



# Community Knowledge and Perception of COVID-19 in the Middle Belt of Ghana

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## Summary

### BACKGROUND

Research has shown that health behaviour is an outcome of individuals' knowledge of the balance between the barriers to and benefits of action. The perceived severity and susceptibility to a disease influence individual's perceived threat of disease and perceived benefits and barriers influence perceptions of the effectiveness of health behaviour. This study sought to assess the knowledge and perceptions of community members in middle Ghana on COVID-19.

### MATERIALS AND METHODS

This was a mix-method descriptive study. A structured questionnaire was administered to collect quantitative data among 517 randomly selected participants. The data were analyzed using STATA version 14, descriptive statistic was performed and results were presented in charts and frequency tables. For the qualitative arm, in-depth interviews were conducted among 20 purposively selected community members. Thematic analysis was performed using NVivo version 10.

### RESULTS

Knowledge of COVID-19 was high (99.8). Knowledge of the mode of transmission was also high (93%). This is comparable to the findings from the qualitative arm where fever, headache, runny nose, sneezing, difficulty in breathing, pain in the lungs and weakness or loss of energy emerged as some of the signs and symptoms of COVID-19. The majority (99.6%) of the respondents indicated that COVID-19 is not transmitted spiritually and collaborates with the qualitative findings where it was indicated that, COVID-19 is a medical condition that has no relationship with spirituality.

### CONCLUSION AND RECOMMENDATION

COVID-19 infection is widely known and perceived as a fearful and serious infection. COVID-19 was identified to be treatable spiritually. Education on the appropriate treatment of COVID-19 should be intensified.

*Keywords: COVID-19, Knowledge, Perception, Community, Ghana*

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## Introduction

Globally, about 258,164,425 confirmed cases of COVID-19 and under 5.2 million deaths have been recorded as of 25<sup>th</sup> November 2021 since the disease was first reported in China, in December 2019 and announced by the World Health Organisation (WHO) as a pandemic on 30<sup>th</sup> January 2020(1). In Ghana, the first confirmed case of COVID-19 was reported on 12<sup>th</sup> March 2020 (2). As of 24<sup>th</sup> November 2021, there were 130,920 confirmed cases of COVID-19 and 1,209 deaths (3). COVID-19 can be transmitted in two ways: directly and indirectly through; (1) aerosols formed during surgical and dental procedures and/or in the form of respiratory droplet nuclei; (2) other body fluids and secretions, such as faeces, saliva, urine, semen, and tears (4).

The first mass vaccination programme commenced in early December 2020 and as of 15<sup>th</sup> February 2021, 175.3 million doses of vaccines had been administered (5). Until the discovery of COVID-19 vaccines, various infection control measures were proposed based on the knowledge of the transmission dynamics. These measures included regular hand washing, social distancing, avoiding physical contact, finding early health treatment for cough, fever and respiratory issues, using face masks and adhering to the recommendations of health care providers (6,7). Most COVID-19 infection prevention measures are human behaviour is driven which indicates that the behaviour of the general public has an important bearing on the transmission of COVID-19. Human behaviour is influenced by people's knowledge and perceptions. Consequently, the level of knowledge and perceptions of people in various countries determines their attitudes towards the acceptance and adherence to COVID-19 infection prevention measures (8,9).

Studies have established the effects of people's knowledge and perceptions on

adherence to COVID-19 infection prevention measures (10,11). Typical in China, where COVID-19 was initially linked to the outbreak of a respiratory illness in Wuhan, the majority of citizens complied with protective behaviour. The high levels of compliance were largely associated with higher knowledge and perceived severity of COVID-19. Based on high knowledge and perceived severity of COVID-19, Chinese citizens complied with protective behaviour (12). Conversely, inadequate knowledge of COVID-19 could influence how people perceive the disease leading to non-compliance with preventive measures.

In Ghana, adherence to COVID-19 preventive measures including social distancing and the use of face masks is low despite the enactment of laws to punish non-compliance. Much attention was paid to public health education and strong government intervention to ensure compliance with limited attention to public responses to the government's actions. Recent studies in northern Ghana revealed that 85% of respondents held the view that COVID-19 is a punishment from God. (13) In this study, whilst 18% of respondents believed that there was no COVID-19 in Ghana, (69.6%) believed they will not contract the virus. (13) Knowledge and perceptions such as these may not encourage compliance with COVID-19 preventive measures. Understanding the knowledge and perception of the general public is therefore critical for the government and relevant stakeholders to develop effective risk communication strategies and ensure high compliance to protective behaviours.

This study sought to assess the knowledge and perceptions of community members in the middle belt of Ghana on COVID-19. Findings could help in the efforts at public health education and insights that might be transferable to similar settings in Ghana and beyond.



## Materials and Methods

### *Study design and setting*

This was a descriptive cross-sectional study design using a mixed-method approach. Both quantitative and qualitative data collection methods were employed to examine community knowledge and perceptions of COVID-19 in the middle belt of Ghana between 15<sup>th</sup> June 2020 to 7<sup>th</sup> July 2020. The quantitative and qualitative data collection was deployed concurrently with the qualitative study mainly focused on providing contextual explanations to the quantitative findings.

