



Determinants of vaccination decisions and lived experiences of Ghanaians with the COVID-19 pandemic; a qualitative study

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ABSTRACT

Background: Two years after the WHO declared a state of emergency as a result of the rapid spread of the COVID-19 virus from Wuhan, China, the rate of new infections experienced intermittent flare-ups globally, with vaccinations still ongoing in countries such as Ghana. One year after the implementation of Ghana's COVID-19 vaccine deployment program, Ghanaians have had the opportunity to reflect on their vaccination decisions, albeit the initial vaccine hesitancy.

Objectives: The current paper examined the knowledge and lived experiences of Ghanaians during the COVID-19 pandemic, and the factors influencing their vaccination decisions, one year after COVID-19 vaccinations commenced in Ghana, with special focus on the social and geographical histories which influenced their vaccination decisions.

Methodology: A qualitative approach using a case study design was used to conduct in-depth interviews among 25 respondents who were 18 years and above, not pregnant, and willing to participate in the study, between 5th and 23rd September 2022. Data was collected in 5 hotspot areas in Ghana with the highest cumulative case counts. A semi-structured interview guide was used to collect data which was analyzed using a thematic approach.

Findings: Respondents demonstrated a good level of knowledge on COVID-19 and related vaccines. Fear, panic, and anxiety were some of the experiences lived by respondents during the pandemic. The factors influencing vaccination decisions included conspiracy theories about COVID-19 and related vaccines, subjective notions about the COVID-19 disease, and subjective notions about the vaccine. The type of community one lived in, taboos, and previous successful vaccination programs in the community were geographic factors that informed respondents' decision to vaccinate or not. Social circles, religion, opinion leaders, and media-based campaigns were the social factors that influenced respondents' decision to vaccinate or not.

Introduction

The state of health systems globally, has never been the same since the World Health Organization (WHO) declared a six-month state of emergency, as a result of the spread of the COVID-19 virus from Wuhan, China [1]. Two years down the line, the global case count, together with the rate of new infections worldwide has experienced intermittent flareups [2], with the case not being any different in Ghana [3]. As of 3rd September 2022, the cumulative case count in Ghana was at 168,580 with 1,460 deaths [3].

The WHO has indicated that COVID-19 may never go away [4]. It may linger on for years, and humanity may have to deal with COVID-19 just as it has dealt with other viral infections which subsequently

became endemic like measles and HIV [5]. In the interim, however, the WHO has indicated the need to vaccinate as many people as possible, with the aim of developing herd immunity, which will hopefully slow down the rate of transmission of the disease [7,8]. However, the global health literature, at the start of the vaccination exercise, recorded significant vaccine hesitancy among the global populace [9,10].

Since the emergence of the COVID-19 disease in December of 2019, a relatively large volume of literature has emerged in a bid to establish the determinants of people's vaccination decisions, in order to determine ways of increasing vaccine uptake rates. A number of studies have so far been conducted in the United States of America [8], Kuwait [13], China [14], and Russia [15]. In Africa, a plethora of studies have also been conducted [6,41,42]. These studies have identified demographic

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characteristics such as age and gender, perceived difficulty in adhering to safety precautions, socioeconomic factors, and perceived risks associated with the vaccine as some determinants of COVID-19 vaccination decisions.

Several papers have recently been published on COVID-19 vaccine acceptance in Ghana [10,38,40]. The findings of most of these studies indicate that occupation, people's attitudes towards the vaccine, perceived susceptibility to and perceived severity of the COVID-19 disease are the determinants of people's COVID-19 vaccination decisions. A detailed examination of the methods and design of these studies reveal that they focused mostly on the standard determinants of health seeking behaviour as espoused by the health belief model. However, there is evidence in the broader health seeking behaviour literature and specifically the vaccine acceptance literature that suggest that social factors (individual cognitions, local group influences, and norms) influence health-seeking behavior such as the decision to accept or reject a particular vaccine [19]. For example, individuals' decision to accept the shingles, influenza, and pneumococcal vaccines were deemed to have been influenced by social factors [17,18]. Additionally, variations in geography is also known to predict vaccine the decision by individuals to accept a particular vaccine [11,18]. Beside the issue of social and geographic factors, almost all the studies on vaccine acceptance in Ghana except one [40] were conducted at a time when the COVID-19 vaccination exercise in Ghana had just begun and in the mist of numerous conspiracy theories on the possible side effects of the vaccines being used. Although vaccination is still ongoing in Ghana, it is approximately one year and six months since the first round of COVID-19 vaccination in Ghana. With the passage of time, it is possible that citizens may have become knowledgeable and less fearful about the supposed side effects of the vaccines being used and may therefore alter their decision to accept the vaccines or not.

