
  - ✓ Senchi - 32

The sample allocation was based on the Sub district population and the population of each community.

3.7 Pretesting

Pretesting of the questionnaire was done at Kpong. A Community in the Lower Manya Krobo District which shares boundary with Asuogyaman district and has almost the same population characteristics as that of Asuogyaman district. Results from the pretesting was not included in the main study. The protest was to assess the participants' level of understanding of the questionnaire, the research assistant's ability to interpret the questionnaire to participants and the necessary corrections were made.

3.8 Data Handling

The data collected was screened for completeness and errors corrected. Since the data was collected electronically, it came direct to the principal investigator (myself) and my supervisor alone which enhanced data cleaning, security and management. The original or the raw data was kept as source document on external drive for safe keep and submission.

3. 9 Data Analysis

The data collected were analysed using STATA version 17.0. The data cleaning was done with the errors corrected in excel before later it was exported to stata for analysis.Anova and logistics regression (bivariate and multivariate) were calculated on the variables to come with the results.

3.10 Ethical Consideration

Ethical clearance was sought and it was sanctioned by the Institutional Review Board of Ensign Global College, with a reference number of ENSIGN/IRB.EL/SN-201. Informed consent form was given or read to all participant before answering the questions.

3.11 Research Limitations

Due to limited resources (time and funds), only six communities from two out of six sub districts were selected for the study. Since the respondents were not selected from all the sub districts and the communities within the district but limited to only two sub districts, the results may not be the true situation in the district. This is possible due to population characteristics and dynamism.

3.12 Assumptions

It was assumed that all respondents understood the questionnaire and answered it correctly. Again, it was assumed that the sample size was large enough and represented the total population of Asuogyaman district.

CHAPTER 4

RESULTS

4.1 Introduction

Key findings from the study was presented in this chapter according to the objectives of the study. These included descriptive statistics on respondents' sociodemographic characteristics and inferential statistics that assessed the association of selected independent variables with some dependent variables. The result was presented in text, tables and graphs. This chapter also includes the findings of respondents' knowledge of the COVID-19 pandemic, previous vaccine experience (AEFI), and coronavirus vaccine acceptance. The total response rate was 98.65% which has even exceeded the calculated sample size.

4.2 Socio-demographic characteristics of the respondents

In table 4.1 below, a total of three hundred and sixty-five (365) respondents contributed to this work with the mean age of 35.92, ±12.10. The participant non response rate was 1.6%. Majority 216/365 (59.18%) of them were aged between 26-45years. Most of the participants 156/365 (42.74%) were single with females being the most respondents 225/365 (61.64%) interviewed. The least population among the participants, 8/354 (8.22%) had their tertiary education and more than half 244/365 (64.85%) of the participants were self-employed. With regards to Religion, majority 333/365 (91.23%) were Christians with the least being Traditional 4/365(1.10%). More than half 261/365(71.51%) of the respondents were Ewe, 18.63% were Akan and 3.84% were Hausa and the rest were other ethnic groups. It also came out that 66.9% of participants were self-employed. Almost16.4% of the participants were unemployed. Those with Government work were the least respondents (7.12%).

Table 3 Socio-demographic characteristics of the respondents

Characteristics	Frequency (365)	Percentage (%)
Age		
Mean, SD (35.92, ±12.10)		
>25years	72	19.73
26-45years	216	59.18
46-55years	54	14.79
56-75years	23	6.30
Sex		
Female	225	61.64
Male	140	38.36
Religion		
Traditional	4	1.10
Islamic	28	7.67
Christian	333	91.23
Ethnicity		
Guan	8	2.19
Hausa	14	3.84
Akan	68	18.63
Ewe	261	71.51
Frafra/Zugu	3	0.82
Ga_Dangme	11	3.01
Marital status		
Single	156	42.74
Cohabiting	38	10.41
Married	149	40.82
Divorce	4	1.10
Widow	13	3.56
Widower	5	1.37
Educational Level		
No formal education	67	18.36
Primary	53	14.52

JHS	140	38.36
SHS	75	20.55
Tertiary	30	8.22
Occupation		
Unemployed	60	16.44
Student	35	9.59
Self-employed	244	66.85
Government work	26	7.12

4.3 Assessment of Past Vaccine Experience of COVID-19 Vaccination

The table 4.2 indicates the past experience with the coronavirus vaccine among respondents. The results revealed that, more than half 250/365 (68.50%) had ever received vaccine of any type (**Yellow fever, Tetanus Diphtheria and COVID-19 vaccine**). Out of those who had ever taken vaccine 84/250 (33.6%) had no experienced of any AEFI whereas the rest of the respondents had experienced other forms of AEFI such as dizziness and weakness, general body pains, headache, swollen at site of injection etc. Out of all the participants who had ever experienced AEFI, more than half 117/166 (70.48%) stated that, they will not go for any vaccination again including COVID-19 vaccine.

Table 4.2 Assessment of Past Vaccine Experience of Covid'19 Vaccination

Characteristics	Frequency	Percentage (%)
Ever Vaccinated		
Yes	250	68.50
No	115	31.50
If yes, which of the vaccine	**n=250**	
Yellow Fever		
No	130	52.00
Yes	120	48.00
Tetanus Diphtheria		
No	157	62.80
Yes	93	37.20
Covid-19 Vaccine	**n= 250**	
No	135	54.00
Yes	115	46.00
Feeling/experience after the vaccination	**n=250**	
Nothing	84	33.6
General body pains	36	14.40
Pain and swollen at the site	61	24.40
Dizziness and general weakness	61	24.40
Headache	8	3.20
Will take vaccine despite any experience or feeling	**n= (166)**	
Yes	49	29.52
No	117	70.48