The study was conducted in six adjoining districts in the Bono East region of Ghana: Kintampo North Municipal (KNM), Kintampo South District (KSD), Techiman South Municipal (TSM), Techiman North District (TND), Nkoranza South Municipal (NSM), and Nkoranza North District (NND) where the Kintampo Health Research Centre maintains a Health and Demographic Surveillance System (HDSS). The HDSS had an estimated population of about 430,728. Males were 47.8% and Females were 52.2%. The various districts constitute; KSD (16.3%), KNM (21.6%), NSM (15.7%), NND (6.1%), TSM (26.1%), and TND (14.2%) of the total population. There are 9 hospitals, 35 health centres, and 214 functional Community-based Health Planning and Services (CHPS) in the study area. The population is multi-ethnic and the majority of them reside in rural communities (14).

### *Sample size calculation and distribution*

Grounded on a survey that assessed the knowledge, attitudes and preventive practices on Ebola Virus Disease within the Kintampo districts of Ghana, 83% knew about the viral disease (15). Using a prevalence of knowledge of 0.83, 95 per cent confidence level, and an

error margin of 0.0324. The sample size was calculated using the formula  $n = \frac{\alpha^2 \rho(1-\rho)}{\epsilon^2}$ , where  $\rho$  is the prevalence of the study, alpha is the significance level and epsilon is the error margin of the study. A sample of 517 is generated when the formula was employed. The sampling distribution was done proportional according to the size of each study district. The distribution is as follows; Kintampo North & South (196 (38%)), Nkoranza North & South (112 (22%)), and Techiman North & South (209(40%)). To avoid sampling bias, all adult resident household members aged 18 years and above were eligible to participate in the survey. Non-resident members were excluded from the study. Survey Solutions Version 19.05 was used to design the questionnaire for data collection (16) and was deployed on android tablets for the collection of data. Data validation checks like branching logics, range and consistencies were incorporated in the design of the data collection tools which ensured that all data fields were completed before it was uploaded. Geographic Position System (GPS) coordinates features were captured automatically for field verification purposes. All completed data were synchronized daily unto the database after cross-checking the response for consistency, completeness and accuracy from the tablets.

Data were cleaned and statistical analysis was done using STATA version 14.0. (17) Descriptive statistics such as frequencies and percentages were used to describe the data and presented in figures and tables. In-depth interviews (IDIs) were conducted among purposively selected opinion leaders and community members within the study area. Their selection was based on their role as gatekeepers in the communities regarding decision-making on critical issues on health and their implementation. A total of 20 IDIs were conducted (Respondents included Muslim clerics, Traditional Authorities, District Political



Authorities, Managers of Health Management teams, Drivers and some members of the general public).

All interviews for the qualitative component were done via telephone and each session lasted for about 50 minutes. Data saturation was considered during the data gathering. Qualitative data were analyzed thematically.

The audio recordings of the interviews which were conducted in Twi (the widely spoken local language) were transcribed into English verbatim. Transcripts were verified to ensure that audio transcripts matched with written transcripts. Written transcripts were then imported into NVivo version 10 and coded in line with a priori themes under knowledge, modes of transmission and perceptions of COVID-19.

To ensure inter-coder agreement and reliability ten per cent of the transcripts were coded by two independent persons. The level of agreement between the different coders was consistently higher than 90%. Findings were presented as narrative and triangulated with the quantitative findings.

## Results

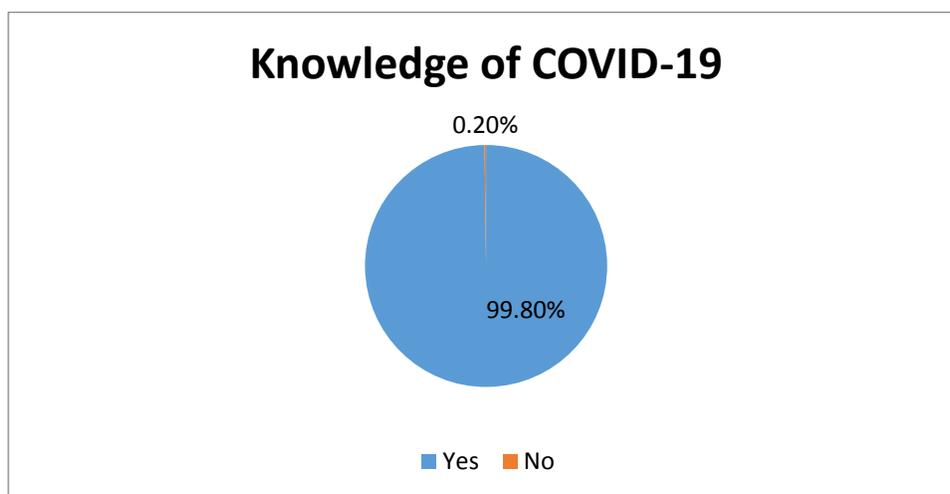
### *Demographic characteristics*

For the quantitative survey, out of the 517 respondents, males constituted 45.4% while females were 54.6%. Respondents ranged from 18 to 60 years of age with an average age of 39 years. Thirty-nine per cent of the respondents had no formal education. Most of the respondents were farmers representing 43% of the sampled population. Table 1 shows more details about the demographic characteristics of respondents.