Following from the discussion above, the current paper seeks to examine the knowledge and lived experiences of respondents during the COVID-19 pandemic, and the factors influencing their vaccination decisions one year after the first round of COVID-19 vaccinations in Ghana, with a special focus on the social histories and geographic factors that influence vaccination decisions.

Theoretical Model

The study is based on the Health belief model which has been used to study vaccination behavior extensively [21,22]. According to the Health Belief Model, a person's decision to engage in a particular health behavior is determined by their perceived susceptibility to the illness in question, their perceived severity of the illness, the perceived benefits of adopting the health behavior, and perceived barriers to adopting the health behavior [23].

The Health Belief Model further argues that people who believe that they are at risk of contracting a particular disease are more likely to engage in behaviors that will reduce their risk of contracting the disease. In the same vein, individuals who believe they are less likely to contract a particular disease are more likely to engage in risky and unhealthy behaviors. Further, individuals who perceive the disease to be severe, perceive the health behavior to be beneficial, and also perceive fewer barriers to adopting the health behavior are more likely to adopt the said health behavior [23].

Cues to action; which are external or internal triggers which cause a person to adopt a health behavior; and self-efficacy; which is an individual's assessment of their ability to successfully perform the health behavior; are also tenets of the health belief model which were added after the model was used in research over time [25]. These tenets were however excluded from this study because self-efficacy has been found to be less necessary within the context of explaining simple health behaviors such as vaccine acceptability [36], while cues to action often have a transient nature [24].

There are however other variables in literature that are not originally

part of the HBM constructs which are believed to significantly influence health behavior. These variables include the geography of communities within which respondents reside, social histories [24,25], conspiracy theories [43], and the perceived risks associated with the health intervention [44], which in this case is the Covid-19 vaccine.

The study therefore uses a modified version of the health belief model where cues to action and self-efficacy have been dropped and other variables from literature such as social histories, geography, influence of conspiracy theories and perceived risks have been added as in Fig. 1.

From a theoretical point, there is a direct relationship between the HBM variables (perceived susceptibility to COVID-19, perceived severity of COVID-19, perceived benefits of the vaccine, and perceived barriers to getting vaccinated) and the health action, that is the decision to accept the COVID-19 vaccine or not [16–20,23–36]. There is also a direct relationship between the social histories, geography, conspiracy theories, and perceived risks of the vaccine on the health action [24,25,43,44].

Methodology

As is consistent with acceptable reporting standards, this study adhered to the Standards for Reporting Qualitative Research (SRQR) [45]. This methodology presents a report on the items on the SRQR checklist.

Design and sampling

A cross-sectional design based on a qualitative approach was used to conduct the study using respondents from the Greater Accra region. The Greater Accra region was selected because it had the highest cumulative case count of COVID-19 infections in Ghana [27]. This study collected data from the Ghana Health Service designated COVID-19 infection hotspots in the Greater Accra Region. These include Tema Metropolis, Korle-Klottey, Accra Metropolis, Kpone Katamanso, and Ayawaso West [27], all around the central business district in the capital of Ghana. These hotspots were reported to have the highest COVID-19 case counts within the Greater Accra Region as of the time COVID-19 vaccinations started in Ghana (in March 2021), hence, their selection for the study. A total of 25 conveniently sampled respondents were selected for the study, made up of 5 respondents in each hotspot. This number of respondents was selected in each hotspot area in order to reduce the contact period between the researchers and respondents and as such, minimize the risk of COVID-19 transmission during the interviews, in addition to complying with the Ghana Health Service approved safety protocol. Persons who were eligible to participate in this study resided in the Greater Accra Region of Ghana (COVID-19 hotspot areas), were 18 years of age or above, and not pregnant as of the time of data collection. Further, only respondents who were willing to participate in the study were included.