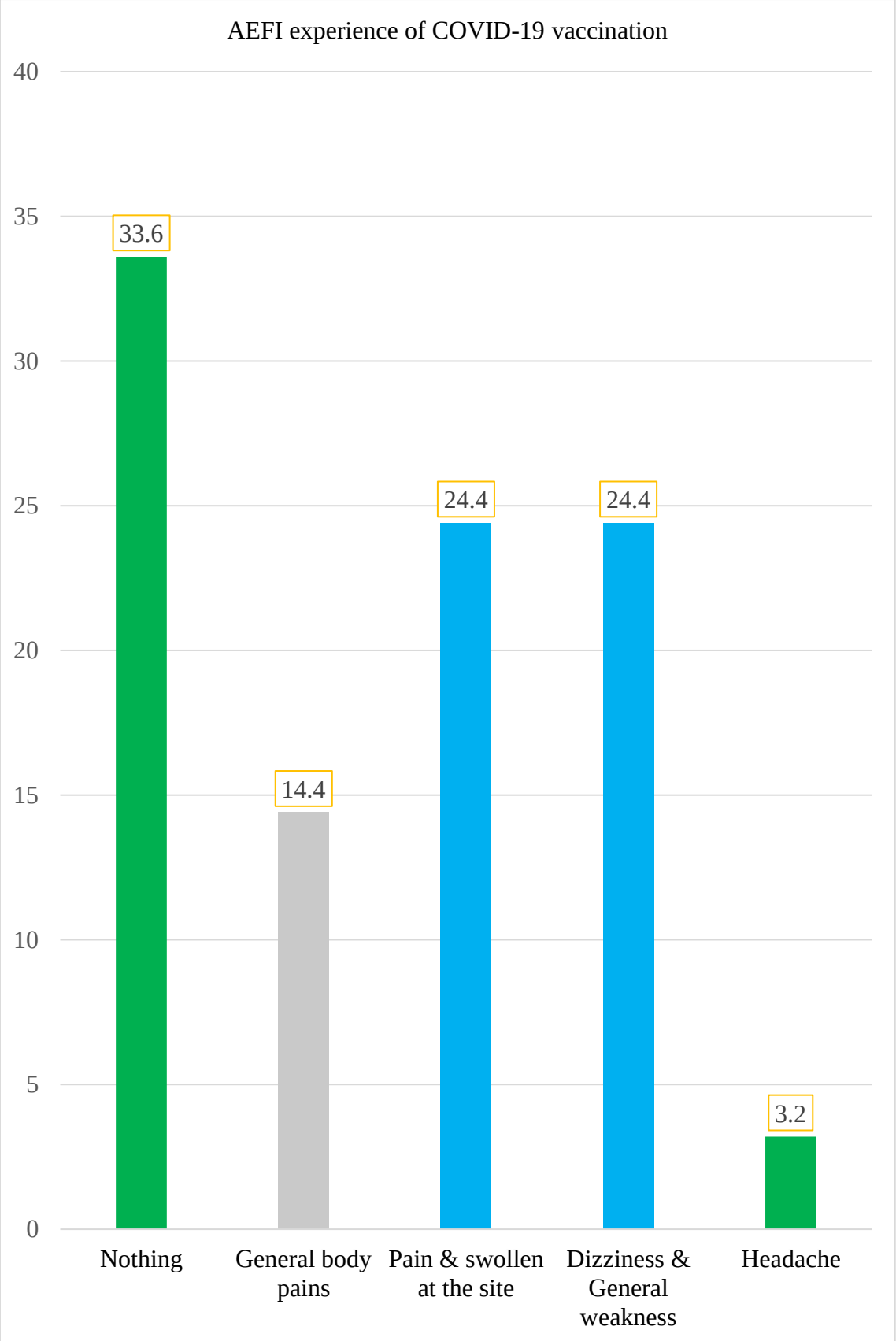


Figure 4.1 Types of AEFI experienced by respondents after COVID-19 vaccination

4.4 Assessment of knowledge on COVID-19 among Participants

Table 4.4 on the next page shows the knowledge of participants regarding COVID-19. Results show that, more than half 220/365 (60.27%) of the participants agreed that the virus is spread through direct inhalation of droplet from infected person. Also, more than half 245/365 (67.12%) of the population agreed that the Signs and symptoms of COVID-19 are; Continuous cough, fever, general body pain Respiratory distress. The study again found out that, half 242/365 (66.30%) of the participants agreed that COVID-19 has greatly affected your means of livelihood. Again, majority 224/365 (60.27%) of the participants agreed that, COVID-19 is the disease of the devil. So, if you believe in God, you cannot get it and even if you get it, it cannot kill you. Majority of the respondents 295/365 (80.82%) agreed that, one can look at somebody's face and declare the person as having covid-19. However, 19.18% of the participants disagreed. The study further evaluated the overall knowledge level of the participants. The results indicated that, (61.1%) of the population had low knowledge about Coronavirus disease with the mean of means score 2.4.

Definition of knowledge level (ranging score; 1-4); Good knowledge = (Mean of means score of 2.6 and above) and Poor knowledge = (mean of means score of less than 2.5)

The table 4.3 below shows the mean score point for each question that assessed the knowledge level of the respondents;

Table 4.3 Mean score point for knowledge level assessment of participants

NO	STATEMENT	MEAN SCORE POINT
1	Covid-19 virus spread through direct inhalation of droplet from infected person or picking the virus from surfaces	2.3
2	Signs and symptoms of covid-19 are; Continuous cough, fever, general body pain Respiratory distress	2.5
3	People aged 70 years and above and people with co-morbidity have high chances of death from coronavirus disease	2.6
4	Covid-19 is a deadly disease	2.6
5	A lot more people are dying from covid-19	2.4
6	Covid-19 has greatly affected your means of livelihood	2.4
7	You can look at somebody's face and declare the person as having covid-19	2.3
8	The coronavirus disease is for the rich people	2.5
9	Covid-19 can kill only people who don't believe in God or Allah	2.3
10	Covid-19 is the disease of the devil. So, if you believe in God, you cannot get it and even if you get it, it cannot kill you.	2.3
	The mean of means score point	**2.42**

Table 4.4 Assessment of knowledge on COVID-19 among Participants

STATEMENT	AGREE NUM	(%)	DISAGREE NUM	(%)
Covid-19 virus spread through direct inhalation of droplet from infected person or picking the virus from surfaces	220	60.27	145	39.73
Signs and symptoms of covid-19 are; Continuous cough, fever, general body pain Respiratory distress	245	67.12	120	32.88
People aged 70 years and above and people with co-morbidity have high chances of death from coronavirus disease	266	72.88	99	27.12
Covid-19 is a deadly disease	228	62.47	137	37.53
A lot more people are dying from covid-19	253	69.32	112	30.68
Covid-19 has greatly affected your means of livelihood	242	66.30	123	33.70
You can look at somebody's face and declare the person as having covid-19	295	80.82	70	19.18
Covid-19 is a disease for the rich	238	65.21	127	34.79
Covid-19 can kill only people who don't believe in God or Allah	273	74.79	92	25.21
Covid-19 is the disease of the devil. So, if you believe in God, you cannot get it and even if you get it, it cannot kill you.	282	77.26	83	22.74