The ages of respondents for the qualitative component ranged from 30-66 years with an average age of 33, and more than half of them were men. Most of the respondents were Akans (Twi-speaking people) from Southern Ghana while the remaining were of Northern Ghana descent. The lowest level of education of the respondents was primary while the highest was a University Post Graduate degree.

### *Knowledge on COVID-19*

Respondent's knowledge of COVID-19 was generally very high in the quantitative survey. Overall, 99.8% of the respondents knew COVID-19 as shown in Figure 1.



**Figure 1:**  
*Knowledge of COVID-19 among community members*



In the qualitative component, respondents were generally aware that COVID-19 started in China and spread to other parts of the world. COVID-19 was said to be a virus transmitted through the air and transmitted from person to person. Generally, COVID-19 was perceived as fearful and deadly, killing a lot of people. COVID-19 was also seen to be just like influenza that occurred in the past. Interestingly, some respondents demonstrated a good

knowledge of COVID-19 as it was mentioned that it belongs to a group of viruses called the coronavirus.

*"Corona is also called COVID-19. It is transmitted from person to person; some think it is airborne but whatever it is, it infects the nose, eyes, and ears. (IDI\_chief 1)*

*"...the little we have heard about coronavirus; we have seen that it is something fearful and it kills a lot of people" (Radio presenter 1).*

**Table 1:**  
**Basic demographic characteristics (N=517)**

Demographics	Total n (%)
<b>Gender</b>	
Female	282 (54.6)
Male	235 (45.4)
<b>Age Group</b>	
Less than 30 years	135 (26.1)
30 – 40 years	147 (28.4)
Above 40 years	235 (45.5)
<b>Level of Education</b>	
None	201 (38.9)
Primary	88 (17.0)
Middle/JSS	122 (23.6)
Technical/SSS	68 (13.2)
Post-middle collage	22 (4.3)
University	16 (3.1)
<b>Occupational level</b>	
No employment	62 (12.0)
Clerical/Secretarial	8 (1.6)
Employed Tradesman	27 (5.2)
Farmer	224 (43.3)
Professional	20 (3.9)
Student	37 (7.2)
Trader/businessman	130 (25.2)
Other Specify	9 (1.8)
<b>Marital Status</b>	
Married	351 (67.9)
Single	91 (17.6)
Living together	25 (4.8)
Separated	21 (4.1)
Widowed	29 (5.6)
<b>Religious Status</b>	
Christian	217 (42.0)
Muslim	278 (53.8)
Traditional	8 (1.6)
None	14 (2.7)



## ***Knowledge of signs and symptoms of COVID 19***

The majority (80%) of the respondents of the sampled population knew the signs and symptoms of Covid-19. Knowledge of the signs and symptoms of COVID-19 infection were further explored amongst respondent who knew the sign and symptoms of Covid-19.

In total, 69.7% of those who knew specific signs and symptoms of Covid-19 indicated that fever is a sign/symptom of COVID-19 infection. The majority (79.3%) of them also identified coughing as a sign and symptom (Table 2). In all about 35% of the respondents believed difficulty in breathing, running nose and sneezing are signs/symptoms of COVID-19.

**Table 2:**  
***Knowledge of signs and symptoms of COVID-19 infection (N=412)***

<b>Statements</b>	<b>Total, n(%)</b>
Is fever a sign/symptom of coronavirus infection	
Yes	287(69.7)
No	125(30.3)
Is coughing a sign/symptom of coronavirus infection	
Yes	327(79.3)
No	85(20.6)
Is difficult in breathing a sign/symptom of coronavirus infection	
Yes	146(35.4)
No	266(64.6)
Is running nose a sign/symptom of coronavirus infection	
Yes	140(34.0)
No	272(66.0)
Is sneezing a sign/symptom of coronavirus infection	
Yes	143(34.7)
No	269(65.3)
Is headache a sign/symptom of coronavirus infection	
Yes	155(36.7)
No	256(62.3)
Is sore throat a sign/symptom of coronavirus infection	
Yes	28(6.8)
No	384(93.2)
Is Pneumonia in both lungs a sign/symptom of coronavirus infection	
Yes	10(2.4)
No	402(97.6)
Is Diarrhoea a sign/symptom of coronavirus infection	
Yes	13(3.2)
No	399(96.8)
Is Vomiting a sign/symptom of coronavirus infection	
Yes	25(6.1)
No	387(93.9)
Are abdominal pains a sign/symptom of coronavirus infection?	
Yes	3(0.7)
No	409(99.3)
Is there another sign/symptom of coronavirus infection?	
Yes	42(10.2)
No	370(89.8)



Sign/symptoms such as abdominal pains, pneumonia in the lungs, diarrhoea and vomiting were the least believed to be a result of COVID-19 (Table 2). Similarly, fever, headache, runny nose, sneezing, difficulty in breathing, pain in the lungs and weakness or loss of energy emerged as some of the signs and symptoms of COVID-19 from the qualitative data.