Data collection

Initial visits were paid to the hotspot areas by researchers to sample respondents and schedule interview dates. Face-to-face interviews were conducted spanning approximately 1½ hours. All interviews are recorded electronically and stored. A semi-structured interview guide was developed using variables from the conceptual framework in Fig. 1 [28,29] for collecting data. The interview guide focused on obtaining data on the demographic characteristics of the respondents (age range, sex, marital status, religion, educational level, employment status), their level of knowledge and lived experiences, social and geographical factors (type of family, type of community in which they live, circle of friends, media-based campaigns, previous vaccination programs in the community, distance from vaccination center, opinion leaders, taboos, influence of religion and luck) and how that affect their perceptions and

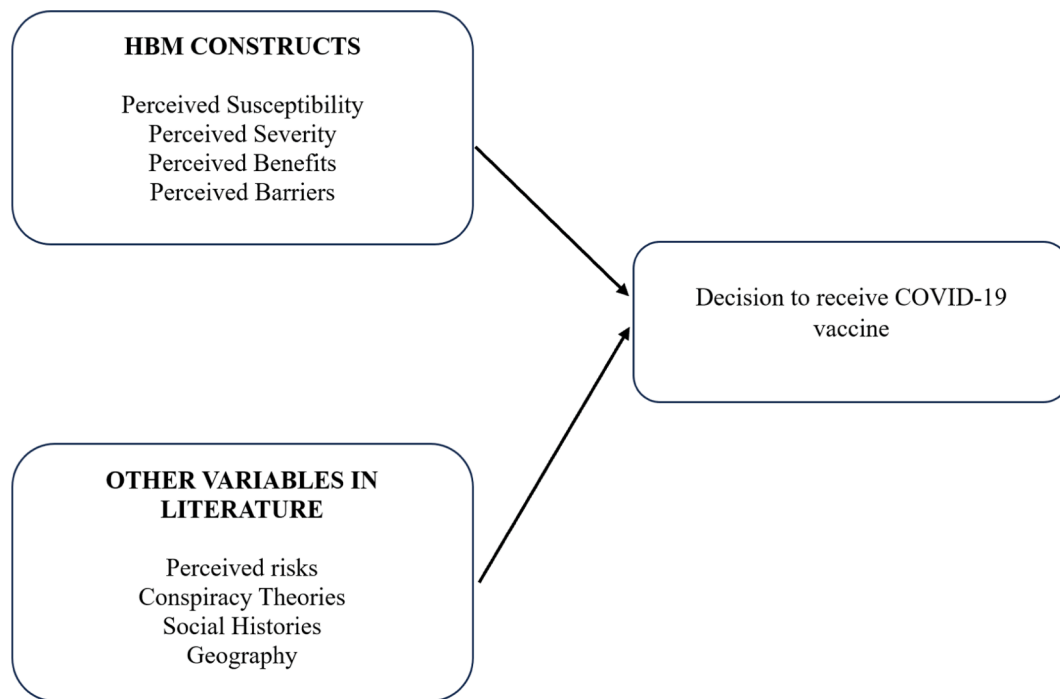


Fig. 1. Conceptual Framework adapted from the Health Belief Model and literature.

ultimately their vaccination decisions. The instrument was pretested among 5 respondents in the Ga East Municipality, who fit the inclusion criteria. Data was collected between 5th and 23rd September 2022. Respondents who had already taken their COVID-19 vaccinations were made to recall their experiences and reasons behind their vaccination decisions.

Analysis of data

Recorded data was transcribed using Google Voice™, after which familiarization with the data was conducted. Thematic Analysis was then conducted by assigning first-order (open) and second-order (axial) codes to specific responses identified in the data, after which aggregated labels were assigned to emerging themes. Findings from the study were then reported using the themes derived in accordance with the specific objectives of the study. Respondent numbers were used in reporting the findings, to protect the identity of the respondents.

Trustworthiness

Data quality was established by ensuring trustworthiness criteria such as credibility, transferability, and reflexivity as outlined in [30]. Credibility was ensured by allowing enough time for the interviews (approximately 1½ hours per interview), while transferability was ensured by defining the context of the study. A detailed reflexivity statement is presented in the ensuing section.

Reflexivity statement

The authors aimed to increase the validity and reliability of the research findings by acknowledging and critically examining their personal biases, assumptions, and interactions.

Positionality

The researchers involved in this study were conscious of the potential impact of their personal biases and backgrounds on the overall research process. As health policy researchers, the questions they formulated

were intended to have a significant influence on policy, which could have affected how data was collected and interpreted. By acknowledging their positionality, the researchers were able to shape their interview questions, interact with participants more effectively, and interpret the data more accurately as a result.

Preconceptions and assumptions

As researchers, we had certain preconceived notions and assumptions about people's choices regarding COVID-19 vaccination. One such notion was that most Ghanaians would not opt for the COVID-19 vaccine. These preconceptions stemmed from societal narratives, media portrayals, and our own personal experiences. During the research process, we made a conscious effort to reflect on these notions to avoid imposing our own beliefs on the participants and to gain a more nuanced understanding of their perspectives.