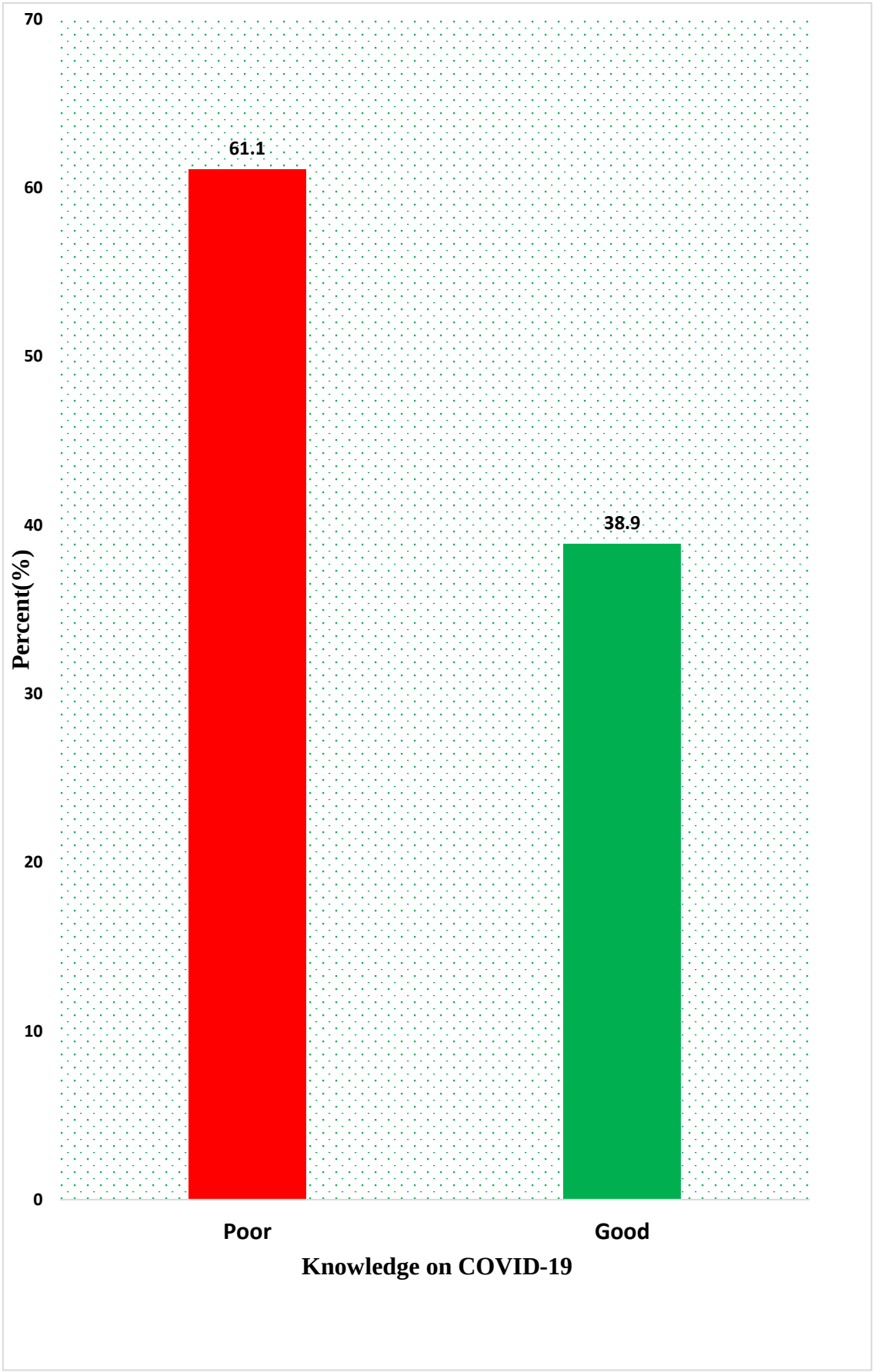


Figure 4.2 Knowledge level on Coronavirus disease

4.5 Assessment of Vaccine Acceptance among participants

In table 4.5 results revealed that, majority of the respondents who have ever been vaccinated, 153/250 (61.20%) were vaccinated with the COVID-19 vaccine. Majority of the participants who have ever received the coronavirus vaccine, were given Astrazeneca as their first dose 72/153 (47.06%). For those who were not vaccinated, only few had reasons for not being vaccinated. Some of the reasons as mentioned were; The COVID-19 vaccine was meant to reduce Ghanaian population; they don't trust the source of the vaccine, the disease cannot kill them, etc. With regards to what put people off from taking the vaccine, more than half 60/97 (74.07%) said because of the side effects of the vaccine (AEFI). Among respondents who refused to receive the coronavirus vaccine, almost all 89/97 (92.17%) indicated, it was not against their religious beliefs. Among those who had taken the COVID-19 vaccine, only half 76/153 (49.67%) of them had taken the first dose. Concerning the thought of participants with regards to coronavirus vaccine, 199/365 (54.5%) had nothing to say. The rest had the following to say about the vaccine; that the vaccine is safe and must be received (21.10%), the vaccine should be given ones (6.03%), The Government is just making money out of it (10.96%), others said they will vaccinate when the current president is out of office (7.40%). In the attempt to evaluate the overall acceptance of coronavirus vaccination uptake, it was found out that, more than half 288/365 (78.90%) of the population had poor acceptance whereas 77/365 (21.10%) had good acceptance.

Table 4.5 Assessment of coronavirus Vaccine Acceptance

Characteristics	Frequency (250)	Percentage (%)
Ever vaccinated with the Covid-19 vaccine	**(n=250)**	
No	135	54.00
Yes	115	46.00
If yes, which type of the vaccine received	**(n=153)**	
Mordena	2	1.31
Astrazeneca	72	47.06
Johnson & Johnson	59	38.56
Pfizer	20	13.07
If no, why not receive the vaccine	**(n=97)**	
The vaccine was meant to reduce our population as Ghanaians.		
No	75	78.13
Yes	21	21.88
It is against my religious belief		
No	89	92.71
Yes	7	7.29
I don't trust the source of the vaccine		
No	68	70.83
Yes	28	29.17
The disease cannot kill me		
No	78	81.25
Yes	18	18.75
Number of times vaccinated with Covid-19 vaccine	**(n=153)**	
1st dose	76	49.67
2nd dose	64	41.83
Booster	13	8.50
Thoughts about Covid-19 vaccination		
Covid-19 Vaccine is safe and must be received	77	21.10
Covid-19 Vaccine should be given ones	22	6.03

Government is just making money out of it	40	10.96
Vaccinate unless the current President is out of office	27	7.40
Nothing to say	199	54.5
Does things concerning co covid-19 vaccination put you off		
Yes	223	61.60
No	139	38.40
What puts me off when it comes to covid-19 vaccination	**223**	
It is too political	29	35.80
Number of times to vaccinate	17	20.99
Its side effect	60	74.07

