Research Paper

Knowledge, Perception, and Attitudes of Residents of Northern Region of Ghana Towards COVID-19

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ABSTRACT

Background: Africa is gradually becoming an epicenter of the COVID-19 pandemic. Based on the current disease trend, Africa might be the last hardest-hit continent. While scientific investigations continue to develop effective management through medications and vaccines, existing knowledge, perceptions, and attitudes could be harnessed to develop an effective strategy to curb community transmission of COVID-19. The present study assessed the awareness level, perceptions, and attitudes of people living in rural, peri-urban, and urban communities in Northern Ghana and their preparedness for the prevention and containment of COVID-19.

Methods: We conducted a face-to-face interview and administered 553 semi-structured questionnaires in 18 rural, peri-urban, and urban communities in Tolon District, Kumbungu District, Sagnarigu Municipality, Savelugu Municipality, and Tamale Metropolis from April 23 to June 8, 2020.

Results: The percentages of males and females among the respondents were 56.8% and 43.2%, respectively. Nearly half (41%) of the respondents had no formal education, and 91.3% of them were Muslims. Most respondents (85%) believed that COVID-19 is a punishment from God. There was a significant difference (P<0.001) between the first-time rural, peri-urban, and urban communities heard of COVID-19. The majority (63%) of the rural respondents depended on radio, while the peri-urban and urban respondents (51%) relied on TV for information on COVID-19. All respondents were aware of COVID-19, and 91.7% could mention at least two symptoms of the disease. However, 18% believed there was no COVID-19 in Ghana. Most respondents (69.6%) thought they would not contract the virus.

Conclusion: Our findings may provide valuable data to the government and other stakeholders to control COVID-19.

Keywords: COVID-19, Knowledge, Perception, Attitude, Northern region, Ghana

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Introduction

The world was thrown into a state of confusion by the COVID-19 pandemic since March 2020. Ever since its outbreak, many misperceptions and false information about the disease have developed. For example, the first misconception among Africans was that SARS-CoV-2 was susceptible to the high temperatures of the tropics, and thus, Africans would be free from this disease. Access to information by the various groups in society is critical to preventing and managing COVID-19. It has been recommended that authentic information on COVID-19 is sought from official websites of health authorities due to myriads of false information flooding the Internet [1]. However, most rural communities have no or limited access to the Internet in Ghana. Furthermore, rural communities lack the means to seek information on the prevention and containment of the disease or to pose questions about the disease to be better informed. Other studies have confirmed a similar situation among indigenous populations in Mexico in South America [2].

Low awareness and perceptions of disease among the population negatively impact preventive measures [3, 4], which may influence early detection and acceptability to test for SARS-CoV-2. Moreover, the culture and religious beliefs of the people may play a crucial role in accepting preventive measures to curb the spread of diseases [5]. Since the first detection of the disease in Ghana, there have been several efforts by the government, the private sector, communities, and individuals to support the less privileged in society. However, conscious efforts have not been made to evaluate how different groups of citizens (rural, peri-urban, and urban dwellers) are coping with the proposed measures to prevent the disease. Several studies investigating rural dwellers' awareness, perceptions, and attitudes toward diseases have proven helpful for this study [6, 7].

In our quest to find common knowledge on COVID-19 in the Northern region of Ghana, we conducted a study in five districts of Northern Ghana. We aimed to report on the awareness level, perceptions, and attitudes of people living in rural, peri-urban, and urban communities and their preparedness for the prevention and containment of COVID-19. We also sought to compare the level of awareness, perception, and attitudes of rural communities with the peri-urban and urban communities.

Methods

Consent of respondents

All the respondents in this study consented to provide information for the research. The respondents were assured their responses would be treated as confidential and used for research purposes only.

Study area

The respondents interviewed for this study were randomly selected from 18 communities in five different districts of the Northern region of Ghana: Tolon District, Kumbungu District, Sagnarigu Municipality, Savelugu Municipality, and the Tamale Metropolitan. The Northern region is the most populated in the northern part of the country, with a population of 1905628 in 14 districts [8]. The Tamale Teaching Hospital in the Northern regional capital, Tamale, serves as a referral tertiary hospital and a testing center for SARS-CoV-2 for the five regions of Northern Ghana.