Reflexive journaling

During the research process, we maintained a reflexive journal to ensure transparency and rigor. This journal contained our thoughts, reflections, and feelings at various stages of the study. Our goal was to engage in reflexive journaling regularly to identify and address any biases, assumptions, or changes in perspective that arose during the research.

Ethical considerations

Ethical clearance was obtained from the Christian Health Association of Ghana (CHAG) Institutional Review Board with Ethical Review Number CHAG-IRB 01072021.

Presentation of findings

The demographic characteristics of the respondents are presented in Table 1 below. Out of a total of 25 respondents who were interviewed in this study, 13 were men, while 12 were women. 15 of the respondents were aged between 18 and 35 years, 7 respondents fell between the ages

Table 1
Demographic Variables of Respondents.

VARIABLE	FREQUENCY	PERCENTAGE (%)
GENDER		
Male	13	52
Female	12	48
AGE RANGE		
18—35 years	15	60
36—46 years	7	28
47 – 56 years	0	0
57 years and above	3	12
MARITAL STATUS		
Single	13	52
Married	10	40
Divorced	1	4
Widowed	1	4
RELIGION		
Christianity	19	76
Islam	5	20
African Traditional Religion	1	4
HIGHEST EDUCATIONAL LEVEL		
Tertiary Education	12	48
Senior High School	9	36
Junior High School	3	12
Primary School	1	4
EMPLOYMENT STATUS		
Formal Sector	7	28
Informal Sector	16	64
Unemployed	2	8

Source: Field Data, 2022.

36–46, while 3 respondents indicated that they were 57 and above. Two of the respondents indicated that they were unemployed, with 7 in the formal sector and 16 in the informal sector.

In line with the objectives of the study, the rest of the findings cover knowledge on COVID-19 and COVID-19 vaccines, lived experiences of respondents with COVID-19, and determinants of COVID-19 vaccine acceptance decisions.

Knowledge on COVID-19 and COVID-19 vaccine

Majority of respondents indicated that COVID-19 is a viral disease, others indicated that it is a pandemic caused by the Corona Virus, is communicable and weakens the immune system. The respondents indicated that COVID-19 could be passed on from one person to the other, and that it started from China. Respondent 1 noted:

“it is a viral condition that spreads through the nose, eyes, and mouth. It is passed on from one person to the other, and it originated from Wuhan China in the year 2019” (R1, Male).

Respondent 23 further indicated that: *“COVID-19 is an infectious disease caused by a newly discovered coronavirus, which spreads primarily when an infected person coughs or sneezes without covering the mouth or nose”* (R23, Female).

Lived experiences with COVID-19 pandemic

Out of the 25 respondents who participated in the study, 1 confirmed that he was infected with the COVID-19 virus in the past. Another respondent also indicated he had symptoms in the past that were likely to be COVID-19, even though it was not confirmed through a laboratory test. It was observed from the responses, that fear, panic, and a sense of insecurity were major experiences verbalized by most of the respondents as how they felt throughout the entire pandemic. Respondent 19 reported:

“I have felt very frightened and insecure since this pandemic started, considering the fact that millions of people have been infected worldwide” (R19, Female).

Respondent 14 also reported:

“The fatality rate of the disease worldwide makes it very scary” (R14,

Male). To buttress this fact, Respondent 7 indicated that the disease is *“so scary, as people were crying everywhere and don’t know what to do”* (R7, Male). Respondents 2,6 and 5 also reported that their experience with Covid-9 had been *“Very fearful so far”* (R2, Female; R5, Male; R6 Male).

Determinants of vaccination decisions

Out of the 25 respondents who were interviewed, 5 of them indicated that they had received at least the first shot of the vaccine, while 20 said they had not received the vaccine at all. Out of the 20 respondents who had not received it, 7 indicated that they may change their mind and accept the vaccine in future. They wanted to wait and observe what would happen to those who had received the vaccine before making a decision. The results suggest that determinants of vaccine acceptance decisions include conspiracy theories surrounding the COVID-19 vaccine, subjective notions about the COVID-19 disease and COVID-19 vaccine, and distance between participants’ homes and the vaccination center.