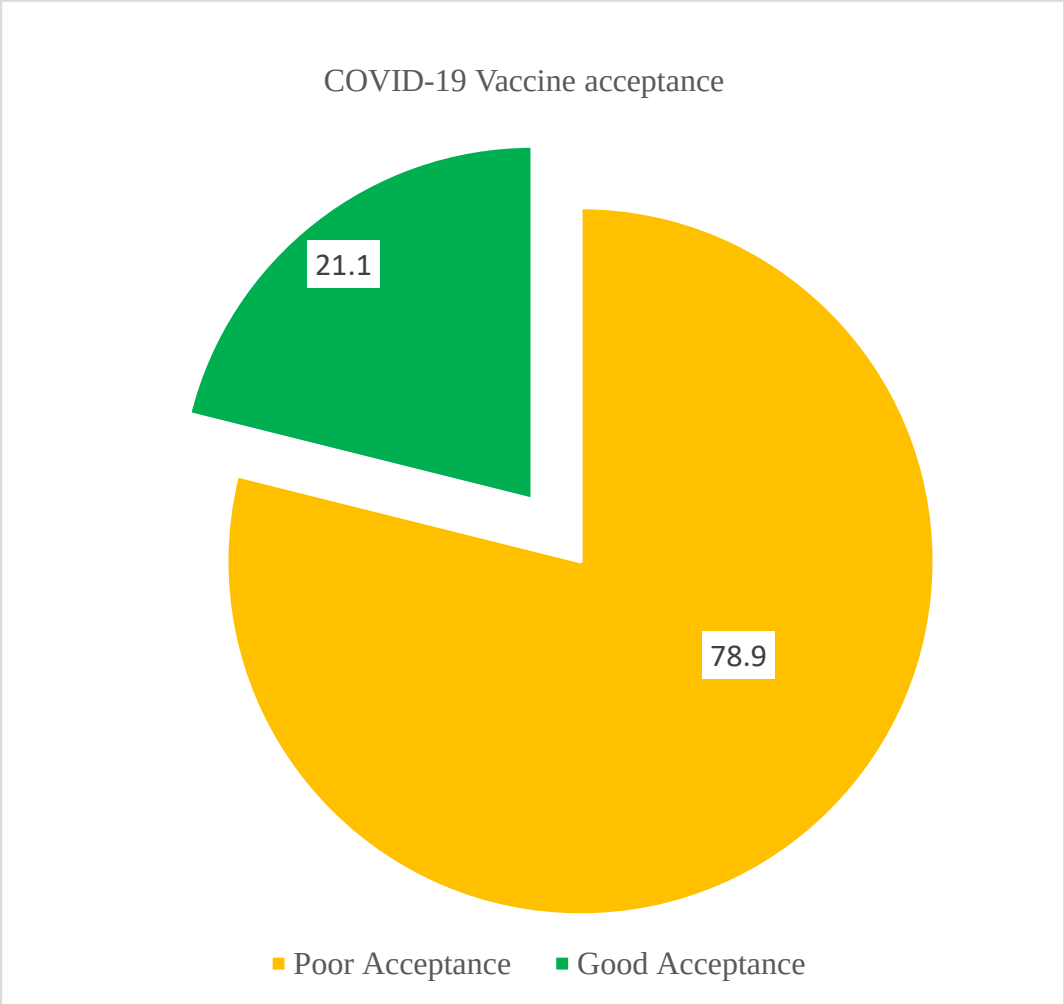


Figure 4.3 Overall COVID-19 vaccine acceptance

4.6 Factors associated with COVID-19 vaccine acceptance in Asuogyaman District

The table 4.6 below shows a multivariate logistic regression to assess factors associated with COVID-19 vaccine acceptance in Asuogyaman district. Results revealed that, age has significant association with COVID-19 vaccine acceptance. That is, persons aged 26-45years [AOR=0.31 (95% CI: 0.11, 0.92), p=0.034] 46-55years [AOR=0.20 (95% CI: 0.05, 0.87), p=0.032] were 69% times and 80% low confidence of accepting the coronavirus vaccine respectively as against those less than 25years and those age 56 years and above.

However, participants without formal education, (Chi-square (17.76**)** p=0.001, those who attained primary [91% [AOR=0.09 (95% CI: 0.02, 0.54), p=0.010] and those who attained tertiary level, [COR=8.89 (1.92, 77.31), 0.048 87% [AOR=0.13 (95% CI: 0.02, 0.85), p=0.033] have low confidence of accepting the coronavirus vaccine as against participants who attained JHS and SHS respectfully and the results were statistically significant.

Table 4.6 Socio-Demographic factors associated with covid'19 vaccine acceptance

Characteristics	Covid'19Acceptance		Chi-Square	P-Value	COR (95% CI), p-value	AOR (95% CI), p-value
	Poor () n(%)	Good () n(%)				
Age						
>25years	13 (43.33)	17 (56.67)	6.25	0.100	Ref.	Ref.
26-45years	60 (56.60)	46 (42.40)			0.57 (0.26, 1.33), 0.201	**0.31 (0.11, 0.92), 0.034**
46-55years	21 (72.41)	8 (27.56)			**0.29 (0.10, 0.87), 0.026**	**0.20 (0.05. 0.87), 0.032**
56-75years	3 (37.50)	5 (62.50)			1.27 (0.26, 6.33), 0.767	1.11 (0.08, 14.76), 0.937
Sex						
Female	65 (58.56)	46 (41.44)	0.80	0.377	Ref.	Ref.
Male	32 (51.61)	30 (48.39)			1.32 (0.71, 2.48), 0.378	1.21 (0.56, 2.62), 0.625
Religion						
Traditional	1 (50.00)	1 (50.00)	1.13	0.569	Ref.	Ref.
Islamic	5 (41.67)	7 (58.33)			1.40 (0.07, 28.12), 0.826	1.54 (0.02, 139.5), 0.851

Christian	91 (57.23)	68 (42.77)			0.75 (0.05, 12.16), 0.838	0.92 (0.01, 70.18), 0.970
Marital Status						
Single	32 (53.33)	28 (46.67)	3.58	0.611	Ref.	Ref.
Cohabiting	14 (60.87)	9 (39.13)			0.73 (0.28, 1.96), 0.537	1.08 (0.32, 3.66), 0.896
Married	43 (55.13)	35 (44.87)			0.93 (0.47, 1.83), 0.834	1.50 (0.50, 3.87), 0.404
Divorce	1 (50.0)	1 (50.00)			1.14 (0.07, 19.13), 0.923	2.01(0.09, 43.20), 0.657
Widow	6 (85.7)	1 (14.29)			0.19 (0.02, 1.68), 0.135	0.15 (0.01, 3.20), 0.224
Widower	1 (33.33)	2 (66.67)			2.29 (0.20, 26.58), 0.509	5.17 (0.26, 101.33), 0.280
Educational Level						
no formal education	**16 (47.06)**	**18 (52.94)**	**17.76**	**0.001**	Ref.	Ref.
Primary	23 (79.31)	6 (20.69)			0.23 (0.08, 0.71), 0.011	**0.18 (0.05, 0.63), 0.008**
JHS	39 (55.71)	31 (44.29)			0.71 (0.31, 1.61), 0.408	0.53 (0.20, 1.36), 0.186
SHS	18 (62.07)	11 (37.93)			0.54 (0.20, 1.49), 0.235	0.43 (0.13, 1.44), 0.169