*"The symptoms you will see are that, when you get a fever, you will experience headache,*

*running nose, and sneezing. So, when you experience the headache, fever, then coronavirus is coming on to you" (IDI, chief\_1)*

*"...they are some viruses that when it enters into your body it first attacks your breathing pattern, I mean your lungs and others and it makes your breathing very difficult and it is very strong, so what the white man will call the immune system, it will fight against this immune system and will make you fill some feverishness, headache and others" (IDI, Radio presenter\_1)*

**Table 3:**  
**Knowledge of how COVID-19 is transmitted (A) (N=479)**

Statements	Total n(%)
Is COVID-19 infection transmitted airborne?	
Yes	248 (51.8)
No	231 (48.2)
Is COVID-19 infection transmitted through handshake?	
Yes	273 (57.0)
No	206 (43.0)
Is COVID-19 infection transmitted through skin contact?	
Yes	225 (47.0)
No	254 (53.0)
Is COVID-19 infection transmitted through close contact?	
Yes	210 (43.8)
No	269 (56.2)
Is COVID-19 infection transmitted through touching the face/nose/month?	
Yes	54 (11.3)
No	425 (88.7)
Is COVID-19 infection transmitted through touching Pangolin?	
Yes	0 (0.0)
No	479 (100)
Is COVID-19 infection transmitted through touching Bats?	
Yes	6 (1.3)
No	473 (98.7)
Is COVID-19 infection transmitted through touching Monkeys?	
Yes	0 (0.0)
No	479 (100)
Is COVID-19 infection transmitted through touching Pigs?	
Yes	1 (0.2)
No	478 (99.8)
Is COVID-19 infection transmitted through touching other bush meat?	
Yes	7 (1.5)
No	472 (98.5)
Is COVID-19 infection transmitted through touching other domestic animals?	
Yes	4 (0.8)
No	475 (99.2)



## ***Knowledge of COVID-19 transmission***

A high percentage of respondents (93%) of the sampled population (517) knew how COVID-19 infection is transmitted. The remaining respondents (7%) indicated they had no Knowledge of how COVID-19 infection is transmitted.

Knowledge of how COVID-19 is transmitted was further explored amongst the respondents (479) who knew how COVID-19 infection is transmitted. In total, 51.8% of those who knew Covid- 19 transmission were of the view that COVID-19 infection is airborne. About 57.0%, 47.0% and 43.8% admitted that COVID-19 is transmitted through a handshake, skin contact and close contact respectively. On

the other hand, 11.3% of the total respondents agreed that COVID-19 is transmitted through touching the face/nose/mouth.

On COVID-19 transmission through touching pangolin or monkeys which were noted by anecdotal evidence as transmitters, none of the respondents believed these wild animals could transmit COVID-19 (Table 3). Respondents in the qualitative study similarly demonstrated good knowledge of the mode of transmission of COVID-19. It was mentioned that COVID-19 is transmitted through the air, mouth, close contact, handshake, touching of face, nose, eyes and ears. It was also spread through sneezing and coughing of an infected person as well as touching infected surfaces.

***Table 4:***  
***Knowledge of how COVID-19 is transmitted (B) (N=479)***

<b>Statements</b>	<b>Total n (%)</b>
Is COVID-19 infection transmitted through food	
Yes	21 (4.4)
No	458 (95.6)
Is COVID-19 infection transmitted through water	
Yes	7 (1.5)
No	472 (98.5)
Is COVID-19 infection transmitted through blood	
Yes	12 (2.5)
No	467 (97.5)
Is COVID-19 infection transmitted through mosquitoes/other insects?	
Yes	6(1.3)
No	473(98.7)
Is COVID-19 infection transmitted through Semen/sexual intercourse?	
Yes	19 (4.0)
No	460 (96.0)
Is COVID-19 infection transmitted through Kissing	
Yes	7 (1.5)
No	472 (98.5)
Is COVID-19 infection transmitted through sneezing or not covering the mouth/ nose?	
Yes	121 (25.3)
No	358 (74.7)



*“If someone believed to have the virus spits or blows the nose which contains the virus and you come into contact the saliva that contains the virus or with surfaces that the person has also had contact with and you touch your face, the virus can easily have access into any of your respiratory systems” (IDI Islamic leader\_1)*

*“One can be infected through handshakes, coughing unto people” (IDI, Market woman\_1)*

In an assessment of whether COVID-19 is transmitted through food, 4.4% of respondents agreed that COVID-19 is transmitted through food. In all, less than 2% of the respondents believed COVID-19 is transmitted through mosquito bites or kissing. About 3% and 4% of the respondents however believed COVID-19 is transmitted through blood transfusion and semen/sexual intercourse respectively. Other

transmission sources as perceived by respondents are indicated below (Table 4).

Close to half (48.4%) of all the participants believed COVID-19 can be transmitted through being in contact with an infected person's cough. About 13% of respondents admitted that COVID-19 can be transmitted by being in contact with an infected person. It was observed that 0.8%, 0.4% and 0.8% believed it can be transmitted through sweat, urine and faeces respectively (Table 5).

### **Perceptions about COVID-19**

#### **Infection: Perception of the existence of COVID-19 infection**

A higher percentage (93%) of the sampled population (517) agreed that Covid-19 infection exists as shown in Figure 2.