Conspiracy theories

Interview responses suggest that conspiracy theories around COVID-19 vaccines (adverse effects on fertility, erection, and perceived ploy to wipe out the black race) were largely responsible for vaccination hesitancy among respondents. Vaccination hesitancy among respondents however reduced due to media-based educational campaigns and respondents’ perceived susceptibility and severity of the COVID-19 disease, together with perceived benefits of the vaccine as per the quotes below.

Respondent 1: *“I heard rumors that the vaccine makes you impotent and infertile. So, I was initially afraid to take it”*. Respondent 1 further explained: *“I later saw adverts on the importance of taking the vaccine since the disease is killing a lot of people, and that is why I changed my mind and took the vaccine”* (R1, *ibid*).

Respondent 5: *“I strongly believed that the vaccine was a weapon of the whites against the blacks, to kill us all. We may not experience the effects now, but we will in a few years to come. I don’t trust the whites. They are capable of using this vaccine as a weapon against us”* (R5, Male).

Subjective notions about the COVID-19 disease

Subjective notions of the respondents on the COVID-19 disease was the second theme that emerged as a determinant of the respondents’ COVID-19 vaccine acceptance. It was observed that for those respondents who considered themselves susceptible to COVID-19, they were more receptive of the vaccine as compared to those respondents who considered themselves not susceptible to the disease. Also, for those respondents who considered COVID-19 as severe, they were more accepting of the vaccine as compared to those respondents who considered COVID-19 as less severe. Out of the 25 respondents who were interviewed, 13 of them verbalized that they believed they stood the chance of contracting COVID-19. Out of this number 12 of them were open to accepting the vaccine due to the fact that they were susceptible, while 1 participant still maintained that he/she would not receive the vaccine, despite the fact that they were susceptible to the disease as per the quote below.

Respondent 1: *“the likelihood that I may be infected with COVID-19 is about 50 % due to the environment I live in so I had to take the vaccine for protection”* (R1, *ibid*).

Respondent 2: *“I was more prone to get the disease because, you know, as a health worker, I’m always in touch with sick people, and before they come, you will not know that they carry the virus, and that is why I will take the vaccine immediately I have the opportunity to”* (R2, Female).

Even though majority of the respondents who believed they were susceptible to the disease were open to receiving the vaccine, there were a few who, despite believing they were susceptible, were still skeptical

about receiving the vaccine. For these respondents, they indicated that they wanted to wait and see the sort of adverse effects other people would experience after taking the vaccine, before they made a decision on the vaccine.

The findings also indicate that those who perceived COVID-19 to be a severe disease were more open to accept vaccination. For example, Respondent 16 indicated:

“We saw a lot of images from other countries where people were really dying, so I believed that it was very severe, so I have taken the first shot and will take the second soon” (R16, Male).

Some respondents indicated that even though they felt they were less likely to contract the COVID-19 disease, they still believed the disease was severe, considering the number of people who had become victims to the disease, hence the decision to take the vaccine.

Subjective notions about the COVID-19 vaccine

The third theme which emerged as a determinant of COVID-19 vaccine acceptance was the respondents' subjective notion about the vaccine. The subjective notions of the respondents about the COVID-19 vaccine include their perceived benefits and perceived risks of the vaccine.

Respondents who perceived the COVID-19 vaccine as beneficial were more accepting of the vaccine compared to respondents who perceived the vaccine as less beneficial.

Respondent 22: *“I believed the vaccine was very beneficial because it would reduce the rate at which the infection is spreading. This influenced my decision positively to accept the vaccine because I knew the vaccine would protect me against the disease”* (R22, Male).

Respondent 19: *“I believed the COVID-19 vaccine had the benefit of making me immune against Covid 19. This influenced my decision to accept the vaccine”* (R19, *ibid*).

These responses run through the respondents who had either received the vaccine or indicated that they would receive the vaccine in the near future. For the respondents who were hesitant towards the vaccine, one of the reasons for their refusal to receive the vaccine was because they didn't think the vaccine had any benefits and this is captured in a quote by a respondent below. Respondent 5, *“I don't think the vaccine has any benefits because you can even be re-infected with the virus after receiving the vaccine. Due to that, I have rejected the vaccine”* (R5, *ibid*).

Perceived risks of the COVID-19 vaccine was the next subjective notion about the vaccine, which determined COVID-19 vaccine uptake among the respondents. It was observed from the responses that, prior knowledge of some perceived risks and side effects of the COVID-19 vaccine allowed respondents to prepare adequately before receiving the vaccine, thereby increasing their acceptability of the vaccine. Respondents mentioned headaches, shortness of breath, chest pain, leg swelling, and persistent stomach pains as some of the risk factors that they believed were associated with the COVID-19 vaccine as indicated by Respondent 23 below.