Tertiary	1 (9.09)	10 (99.91)			**8.89 (1.92, 77.31), 0.048**	0.56 (72.55, 0.59), 0.125
Occupation						
Unemployed	20 (62.50)	12 (37.50)	4.80	0.187	Ref.	Ref.
Student	7 (53.85)	6 (46.15)			1.43 (0.39, 5.26), 0.592	1.23 (0.24, 6.09), 0.800
self-employed	68 (57.14)	51 (42.86)			1.25 (0.56, 2.79), 0.586	1.51 (0.59, 3.85), 0.393
government work	2 (22.22)	7 (77.78)			5.83 (1.04, 32.80), 0.045	2.38 (0.26, 22.13), 0.447

4.7 Assessment between knowledge and COVID-19 vaccine acceptance

In table 4.7, it was also realized that, knowledge as assessed by individual questions has no significant association with the coronavirus vaccine acceptance except for those who accepted that, coronavirus disease can only kill those who don't believe in God or Allah [AOR=9.58 (95% 2.23, 41.14) p=0.002]. In other words, those who agreed that, Coronavirus disease can only kill those who don't believe in God or Allah are 9.58% times less likely to accept the COVID-19 vaccine.

Table 4.7: knowledge on covid'19 associated with covid'19 vaccine acceptance in Asuogyaman District

Characteristics	**AOR (95% CI)**	**p-value**
Covid-19 virus spread through direct inhalation of droplet from infected person or picking the virus from surfaces		
Agree	Ref.	
Disagree	1.35 (0.41, 4.39)	0.620
look at somebody's face and declare the person as having covid-19		
Agree	Ref.	
Disagree	1.92 (0.75, 4.96)	0.176
Signs and symptoms of covid-19 are; Continuous cough, fever, general body pain Respiratory distress		
Agree	Ref.	
Disagree	1.57 (0.44, 5.60)	0.483
Covid-19 is a deadly disease		

Agree	Ref.	
Disagree	0.30 (0.08, 1.16)	0.082
People aged 70 years and above and people with co-morbidity are at higher risk of death from covid-19		
Agree	Ref.	
Disagree	0.46 (0.17, 1.21)	0.114
Covid-19 has greatly affected your means of livelihood		
Agree	Ref.	
Disagree	0.98 (0.98, 2.50)	0.959
Covid-19 is a disease for the rich		
Agree	Ref.	
Disagree	1.77 (0.73, 4.31)	0.206
Covid-19 can kill only people who don’t believe in God or Allah		

Agree	Ref.	
Disagree	**9.58 (2.23, 41.14)**	**0.002**
Covid-19 is the disease of the devil. So, if you believe in God, you cannot get it and even if you get it, it cannot kill you.		
Agree	Ref.	
Disagree	0.30 (0.08, 1.18)	0.086
A lot more people are dying from covid-19		
Agree	Ref.	
Disagree	2.24 (0.67, 7.53)	0.191

Table 4.8 Assessment between AEFI and COVID-19 vaccine acceptance

In trying to find out the association between AEFI and COVID-19 vaccine acceptance, it was realized that, with the COR, all the types of AEFI has significant association with the COVID-19 vaccine acceptance except for headache. However, with the AOR, only dizziness and general weakness was identified as having significant association with COVID-19 vaccine acceptance

(Ref. table 4.7).

Table 4.8 Multivariate analysis on Past Vaccine experience and COVID-19 Vaccine Acceptance

Characteristics	COR (95% CI)	p-value	AOR (95% CI)	p-value
Feeling/experience after the vaccination				
Nothing				
No	Ref.		Ref.	
Yes	**0.14 (0.06, 0.31)**	**<0.001**	1.84 (0.10, 34.29)	0.682
General body pains				
No	Ref.		Ref.	
Yes	**4.33 (1.32, 14.15)**	**0.015**	6.95 (0.44, 109.44)	0.168
Pain and swollen at the site				
No	Ref.		Ref.	
Yes	**4.38 (1.70, 11.31)**	**0.002**	3.07 (0.23, 41.14)	0.398
Dizziness and general weakness				

No	Ref.		Ref.	
Yes	**48.00 (6.04, 381.14)**	**<0.001**	49.84 (3.08, 806.82)	0.006
Headache				
No	Ref.		Ref.	
Yes	7.38 (0.75, 73.18)	0.088	16.88 (0.40, 703.70)	0.138

CHAPTER 5

DISCUSSION

5.1 Introduction

Vaccines are considered one of the greatest public health interventions that have achieved a lot of successes in the last century. Understanding the basic ideas of vaccines in relation to protecting individuals from vaccine preventable diseases is vital to understanding how they work, benefits, risks and their potential real-life impact on protection. This knowledge increases people's confidence and attitudes towards vaccination(Vetter *et al.*, 2018). Vaccines have brought at least or in some cases the complete eradication or elimination of some diseases like small pox, pertussis, poliomyelitis, rubella, and measles among others. Nevertheless, a lot more people have issues with vaccines and therefore has affected their attitudes towards vaccination. This study was a cross sectional study which seek to explore the determinant of COVID-19 vaccine acceptance in Asuogyaman District of the Eastern Region.

5.2 Past vaccine experience

Overall, a total of 365 responses were valid out of the 370 respondents surveyed. Regarding previous vaccine experience (AEFI), the result showed that more than half 66.4% of the respondents had some form of non-severe AEFI after their first dose.

These AEFI were, General body pains, Pain and swollen at the site and dizziness and general weakness. Of the total number who experience AEFI, 70.48% indicated their unwillingness to take the subsequent doses of the vaccine. In assessing the association between AEFI as individual reactions against the COVID-19 vaccine acceptance using

multivariate logistics regression, it came out that, AEFI has significant association with the COVID-19 vaccine acceptance.

This contradicts the result of a similar study at Malaysia which said that, people who had AEFI in their first 1st dose were ready for their second dose of the vaccine(Elnaem *et al.*, 2021). Another contradictory result was a study by Parrella et al, 2012, which also pointed out that, Parents were ready to send their children for subsequent vaccinations irrespective of the AEFI their children suffered in the previous vaccinations(Parrella *et al.*, 2012). However, it conforms with the study at Canada that concluded that, AEFI affect the individuals decision-making towards accepting future vaccinations(Azarpanah *et al.*, 2021). This contradiction in the results could be as a result of the fact that, in Parrella et al (2012) study, the decision was taken by parents. And taking decision that affects others is easier than taking decision that affects one self. The decision in this study had to do with the individual's own life. It might also be due to geographical local and the differences in their perception in relation to the disease. Majority, 62.47% agreed that, the Coronavirus disease is deadly and that, they were vulnerable due to how it is transmitted.