Study design and sample size

The sampling method adopted was simple random sampling. The study was designed to seek the views of rural, peri-urban, and urban communities. The questionnaires were administered randomly in the communities visited after a brief introduction about the purpose of the research. All COVID-19 protocols were observed to minimize the risk of the interviewer and the participants contracting the virus.

We interviewed 553 respondents from 18 communities out of five districts selected for the research. The districts were selected based on their proximity to Tamale, the northern regional capital.

Study tool and data collection

Semi-structured questionnaires were administered face-to-face to gather respondents' knowledge, perceptions, and attitudes toward the COVID-19 pandemic. The items captured in the questionnaire stemmed from an outreach program by way of a preliminary survey by observing the activities of the people in a community.

Therefore, it is important to note that items included in the questionnaire reflect the inhabitants' practices and not actual or standard practices. The semi-structured questionnaire was prepared in English and translated into the respondents' local language (Dagbani and Twi) with translators where necessary. The interviews and questionnaires were administered from April 23 to June 8, 2020.

The inclusion criteria

The study samples included all residents in any of the five districts who are of sound mind and willing to participate.

Statistical analysis

The data obtained were coded, processed, and analyzed using IBM SPSS software, version 20. The descriptive statistical method was used to summarize the data, and the results were presented using graphs and tables. Mean values were calculated, and the Pearson chi-square test determined significant differences at $P<0.05$.

Results

Background information of the respondents

Views of 553 respondents were sought for the present study (Table 1). Of them, 353(63.8%) were inhabitants of rural communities, and the rest (200) were individuals from peri-urban and urban centers within the northern region of Ghana. Demographically, the male-female ratio of respondents was 56.8% (314) vs 43.2% (239) of various age groups, from age 14 to 100. Nearly half of the respondents (41.0%; 227/533) have no formal education, and 54.5% (301/533) are unmarried. Almost all the people interviewed (91.3%) hold religious beliefs, mainly Islam.

Table 1. Sociodemographic characteristics of the respondents (n=553)

Variables	Category	No.(%)
Sex	Male	314(56.8)
	Female	239(43.2)
Age (y)	<18	113(20.4)
	18- 25	201(36.3)
	26-35	144(26.0)
	36-45	48(8.7)
	46-55	26(4.7)
	≥56	21(3.9)
Religion	Islam	505(91.3)
	Christianity	46(8.3)
	African traditional religion (ATR)	2(0.4)
Marital status	Single	294(53.2)
	Married	252(45.6)
	Widow/Widower	7(1.3)
Educational status	Non-formal education	227(41.0)
	Primary	58(10.5)
	Junior high school	106(19.2)
	Senior high school	105(19)
	Tertiary	57(10.3)
Locality	Rural communities	353(63.8)
	Peri-urban/urban	200(36.2)

Time of acquiring earliest information about COVID-19

Concerning the time of information about COVID-19, 266(48.1%) of the respondents revealed that they became aware of the virus in March. Only 92(16.6%) knew of the virus's existence when it started spreading in China in December 2019. Regarding the respective settings, 140(39.7%) and 126(63%) of the rural and peri-urban/urban inhabitants, respectively, knew about the virus in March.

Source of information about COVID-19

Nearly all respondents, namely 90.42% (500/553), relied on the mass media (radio, television, and Internet) for information on the novel coronavirus pandemic. Radio was much more dependent on the rural areas (63.0%; 222/353), whereas television was more relied upon in the urban and peri-urban areas (51%; 102/200). Although COVID-19 information is obtained from combinations of all mass media platforms across geographic settings, there was a significant difference (P<0.001) in the sources of information about COVID-19 available at the different geographical locations.