“Because I'm aware of such risks, I know what to expect after taking the vaccine” (R23, *ibid*).

That being said, this respondent was of the view that knowledge about these risk factors rather influenced her in a positive manner in the sense that she could brace herself for them after taking the vaccine, thus, the risk factors did not deter her from taking the vaccine. Other respondents also reported that all medications have risks, life itself is a risk, and that they didn't think the vaccine carried any significant risks.

Influence of Social Histories

A key focus of the study was exploring how the social histories of the respondents affected their COVID-19 vaccination decisions. It was identified from the responses that geographic factors (the type of community the people lived in; including the taboos and healthcare facilities

available in the community; previous vaccination programs held in the community) and social histories (the effect of religious beliefs, family influence, opinion leaders in the society, media-based campaigns and influence from the people around the respondents) influenced the respondents' vaccination decisions as below.

First, respondents who belonged to liberal families reported being open to receiving the vaccine, as compared to respondents who belonged to conservative families. Respondent 24, who belongs to a liberal family of six indicated that:

“My family is very liberal and they encouraged me to go in for the vaccine because it will help save my life if I get in contact with the disease” (R24, Male).

In the same vein, respondents who belong to conservative families also reported that they would not take the vaccine. Respondent 21 indicated that:

“I belong to a very conservative family. They are very traditional and not easily convinced to adapt to new stuff. This has influenced me such that I would not be going in for the vaccine” (R21, Male).

Secondly, the social circle or group of people who have close interpersonal relationships with the respondent influenced them to either accept or reject the vaccine. Respondent 20 indicated: *“my circle of friends shared negative testimonies about the side effects of the vaccine, and due to this I also became skeptical about receiving the vaccine”* (R20, Male).

Respondent 3: *“for the people around me, most of them initially said they were not going to take the vaccine, so I also decided not to take the vaccine. But finally, I saw that my friends were now convinced to take the vaccine, and I was also encouraged. So, they influenced my decision positively to just go for the jab”* (R3 Female).

Thirdly, Media-based campaigns were observed to have influenced some respondents' vaccination decisions. Some respondents reported that media-based campaigns within their society gave them more knowledge on the COVID-19 disease and its vaccine, thereby causing them to accept the vaccine.

Respondent 7: *“in the initial stages of the COVID-19 disease, the media was rather making the vaccine look scary, thus, making me decide to reject the vaccine initially. Subsequently, however, I received more education on the vaccine through the same media, which made me change my mind”* (R7, Male).

Additionally, Opinion leaders within a community were observed to influence the decision of some respondents on the COVID-19 vaccine. Five of the respondents were of the view that some influential people within their communities influenced their decision on the vaccine. For these respondents, opinion leaders within their social circles mostly positively influenced their decision to receive the vaccine as per the quote from Respondent 7 below

“When the vaccines first came, the opinion leaders were just against them. But when the education came right, a lot of them, those we look up to said we should go for the jab and that it's safe. And it really influenced my decision to accept the vaccine” (R7, *ibid*).

The findings of the study also suggest that religious considerations influenced the decision to accept the vaccine or not. While some respondents indicated that they will be protected by God from contracting the virus and so have not taken the vaccine, others indicated that they have taken the vaccine because their religious leaders admonished them to do so given that taking the vaccine is in their own interest. This is reflected in the quotes from Respondent 6 and 10 below: follows:

Respondent 6: *“I have not been infected because God has been protecting me. It is the will of God. That is what I believe. I believe that if God wants me to get it (COVID-19) no matter what, I will get it. Because I sit in public cars, I sit with other people to eat and converse. I attend social events but still I haven't had it”* (R6, Male).

Respondent 10: *“per my religion Islam, if there is a vaccine for a disease and you refuse to take it and you die from that disease, it is regarded as suicide so we are usually encouraged to take the vaccine”* (R10, Male).

Geography of respondents

Geography in the context of this study refers to the type of community respondents belonged to, the presence or otherwise of taboos in the community, presence of a vaccination center; including the distance to the nearest hospital or vaccination center in the community; and previous history of vaccination programs in the community and how they affect the decision of respondents to either accept or reject the vaccine. It was however observed that the presence of a vaccination center and distance to the nearest hospital or vaccination center in the community was not considered to be an important consideration for respondents' vaccination decisions.