5.3 Knowledge level of respondents about the Coronavirus disease

With regards to knowledge on Coronavirus disease, it came out clear that, majority of the people of Asuogyaman have poor knowledge (61.1%). The outcome of this study therefore, was consistent with the other studies that said that, high prevalence of COVID-19 vaccine refusal was due to low knowledge levels. In other words, high knowledge level on the coronavirus disease results in good COVID-19 vaccine acceptance (Mahmud *et al.*, 2021), (Tegegne *et al.*, 2021) and (Afakorzi and Manortey, 2022) respectfully.

5.4 Factors associated with COVID-19 acceptance

With regards to the factors associated with the COVID-19 vaccine acceptance or hesitancy, there were some associations identified; the adjusted Odds Ratio revealed that, age and educational level has significant association with COVID-19 vaccine. The age group are within the working class in society that need to be protected. This association might be due to multiple hidden factors which further study is needed to explain into details. Other Socio-demographic variables such as Sex, ethnicity, religion, and marital status were not significantly associated with the acceptance of the COVID-19 vaccine which is consistent with a study conducted among adult in Kano, Nigeria(Iliyasu *et al.*, 2021).

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

In conclusion, majority, 78.90% of the people of Asuogyaman district had low COVID-19 vaccine acceptance. This was partly due to the AEFI those who received the first 1st dose suffered.

Also, more than half (61.1%) of the people had low knowledge level about the Coronavirus disease. Other factors leading to low COVID-19 vaccine acceptance in the district were age and educational level. Other factors identified were rumours and myths about the disease. Some of these myths and rumours were; the COVID-19 vaccine was meant to sterilize Ghanaians as family planning, the Government is just making money out of it, the vaccine should be given ones.

6.2 Recommendations

- With the current situation regarding the acceptance of the COVID-19 vaccine and the relevant factors in the district, the following recommendation is very necessary to be considered and implemented as soon as possible. The DDHS, Asuogyaman district and the health promotion unit of the health directorate should urgently plan carefully and package appropriate messages to educate people about the coronavirus disease and the COVID-19 vaccine to address all the rumours, AEFIs and vaccine trust issues in the area in order to increase people's confidence and willingness to accept the COVID-19 vaccine irrespective of the age and educational level.

- The surveillance unit of the district health directorate should strengthen surveillance on AEFI during vaccination campaigns to ensure that all AEFIs are identified and managed properly to prevent future vaccine hesitancy.

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APPENDICES

APPENDIX I: INFORMED CONSENT

Project topic**; DETERMINANTS OF COVID-19 VACCINE ACCEPTANCE IN ASUOGYAMAN DISTRICT OF THE EASTERN REGION OF GHANA**

INTRODUCTION AND INFORMED CONSENT FORM TO PARTICIPANTS

Hello Sir/Madam,

My name is **EMMANUEL PARTEY**, a Master of Public Health student from Ensign Global College, Kpong**. I am conducting research on determinants of Covid-19 vaccine acceptance in Asuogyaman District of the Eastern Region**. This is an academic work which could be used to take decisions to help the district. I would be very glad if you could spare me some of your precious time to answer this questionnaire.

Covid-19 pandemic remains one of the major health challenges which is affecting the world's economy including Ghana. Covid-19 Vaccine has been identified as the only hope for control and prevention of the disease. Amazingly, the vaccination coverage against the disease in the district is very low (31.5%). This study therefore seeks to explore the factors contributing to the covid-19 vaccine acceptance in the district.

Confidentiality

This information you're about to share will not be disclosed to anyone outside this research team. Your name will not be written, but **a number** will be assigned to your questionnaire. Every information from this research will be kept private and under lock and key.

Risks

This survey might require you to give very personal details about yourself, the Covid-19 vaccine and the reasons why you are not vaccinated or vaccinated. You might feel a bit

awkward about some of the questions I will be asking but bear in mind that, you do not have to answer any question if you are not comfortable to do so. You should also bear in mind that; you don't owe anybody explanation if you refuse to partake in this survey.

Benefits

You will not be given anything to motivate you to partake in this survey. However, your participation might assist us to find out more about the factors contributing to the covid-19 vaccine acceptance in the District and to find ways and means to educate people to make informed decisions about the vaccine and the vaccination.

Thank you for your acceptance to participate in this research.

Duration

Due to the detailed nature of the questions I'm about to ask you, this interview might take 15 to 25 minutes to complete. **Do you have any questions to ask about the interview?**

Are you ready to partake in the survey? ☐ **YES** ☐ **NO**

Kindly Answer Any Questions and Address Respondent's Concerns.

RESPONDENT *AGREES* TO BE INTERVIEWED

1	----→ BEGIN

RESPONDENT *DOES NOT AGREE* TO BE INTERVIEWED

2	----→ END

Name of Interviewer _____

Date: _____

RESPONDENT'S SIGNATURE: _____

THUMB PRINT

CONTACT FOR FURTHER QUESTIONS

If you have any further information or questions about the study, you may contact the principal investigator, **EMMANUEL PARTEY** on phone number: **0242631233** or email: emmanuel.partey@st.ensign.edu.gh Thank you.

APPENDIX II: ASSENT FORM FOR STUDY PARTICIPANTS BELOW 18 YEARS

Project Title: DETERMINANTS OF COVID-19 VACCINE ACCEPTANCE IN ASUOGYAMAN DISTRICT OF THE EASTERN REGION OF GHANA

Purpose of Research

My name is Emmanuel Party, a Master of Public Health student at Ensign Global College. I am conducting a study on determinants of Covid-19 vaccine acceptance in Asuogyaman district. This is to explore the factors that is influencing the Covid-19 vaccine acceptance in the district.

Research Procedure

If you agree to be in this study, you will be asked to answer questions about yourself as well as questions about the factors that influenced you to accept or not accept the Covid-19 vaccination. These questions will be asked in a form of individual interview using an interviewer administered structured questionnaire. This will take between 15 – 25 minutes.

Risks and benefits:

There are no risks if you take part in this study. There are also no incentives but the information you provide may help in the formulation of policies that will improve the Covid-19 vaccine acceptance in the district.

Voluntary Nature of Participation

If you decide to participate in this study, you are free to answer the questions with much or as little details as you wish and feel comfortable to ask any question if you do not understand for further explanation. You are also at liberty not to answer

a particular question or withdraw from the study at any time for any reason with no penalty.

Confidentiality

You are assured of strict anonymity and confidentiality on any information you give. Only the research team will have access to the answered questionnaires. Confidentiality and privacy will be maintained by keeping all materials under lock and key. Your name will not be recorded. Instead, all data files will be coded and stored in randomly selected identification number making it impossible to identify you or your answers in anything written about this study.

Statement of Consent

I have read the information above, or it has been read to me. I consent voluntarily to be a participant in this study

Name of Participant: ……..…….

Signature or Thumb print of Participant: ……..

Date: ……..

Thank you for agreeing to participate

Name of witness: ……..

Signature or Thumb print of witness: ……

Date: ……

I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Researcher or Principal investigator: ……..