**Table 5:**  
**Knowledge of How COVID-19 is Transmitted (C) (N=479)**

Statements	Total n (%)
Is COVID-19 infection transmitted through Sweat	
Yes	37 (7.7)
No	442 (92.3)
Is COVID-19 infection transmitted through Saliva	
Yes	111 (23.2)
No	368 (76.8)
Is COVID-19 infection transmitted through Faeces	
Yes	4 (0.8)
No	475 (99.2)
Is COVID-19 infection transmitted through Urine	
Yes	2 (0.4)
No	477 (99.6)
Is COVID-19 infection transmitted through Cough	
Yes	232 (48.4)
No	247 (51.7)
Is COVID-19 infection transmitted through Spiritual Attack	
Yes	2 (0.4)
No	477 (99.6)
Is COVID-19 infection transmitted through contact with an infected person?	
Yes	187 (39.0)
No	292 (61.0)
Is COVID-19 infection transmitted through travel to an area with COVID-19?	
Yes	41 (8.6)
No	438 (91.4)
Is COVID-19 infection transmitted through other means? Specify	
Yes	14 (2.9)
No	465 (97.1)

Concerning perceptions, the qualitative arm revealed that some respondents believe they cannot get infected with COVID-19 at night as most people wear their nose mask during the day and removed it at night as indicated in the excerpt below;

*"People think they can get infected during day time but not at night. People use the face mask during the day time but they remove it at night and be roaming at Sawaba[name of an area in one of the study communities] and transport yard selling things without wearing it" (IDI, radio presenter 1).*

### **Community's perceptions of COVID-19 infection**

More than 9 in 10 respondents (95.7%) believed COVID-19 is a serious infection. About 2 in 5 respondents (41%) perceived it as a result of a curse or a spiritual infection and about a similar proportion (46%) perceived it is curable through spiritual treatment or herbal treatment (42%). On the other hand, 57% believed it is curable through medical treatment. A description of the community's perceptions of COVID-19 infection is presented in Table 6. COVID-19 was generally seen as a medical condition caused by a virus and has no

relationship with spirituality as depicted in the quotes below.

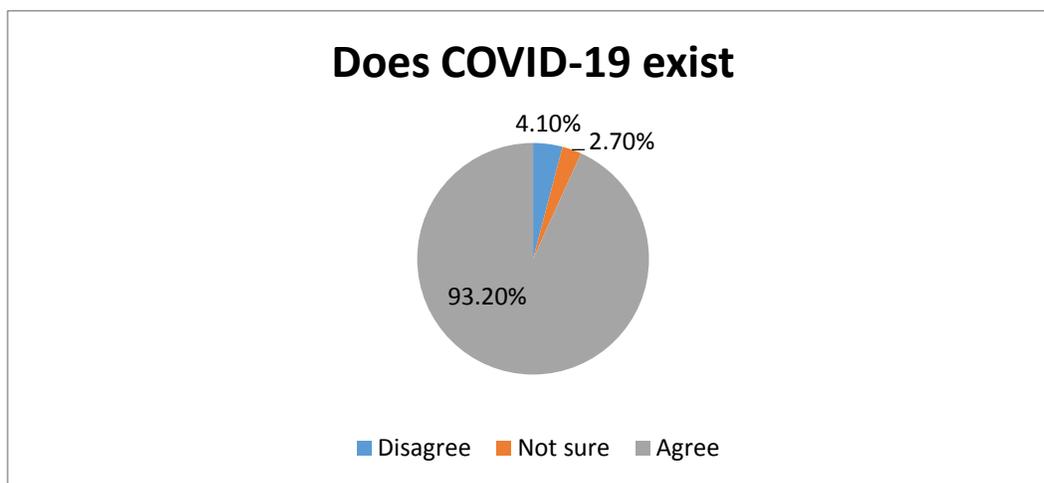
*"I don't think there is any relationship; I don't have any proof" (IDI, Chief\_2)*

*"No, I don't believe it is a spiritual disease. It is a virus that affects everyone" (IDI, Islamic leader 1)*

*"The virus is not only in Ghana. If it were only in Ghana, I might be tempted to believe it has a relationship with spirituality but since it's all over the world, I think it has nothing to do with spirituality" (IDI, Driver\_1)*

### **Discussion**

This study showed a high knowledge of COVID-19 infection among the surveyed population. Studies from other parts of Ghana showed varying levels of awareness of COVID-19(18,19). Situating this finding within the Health Belief Model (HBM), residents of our study context are more likely to comply with the COVID-19 prevention control measures when public education campaigns are well crafted taking into account context-specific cues. As revealed in China, higher levels of protective behaviour were associated with higher knowledge, and perceived severity of COVID-19 among others (20).



**Figure 2: Perception of the existence of COVID-19 infection**



Similarly, a study in Nigeria also found knowledge of COVID-19 among respondents to be high (21). On the contrary, knowledge of COVID-19 among a high-risk population of people living with hypertension and *diabetes mellitus* attending public health facilities in Ethiopia was low in another study (22). This might be because this is a high-risk group and health system-related reasons such as poor health promotion activity among this group may have led to low knowledge levels. Around the globe, several studies have reported on Knowledge of COVID-19 and this is at varying proportions among different populations using different methodological approaches (23–26).