Few respondents indicated that belonging to a liberal community that accepts change and allows people to make certain decisions for themselves allowed them to make informed decisions regarding the vaccine. On the other hand, respondents in communities with taboos were more reluctant to take the vaccine due to perceived conflicts with their beliefs emanating from those taboos. The point of view above is clearly articulated by the quotes below

Respondent 4, *"My community is one which allows people to make their own decisions, so it affected me in the positive way to accept the vaccine"* (R4, Female).

Respondent 2: *"You know, the local people believe that whenever you have a boil, you should not vaccinate. Due to this, some people decided not to be vaccinated because they had boils. They believed that if they took the vaccine, they would die. But for me, I took the vaccine because I did not have any boil at the time"* (R2, *ibid*).

Lastly, previous successful vaccination programs in specific communities made it easier for members of such communities to accept the COVID-19 vaccine as per the account respondent 8.

Respondent 8: *"there was a previous yellow fever vaccination program in the community. People took that vaccine and it prevented them from getting the disease. The experience was great because it prevented the spread of the disease, so it made people accept the COVID-19 vaccine as well"* (R8, Male).

Discussion

All 25 respondents who partook in this study indicated that they had at least heard of the COVID-19 disease and its vaccine. This is an indication that news regarding the pandemic and its vaccine has spread to people from all walks of life within the Ghanaian community irrespective of their educational, religious or socioeconomic status. It is also an indication of some level of success in stakeholder efforts to educate the public on the nature and origin of the COVID-19 disease. These findings are in agreement with findings presented by [31,32] which indicate that majority of people in the global population have heard about the COVID-19 disease and exhibit an appreciable level of knowledge on the disease. Admittedly, some respondents in this current study displayed in-depth knowledge than others, and this is likely as a result of differences in educational levels (socioeconomic differences) and geographic differences.

The major lived experience which was verbalized by the respondents as being associated with the COVID-19 pandemic was fear, panic and a deep sense of insecurity. These findings are supported by findings from [10,33,34]. According to these authors, fear, panic and a deep sense of insecurity are some of the major experiences that COVID-19 has brought upon humanity as a whole. This is likely as a result of the relatively high death toll at the beginning of the pandemic, and the relatively low levels of information available on the virus at the time.

Findings from this current study have further revealed the spiritual nature of the Ghanaian community and how much a lot of health-related issues are attributed to spirituality. These findings are in line with [35] who reported that majority of Ghanaians attribute their health outcomes to being as a result of God's interventions. This is likely so because about 72 % of Ghanaians are Christian, with 17 % of the population belonging to the Islamic religion [35].

Further, this study has revealed that at the time of conducting this study, majority of the respondents (20 respondents) wanted to wait and observe what would happen to people who had received the COVID-19 vaccine before making a decision on whether or not to accept the vaccine. This finding is in line with previous reports in the vaccine acceptance literature that, a large proportion of the global population are quite skeptical about receiving the COVID-19 vaccine [9,10]. Similar findings by [25,36] have also indicated that 1 in 5 people are hesitant towards receiving the COVID-19 vaccine.

The third objective of this study which aimed at examining the determinants of COVID-19 vaccination decisions among Ghanaians revealed conspiracy theories surrounding the COVID-19 vaccine, subjective notions about the COVID-19 disease and subjective notions about the COVID-19 vaccine as the reasons for which Ghanaians decided to either receive or reject the vaccine.

Conspiracy theories about the COVID-19 vaccine being a "weapon from the Western World to wipe out the black population" and the vaccine making one "impotent and infertile" as reported by the respondents, indicated that conspiracy theories have plagued the Ghanaian health system, and is consistent with previous findings by [31,32], who indicated that conspiracy theories have plagued the global health system and are significantly affecting the decision of some people to receive the COVID-19 vaccine, resulting in vaccine hesitancy among a substantial proportion of the populace.

Also, subjective notions about the COVID-19 disease (which includes their perceived susceptibility to and perceived severity of the disease) and subjective notions about the vaccine (which include perceived benefits and risks of the vaccine) were revealed to determine people's vaccination decisions. These are in line with tenets of the Health Belief Model, as these determinants have been reported to directly influence the actions of the patient to engage in a particular health action [25]. These subjective notions have also been largely documented in the vaccine acceptance literature as being responsible for people's vaccination decisions, as reported by [9,12,33,37].