Signature of Researcher: ……

Contact and Questions

If you have any further information or questions about the study, you may contact the principal investigator, **EMMANUEL PARTEY** on phone number: **0242631233** or email: emmanuel.partey@st.ensign.edu.gh. Thank you

APPENDIX III: CONSENT FORM FOR PARENT OR GUARDIAN OF PARTICIPANTS BELOW 18 YEARS

Project Title: Determinants of covid-19 vaccine acceptance in Asuogyaman district of the eastern region of Ghana

Purpose of Research

My name is **Emmanuel Party,** a Master of Public Health student at Ensign Global College. I am conducting a study on determinants of Covid-19 vaccine acceptance in Asuogyaman district. This is to explore the factors that is influencing the Covid-19 vaccine acceptance in the district.

Procedure:

If you agree for your child to be in this study, he/she will be asked to answer questions about his/herself as well as questions about the factors that influenced him/ser either accept or not accept the Covid-19 vaccination. These questions will be asked in a form of individual interview using an interviewer administered structured questionnaire. This will take between 15 – 25 minutes.

Risks and benefits:

: There are no risks if he/she take part in this study. There are also no incentives but the information he/she provides may help in the formulation of policies that will improve the Covid-19 vaccine acceptance in the district.

Voluntary Nature of Participation

If your child/guardian decides to participate in this study, they are free to answer the questions with much or as little details as they wish and feel comfortable to

explain. They are also at liberty not to answer particular questions or withdraw from the study at any time for any reason with no penalty.

Confidentiality

You are assured of strict anonymity and confidentiality on any information your child/guardian gives. Only the research team will have access to the answered questionnaires. Confidentiality and privacy will be maintained by keeping all materials under lock and key. Their names will not be recorded. Instead, all data files will be coded and stored in randomly selected identification number making it impossible to identify them the answers they give in this study.

Contact and Questions

If you have any further information or questions about the study, you may contact the principal investigator, **EMMANUEL PARTEY** on phone number: **0242631233** or email: emmanuel.partey@st.ensign.edu.gh Thank you.

Statement of Consent

I have read the information above, or it has been read to me. The study has been explained to me and my questions have been answered. I consent voluntarily for my child to be a participant in this study.

Name of Parent or Guardian: ……..

Signature or Thumbprint of Parent or Guardian: ……..

Date: ……..

Thank you for agreeing for your child to participate

Name of Researcher or Principal investigator: ……..

Signature of Researcher: ……..

Date: ……

PROVISION FOR ADHERENCE OF THE COVID-19 PROTOCOLS

The research assistants shall be provided with the following items to enhance adherence to the Covid-19 protocols during data collection as demanded by the policy.

1. Hand sanitizers
2. Adequate disposable facemasks for daily use
3. They shall be trained to keep social distancing during the data collection

APPENDIX IV: QUESTIONNAIRE

Project Title**; DETERMINANTS OF COVID-19 VACCINE ACCEPTANCE IN ASUOGYAMAN DISTRICT OF THE EASTERN REGION OF GHANA**

SECTION A

Kindly tick (√) or write answers where applicable

SOCIODEMOGRAPHIC INFORMATION

1. Age ……
2. Gender; ……... ☐ Male ☐ Female
3. Marital Status; ☐ Married ☐ Single ☐ Widow/ Widower ☐ Divorced/Separated ☐ Co-habiting
4. Educational Background ☐ No Formal Education ☐ Primary JHS ☐ SHS or equivalent ☐ Tertiary
5. Occupation……
6. Ethnicity ☐ Akan ☐ Ewe ☐ Ga/Dangme

   Other, Specify…….
7. Religion ☐ Christianity ☐ Islamic ☐ Traditional

   Other, Specify…….

SECTION B

PAST VACCINE EXPERIENCE

8. Have you heard of vaccines in general? ☐ Yes ☐ No

   8b. If yes, name on vaccine you have heard of……

9. Have been vaccinated before in your life? ☐ Yes ☐ No

   9b. If yes, state one of such vaccine……

   If no to question 10, skip question 11

10. What happened to you after the vaccination? Choose multiple answers;

    a. Nothing ☐
    b. General body pains ☐
    c. Pain and swollen at the site ☐
    d. Dizziness and general weakness ☐
    e. Other,

       Specify……...

11. Is that why you don't want to take the covid-19 vaccine? ☐ Yes ☐ No

SECTION C

Knowledge level and perception about Covid-19

Strongly Agree (SA), Agree (A), Disagree (D),

S/N	STATEMENT	SA	A	D	SD
12	The virus that causes covid-19 spread from person to person through direct inhalation of droplet from infected person or picking the virus from surfaces				
13	You can look at somebody's face and declare the person as having covid-19				
14	The common signs and symptoms of covid-19 are; Continuous cough, fever, general body pain Respiratory distress				
15	Covid-19 is a deadly disease				
16	People aged 70 years and above and people with co-morbidity are at higher risk of death from covid-19				
17	Covid-19 has greatly affected your means of livelihood (**Businesses**)				
18	Covid-19 is a disease for the rich				
19	Covid-19 can kill only people who don't believe in God or Allah				
20	Covid-19 is the disease of the devil. So, if you believe in God, you cannot get it and even if you get it, it cannot kill you.				
21	A lot more people are dying from covid-19				

SECTION D

VACCINE ACCEPTABILITY

22. Have you been vaccinated with the Covid-19 vaccine? ☐ Yes ☐ No

23. If yes, which type of the vaccine?

a. Mordena

b. Astrazeneca

c. Johnson & Johnson

d. Pfizer

e. Don't Know

24. How many times have been vaccinated with Covid-19 vaccine?..... Ref. to Covid-19 vaccination card

25. Which of the vaccine was given as booster…… Ref. to covid-19 vaccination card

26. If no, why? **Multiple answers are allowed;**

a. The vaccine was meant to reduce our population as Ghanaians. ☐

b. It is against my religious belief ☐

c. I don't trust the source of the vaccine ☐

d. The disease cannot kill me ☐

e. Other, specify……...

27. If yes what motivated you?.....

……

……

……

……

…….