Findings from this study on the knowledge of the symptoms of COVID-19 were similar to findings of a study in Nigeria where high numbers of respondents indicated difficulty in breathing, dry cough, and fever as symptoms

of COVID-19 infection (21). All studies cited above are indicative of the fact that knowledge of COVID-19 like any other phenomenon depends on the context and the population that is being studied and the knowledge gap differs between genders, regions, educational levels and age (27).

COVID-19 is primarily transmitted from human to human via oral and respiratory aerosols, with droplets from the virus-infected environment playing a minor role in disease transmission, according to a published report (28). This study showed low levels of knowledge on modes of transmission such as liquid droplets from sneezes and coughs among respondents.

Other transmissions such as body fluids and secretions such as faeces, saliva, urine, semen, and tears as described by Karia R. *et al*, (2020) were least mentioned (4).

**Table 6:**  
**Description of community's perceptions of COVID-19 infection (N=517)**

Statements	Total n(%)
COVID-19 is a serious infection	
Agree	495 (95.7)
Not sure	9 (1.7)
Disagree	13 (2.51)
COVID-19 is a curse/spiritual infection	
Agree	196 (37.9)
Not sure	108 (20.9)
Disagree	213 (41.2)
COVID-19 is curable through medical treatment	
Agree	297(57.4)
Not sure	97 (18.8)
Disagree	123 (23.8)
COVID-19 is curable through spiritual treatment	
Agree	240 (46.4)
Not sure	73 (14.1)
Disagree	204 (39.5)
COVID-19 is curable through herbal treatment	
Agree	218 (42.2)
Not sure	109 (21.1)
Disagree	190 (36.8)
Our health facilities are equipped to handle the COVID-19 pandemic	
Agree	193 (37.3)
Not sure	111 (21.5)
Disagree	213 (41.2)



This may be attributed to low levels of knowledge on the mode of transmission at the time of data collection as this data was gathered at the early stages of the pandemic. Coming into contact with or eating certain wild animals was not indicated by our study to transmit COVID-19, a study in Ethiopia however recorded a significant number of respondents indicating that coming into contact with or eating certain wild animals could transmit COVID-19 (29).

According to the HBM, the low level of knowledge on the specific mode of transmission as indicated above could influence low or non-compliance to specific COVID-19 prevention measures (30).

The ability of herbal products to treat COVID-19 was common among respondents in our study probably because the use of herbal products is high in some parts of Ghana. (31) This was similar to findings from a study in Ethiopia where study respondents used herbal preparations and nutritional supplements as preventive measures for COVID-19 prevention and also in India where herbal preparations were noted to prevent and control COVID-19 (32,33). The use of herbal remedies for the management of diseases in Ghana has been well documented. (31) COVID-19 was also perceived as a serious infection, this finding is similar to a study(34) in Ghana that recorded a high-risk perception and also similar to another study in Ethiopia that also recorded a high risk of perception among respondents(35). The high-risk perception of COVID-19 among respondents may help comply with prevention practices because of the fear of the infection as espoused by the HBM (30). However, a study in Ghana also found inadequate risk communication and risk perception among respondents which may fuel misinformation and poor compliance with infection and prevention control measures (34).

Finding from our study further showed that some proportions of respondents perceiving

that COVID-19 can be managed spiritually is a source of worry that must be confronted by the health authorities to avoid its widespread as this may also influence low compliance to prevention measures. The WHO's strategic objectives for ending the COVID-19 pandemic are outlined in its strategic preparedness and response plan. This is to assist national stakeholders in developing a structured response to the pandemic. The main objectives of the WHO for COVID-19 are to 1) slow and stop transmission; 2) provide optimal care for all patients, and 3) minimize the epidemic's impact on health (36). With these in place, it is obvious that the WHO has a plan that hinges on medically managing the COVID-19 pandemic as it continues to advocate for maximum compliance to all necessary prevention measures. Perceptions, such as COVID-19 could be cured spiritually is counterproductive to efforts by governments and other relevant stakeholders.

## Study limitations

In gathering the qualitative data, it was difficult to take note of non-verbal communications as the data was gathered via telephone. Some interviews were abruptly stopped because of a poor telephone network. Other interview sessions had to be suspended midway due to the required attention of respondents on other personal tasks. The study reports on data collected from the Kintampo HDSS catchment area which may not necessarily apply to other areas in Ghana.

## Conclusion

COVID-19 infection is widely known and perceived as a fearful and serious infection. Generally, knowledge of COVID-19 infection, symptoms, and treatment is widely known among the study population. Some known biological symptoms of COVID-19 infections were also indicated by study respondents.



People in the study area largely did not think that COVID-19 is transmitted through contact with animals. In the opinion of participants in this study, COVID-19 is not transmitted spiritually. COVID-19 was reported to be treatable medically but it was interesting to note that a section of the surveyed population believed that it could also be treated spiritually and by use of herbal preparations. It is recommended that the health authorities in Ghana institute measures to particularly educate the general public on the availability of medicines for the management of COVID-19 and more specifically the availability of vaccines for COVID-19 prevention. Further research is recommended to examine the relationship between COVID-19 and spiritual beliefs.

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**Conflict of interest** - The authors declare no conflict of interest.