For the fourth objective and key focus of this current study, geographical characteristics of the respondents, such as the type of community they lived in, taboos in the community, and previous successful vaccination programs in their communities, were found to influence their COVID-19 vaccination decisions. This goes to support the evidence within the health seeking behavior literature which indicates that some variations in geographical histories could influence a person's vaccination decision as reported by [11,18]. Specifically, [8,11,12] have also reported that previous successful vaccination programs in a community make it more likely for people to accept the COVID-19 vaccine. These findings are in line with findings derived from this current study. Further, findings from this current study are supported by [33] who reported that the distance from the nearest hospital or vaccination center in the community does not tie into the people's decision to either accept or reject a vaccine.

With regards to the social factors, this study revealed that family influence, religious beliefs, influence of opinion leaders, media-based campaigns and social circles of the respondents influenced their COVID-19 vaccination decisions. This finding is line with evidence in the greater vaccine acceptance literature which indicates that some social factors influence vaccine acceptance [17-19]. Specifically, the type of family a person belongs to [38], circle of friends [37], media based campaigns [39], opinion leaders and religious influence [35]. These factors, which were initially identified in literature as being determinants of the shingles, influenza, and pneumococcal vaccines, have now been identified as determining COVID-19 vaccine acceptance or otherwise.

The results of this study have significant implications for healthcare policy, practice, and systems research. Firstly, health systems need to implement targeted communication strategies [46] that utilize culturally appropriate and locally relevant messaging to enhance vaccine acceptance among Ghanaians. This will help build trust among

community members through transparent communication, correcting misinformation, and involving them in the decision-making process.

Additionally, community-based initiatives should be established to engage with local leaders, influencers, and community members. Targeted Health Education Programs can raise awareness about COVID-19 and the importance of vaccination [47]. The health system can also collaborate with schools, community centers, and religious institutions to disseminate accurate information.

Conclusion

The COVID-19 disease, since its discovery, has negatively impacted the global population in numerous ways, with Africa and Ghana being no exception. Using the Health Belief Model as a theoretical underpinning, this study examined the knowledge and lived experiences of Ghanaians during the COVID-19 pandemic, and the factors influencing their vaccination decisions, one year after COVID-19 vaccinations commenced in Ghana, with special focus on the social and geographical histories which influenced their vaccination decisions. Findings revealed a good level of knowledge of COVID-19 and its vaccine, together with fear, panic and anxiety as the respondents' lived experiences throughout the pandemic. Also, the determinants of COVID-19 vaccination decisions include conspiracy theories, subjective notions about COVID-19 disease and its vaccine, geographic and social factors.

Findings from this study have confirmed tenets from the Health Belief Model and previous studies in the vaccine acceptance literature. The study further revealed implications for health policy such as intensifying educational campaigns which are tailored towards addressing conspiracy theories, subjective notions of the general population on COVID-19, geographic and social factors identified in this study, especially at the community level, using opinion and religious leaders and media-based campaigns will go a long way to improve COVID-19 vaccine acceptance.

Future, research can compare the results of this study with the findings of similar research conducted in other countries. This will help in gaining valuable insights into the determinants and lived experiences of vaccine acceptance across different cultures. Additionally, future research can assess the effectiveness of targeted intervention strategies, such as implementing and evaluating the impact of communication campaigns, community engagement initiatives, and policy changes designed to address the determinants of vaccine acceptance.

Limitations of the study

The study was carried out in the Greater Accra Region of Ghana due to the fact that it has the highest cumulative case count of COVID-19 in Ghana. As such, results may not be applicable to people in other regions of Ghana. This is because the geography and histories of the people in other regions may differ. Also, situational and contextual factors in other regions may have a bearing on the study, thus, making the findings ungeneralizable to other regions in Ghana. Further, the risk for recall bias was not considered a problem in this study because data for this study was collected a year after the first COVID-19 vaccine was administered in Ghana, and also, COVID-19 vaccination is still ongoing in Ghana.

Declarations.

Ethics approval.

Ethical approval for conducting this study was sought from the Christian Health Association of Ghana Institutional Review Board, prior to commencement of this study. Ethical clearance number: CHAG-IRB 01072021.

Consent for publication

Not applicable.

Availability of data and materials.

Data for the study can be obtained from the corresponding author upon reasonable request.

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Authors' Contributions.

GAB and LAB conceptualized the study. LAB collected, analyzed the data, and discussed the findings. GAB critically reviewed the findings and discussions. Both authors developed the manuscript together and agreed to its submission for publication.

CRedit authorship contribution statement

Lawrencia Aggrey-Bluwey: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Gordon Abekah-Nkrumah:** Conceptualization, Methodology, Resources, Supervision, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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