28 Do you remember any event that put you off when it comes to covid-19 vaccine?

☐ Yes ☐ No

29. If yes, to question 29, what? ……..

30. Do you think you have had enough information or education about the covid-19 vaccine

☐ Yes ☐ No

31 Do you have anything to say about the vaccine?

……
……
……
……
……
……
……

APPENDIX V: GANTT CHART

Activity	**March 2022**				**May &June 2022**				**July & Aug. 2022**				**September 2022**			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Protocols & finalization of the proposal																
Submission for approvals																
Selection and training of research assistants																
Data collection																
Data cleaning																
Development of analysis plan																
Data analysis and report writing																
Dissemination & Evaluation																

APPENDIX VI: BUDGET

NO.	ITEM	FREQ.	QUANTITY	UNIT COST	TOTAL GH₵
1	**Stationery & Supplies**				
	1, Printing of final Proposal	1			50.00
	2, Printing and photocopy of questionnaire	2			100.00
	3, Printing of final research report and binding	6			600.00
	SUBTOTAL				**750.00**
2	**Training of research Assistants**				
	Lunch & water	1	6	50.	300.00
	T&T	1	6	50	300.00
	Hiring of venue	1	1	100.00	100.00
	SUBTOTAL				**700.00**
3	**Data Collection**				

	Allowance for research Assistants	1	6	300.00	1,800.00
	Credit for communication	1	7	20.00	140.00
	SUBTOTAL				**1,940.00**
4.	**Report Dissemination meeting**	1	25	50.00	**1,250.00**
	GRANDTOTAL				**4,640.00**

APPENDIX VII: ETHICAL CLEARANCE FROM ENSIGN GLOBAL COLLEGE

ENSIGN GLOBAL
COLLEGE

OUR REF: ENSIGN/IRB/EL/SN-201 July 08, 2022.
YOUR REF:

INSTITUTIONAL REVIEW BOARD SECRETARIAT

Emmanuel Partey
Ensign Global College
Kpong.

Dear Emmanuel,

ETHICAL CLEARANCE TO UNDERTAKE POSTGRADUATE RESEARCH

At the General Research Proposals Review Meeting of the *INSTITUTIONAL REVIEW BOARD (IRB)* of Ensign Global College held on Tuesday, June 21, 2022, your research proposal entitled **"Determinants of Covid-19 Vaccine Acceptance is Asuogyaman District of the Eastern Region of Ghana"** was considered.

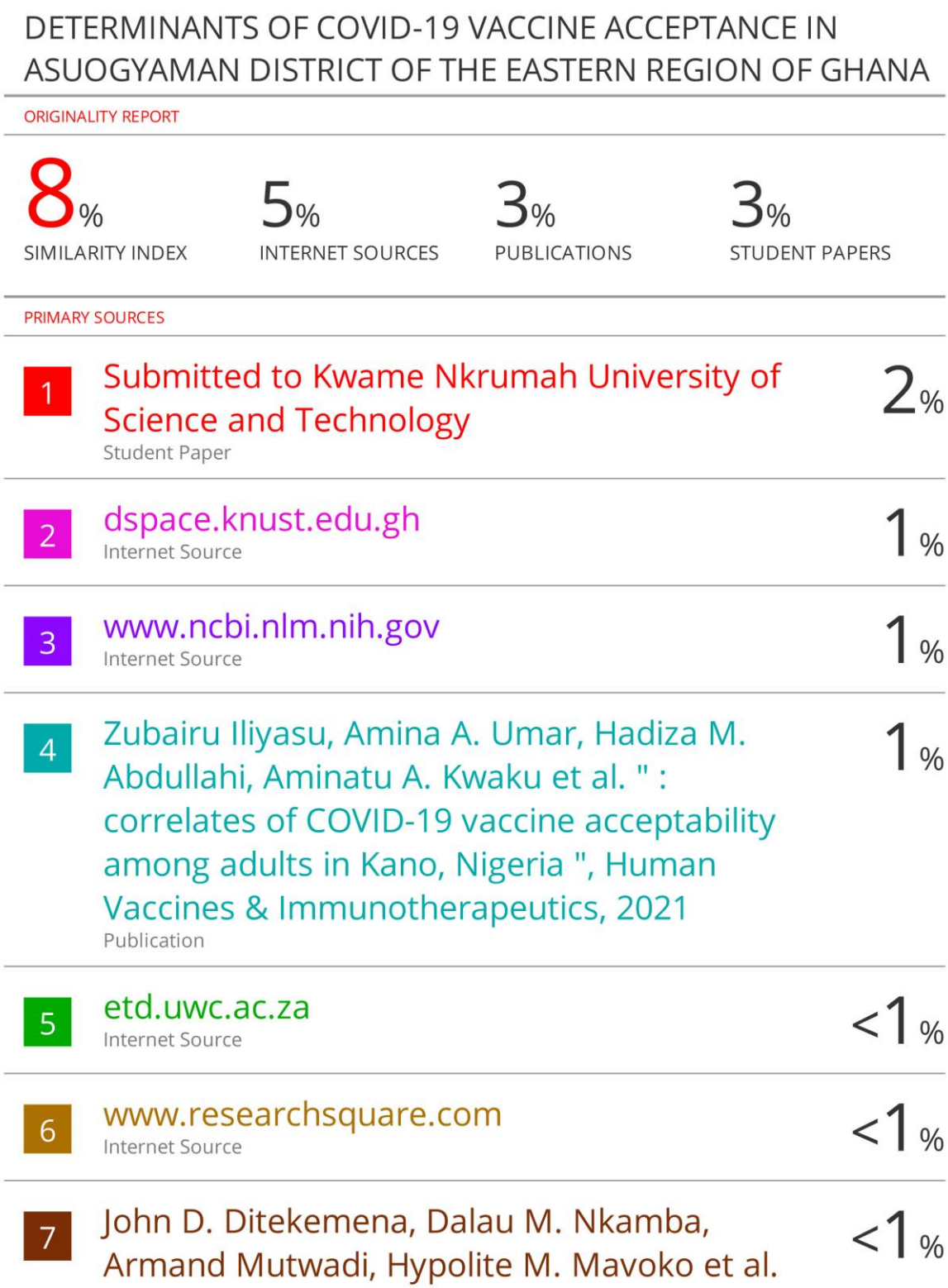
You have been granted Ethical Clearance to collect data for the said research under academic supervision within the IRB's specified frameworks and guidelines.

We wish you all the best.

Sincerely,

Dr. (Mrs.) Rebecca Acquaah-Arhin
IRB Chairperson

APPENDIX VIII: PLAGIARISM CHECK REPORT



DETERMINANTS OF COVID-19 VACCINE ACCEPTANCE IN ASUOGYAMAN DISTRICT OF THE EASTERN REGION OF GHANA

ORIGINALITY REPORT

8%	5%	3%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Kwame Nkrumah University of Science and Technology Student Paper	2%
2	dspace.knust.edu.gh Internet Source	1%
3	www.ncbi.nlm.nih.gov Internet Source	1%
4	Zubairu Iliyasu, Amina A. Umar, Hadiza M. Abdullahi, Aminatu A. Kwaku et al. " : correlates of COVID-19 vaccine acceptability among adults in Kano, Nigeria ", Human Vaccines & Immunotherapeutics, 2021 Publication	1%
5	etd.uwc.ac.za Internet Source	<1%
6	www.researchsquare.com Internet Source	<1%
7	John D. Ditekemena, Dalau M. Nkamba, Armand Mutwadi, Hypolite M. Mavoko et al.	<1%