### Author contribution

Lawrence Gyabaa Febir, Sulemana Watara Abubakari, Samuel Afari-Asiedu, Edward Anane Apraku and Kwaku Poku Asante conceptualized the idea and put together a study proposal and were responsible for the design of data collection tools. Francis Agbokey, Solomon Nyame and Charles Zandoh were responsible for the supervision of data collection. Richard Joshua Tetteh, Dennis Adu-Gyasi, Livesy Abokyi and Lawrence Gyabaa Febir played extensive roles in data management and analysis with the support of all other authors. An initial draft of the manuscript was put together by Lawrence Gyabaa Febir and was reviewed by all

authors. All authors approved the current version of the manuscript.

### Data availability statement

The data for this study is available upon reasonable request from the Director, Kintampo Health Research Centre

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## Reference

1. **WHO.** WHO Coronavirus (COVID-19) Dashboard. Global Situation. [Internet]. 2021. Available from: <https://covid19.who.int/>
2. **WHO.** COVID-19 Weekly Epidemiological Update. [Internet]. World Health Organization. 2021. Available from: <https://www.who.int/publications/m/item/covid-19-weekly-epidemiological-update>
3. **WHO.** Ghana Situation. World Health Organization, WHO Health Emergency Dashboard WHO (COVID-19) Homepage [Internet]. 2021 [cited 2021 Nov 25]. Available from: <https://covid19.who.int/region/afro/country/gh>
4. **Karia R, Gupta I, Khandait H, Yadav A, Yadav A.** COVID-19 and its Modes of Transmission. *SN Compr Clin Med.* 2020;2(10):1798–801.
5. **WHO.** Coronavirus disease (COVID-19): Vaccines. Available from: [https://www.who.int/news-room/q-a-detail/coronavirus-disease-\(covid-19\)-vaccines?adgroupsurvey={adgroupsurvey}&gclid=Cj0KCQiAv6yCBhCLARIsABqJTjbG-9TjotYkdUsR-tVdQNJvHpAWLiDSImoDdQx-Mnc2b6Mv4MIpgsQaA](https://www.who.int/news-room/q-a-detail/coronavirus-disease-(covid-19)-vaccines?adgroupsurvey={adgroupsurvey}&gclid=Cj0KCQiAv6yCBhCLARIsABqJTjbG-9TjotYkdUsR-tVdQNJvHpAWLiDSImoDdQx-Mnc2b6Mv4MIpgsQaA). 2021.
6. **Olapegba PO, Ayandele O, Kolawole SO, Oguntayo R, Gandi JC, Dangiwa AL, et al.** A Preliminary Assessment of Novel Coronavirus (COVID-19) Knowledge and Perceptions in Nigeria. *SSRN Electron J.* 2020;(May).
7. **WHO.** Coronavirus disease (COVID-19) advice for the public. 2021 2021; Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>.
8. **Ferguson MJ, Bargh JA.** How social perception can automatically influence behavior. *Trends Cogn Sci.* 2004;8(1):33–9.
9. **Janz NK, Becker MH.** The Health Belief Model: A Decade Later. *Heal Educ Behav.* 1984;
10. **M A.** Knowledge, Attitude and Perception of People towards the Novel Coronavirus Disease (COVID-19) Outbreak and its Effects on Their Livelihoods: Perspectives from Diverse Populations. *Radiol Open Access J.* 2021;01(01).
11. **Rubin JE, Crowe SE.** Annals of internal medicine®. *Ann Intern Med.* 2020;172(1):ITC1–14.
12. **Ning L, Niu J, Bi X, Yang C, Liu Z, Wu Q, et al.** The impacts of knowledge, risk perception, emotion and information on citizens' protective behaviors during the outbreak of COVID-19: a cross-sectional study in China. *BMC Public Health.* 2020;20(1):1–12.
13. **Courage Kosi Setsoafia Saba, Joseph Nzeh, Francis Addy ABK.** COVID-19: Knowledge, perceptions and attitudes of residents in the Northern Region of Ghana, West Africa. 2020;(December 2017):1–29. Available from: <https://www.preprints.org/manuscript/202008.0060/v1>
14. **Owusu-Agyei S, Nettey OEA, Zandoh C, Sulemana A, Adda R, Amenga-Etego S, et al.** Demographic patterns and trends in Central Ghana: baseline indicators from the Kintampo Health and Demographic Surveillance System. *Glob Health Action.* 2012;5(June 2014):1–11.
15. **Nettey OEA, Enuameh YA, Zandoh C, Anane EA, Abukari M, Agbokey F, et al.** Knowledge, Attitudes and Preventive Practices on Ebola Virus Disease in the Kintampo Districts of Ghana. *Health (Irvine Calif).* 2016;
16. **Radyakin S. SURVEY SOLUTIONS CAPI / CAWI. 2020;** Available from:



- <https://unstats.un.org/unsd/demographic-social/meetings/2017/dar-es-salaam--regional-workshop-on-2020-census/docs/s16-01-WorldBank.pdf>
17. **STATA**. StataCorp. 2015. Stata: Release 14. Statistical Software. College Station, TX: StataCorp LP.
  18. **Kumbeni MT, Apanga PA, Yeboah EO, Lettor IBK**. Knowledge and preventive practices towards COVID-19 among pregnant women seeking antenatal services in Northern Ghana. Vol. 16, *PLoS ONE*. 2021.
  19. **Adu DK, Gyan B, Dzokoto MK, Addai R, Woli MK, Boamah B, et al**. COVID-19 in Ghana: Knowledge, perception and practice among health trainees. *Open Sci J*. 2020;5(4):1–19.
  20. **Gao H, Hu R, Yin L, Yuan X, Tang H, Luo L, et al**. Knowledge, attitudes and practices of the Chinese public with respect to coronavirus disease (COVID-19): An online cross-sectional survey. 2020;1–8.
  21. **Adesegun OA, Binuyo T, Adeyemi O, Ehioghae O, Rabor DF, Amusan O, et al**. The COVID-19 crisis in sub-Saharan Africa: Knowledge, attitudes, and practices of the Nigerian public. *Am J Trop Med Hyg*. 2020;103(5):1997–2004.
  22. **Taye GM, Bose L, Beressa TB, Tefera GM, Mosisa B, Dinsa H, et al**. COVID-19 knowledge, attitudes, and prevention practices among people with hypertension and diabetes mellitus attending public health facilities in Ambo, Ethiopia. *Infect Drug Resist*. 2020;13:4203–14.
  23. **Bastable SB**. Nurse as Educator: Principles of Teaching and Learning for Nursing Practice, 2nd ed. [Internet]. Vol. 34, The Journal of Continuing Education in Nursing. 2003. 281–282 p. Available from: [http://www.ifeet.org/files/-Susan\\_Bacorn\\_Bastable-\\_Nurse\\_as\\_Educator\\_Princip.pdf](http://www.ifeet.org/files/-Susan_Bacorn_Bastable-_Nurse_as_Educator_Princip.pdf)
  24. **Labban L, Thallaj N, Labban A**. Assessing the Level of Awareness and Knowledge of COVID 19 Pandemic among Syrians. *Arch Med*. 2020;12(3):1–5.
  25. **Bhagavathula AS, Aldhaleei WA, Rahmani J, Mahabadi A, Bandari DK**. Novel Coronavirus ( COVID-19 ) Knowledge and Perceptions : A Survey of Healthcare Workers. 2020;
  26. **Zhong B-L, Luo W, Li H-M, Zhang Q-Q, Liu X-G, Li W-T, et al**. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *Int J Biol Sci* [Internet]. 2020;16(10):1745–52. Available from: <http://www.ijbs.com/v16p1745.htm>
  27. **Sengeh P, Jalloh MB, Webber N, Ngobeh I, Samba T, Thomas H, et al**. Community knowledge, perceptions and practices around COVID-19 in Sierra Leone: a nationwide, cross-sectional survey. *BMJ Open*. 2020;10(9):e040328.
  28. **Rahman HS, Aziz MS, Hussein RH, Othman HH, Salih Omer SH, Khalid ES, et al**. The transmission modes and sources of COVID-19: A systematic review. *Int J Surg Open* [Internet]. 2020;26:125–36. Available from: <https://doi.org/10.1016/j.ijso.2020.08.017>
  29. **Kebede Y, Yitayih Y, Birhanu Z, Mekonen S, Ambelu A**. Knowledge, perceptions and preventive practices towards COVID-19 early in the outbreak among Jimma university medical center visitors, Southwest Ethiopia. *PLoS One* [Internet]. 2020;15(5):1–15. Available from: <http://dx.doi.org/10.1371/journal.pone.0233744>
  30. **Blackwell B. Compliance**. *Psychotherapy and Psychosomatics* 58(3):161–69. 1992;
  31. **Boadu AA, Asase A**. Documentation of herbal medicines used for the treatment and management of human diseases by some communities in southern Ghana. *Evidence-*



- based Complement Altern Med.* 2017;2017.
32. **Gohel KH, Patel PB, Shah PM, Patel JR, Pandit N.** Knowledge and perceptions about COVID-19 among the medical and allied health science students in India: An online cross-sectional survey. 2020;(January).
  33. **Alyami HS, Orabi MAA, Aldhabbah FM, Alturki HN, Aburas WI, Alfayez AI, et al.** Knowledge about COVID-19 and beliefs about and use of herbal products during the COVID-19 pandemic: A cross-sectional study in Saudi Arabia. *Saudi Pharm J* [Internet]. 2020;28(11):1326–32. Available from:  
<https://doi.org/10.1016/j.jsps.2020.08.023>
  34. **Serwaa D, Lamptey E, Appiah AB, Senkyire EK, Ameyaw JK.** Knowledge, risk perception and preparedness towards coronavirus disease-2019 (Covid-19) outbreak among Ghanaians: A quick online cross-sectional survey. *Pan Afr Med J.* 2020;35(2):1–7.
  35. **Asefa A, Qanche Q, Hailemariam S, Dhuguma T, Nigussie T.** Risk perception towards covid-19 and its associated factors among waiters in selected towns of Southwest Ethiopia. *Risk Manag Healthc Policy.* 2020;13:2601–10.
  36. **WHO.** Clinical management of COVID-19, Interim guidance 27 May 2020. *World Health Organization.* 2020;