Awareness and knowledge about COVID-19

Different questions were asked to assess respondents' awareness and knowledge of COVID-19. All 553(100%) respondents indicated that they were aware and had heard of the novel coronavirus. Ninety-nine respondents, representing 18.0%, thought that COVID-19 was not in Ghana. Regarding the respective geographic settings, 37(18.5%) and 62(17.6%) respondents in peri-urban/urban and rural areas, respectively, refused to accept that the virus is in Ghana.

The majority (385; 69.6%) of the respondents indicated that they could not contract the virus because they live in a rural or urban setting. Of the 200 respondents from peri-urban or urban settings, 60(30%) revealed they could not contract COVID-19. In the rural settings, 108 (31%) respondents shared the same thoughts as their urban counterparts. However, there was no significant difference (P=0.884) between respondents as to why they believed in their immunity to the virus based on their settings.

Only 6(1.1%) of the respondents indicated that someone within their community could have had either SARS-CoV-2 or the disease COVID-19. In the rural settings, 4(1.1%) suspected a case of COVID-19 in their community, whereas only 2(1.0%) of the respondents in the peri-urban or urban settings suspected a case of COVID-19 in their community.

Nearly 91.7% (503/553) of respondents mentioned at least two symptoms associated with COVID-19. Despite that, 31(8.5%) and 15(7.5%) of the respondents in rural and urban settings, respectively, indicated that they do not know the symptoms associated with COVID-19. There was no significant difference (P=0.600) between respondents' geographical settings and their level of knowledge about symptoms of COVID-19.

About their perceptions of COVID-19, the majority of respondents (85.0%) believed that the disease was a punishment from God. This perception significantly transcends rural-urban: 215/353 (60.9%) and 156/200 (78.0%) respondents from rural and urban/peri-urban settings, respectively.

Covid-19, a disease from Satan/witches

When the question of whether COVID-19 is a disease from Satan was posed, the majority (81.24%) frankly spoke out that the disease is an affliction from God and rejected associating it with the works of Satan. This perception was more common among urban and peri-urban respondents (87.50%) than those in rural areas (73.09%). Only 73 individuals held the perception that COVID-19 could also be a disease from Satan (witches).

COVID-19, a disease for rich people

Most (81.99%) of our respondents indicated that COVID-19 is not a disease that only affects the rich. Rural, Urban, and peri-urban dwellers held similar views, but the belief was more common among respondents from rural settings.

COVID-19 cannot infect and or kill rural or urban people

When respondents were asked whether they could be infected or killed by COVID-19, the majority (75.54% and 90.00% from rural and urban/peri-urban areas, respectively) agreed. Notwithstanding, it is interesting to find that some (140; 25.32%) individuals thought otherwise, and 19(3.44%) neither agreed nor disagreed.

Knowledge of the spread and or transmission routes of COVID-19

Concerning how the virus spreads, 87.7% (485/553) of the respondents had some knowledge of the different ways by which the virus spreads. Nevertheless, 20(10%)

and 48(13.6%) respondents in peri-urban/urban and rural settings, respectively, indicated they did not know how the SARS-CoV-2 spreads. There was no significant difference (P=0.216) related to the geographic settings of the respondents and their knowledge of the spread and or transmission routes of SARS-CoV-2.

Interestingly, 385(69.6%) of the respondents think that SARS-CoV-2 can be sexually transmitted. One hundred and forty (70%) of the total population sampled from the peri-urban or urban settings indicated that sex could be one of the transmission routes of SARS-CoV-2. Concerning the rural settings, 245(69.4%) people believed that the novel coronavirus can be transmitted through sexual activities. There was no significant difference (P=0.884) between the respondents in the rural settings and those in the peri-urban/urban areas on the spread of SARS-CoV-2 through sex.

Also, 357 respondents (64.6%) indicated that consuming contaminated foods can serve as a transmission route of SARS-CoV-2. Nevertheless, 51(25.5%) and 145(41.1%) of the respondents from the peri-urban/urban and rural settings, respectively, revealed that they had no idea that SARS-CoV-2 could spread through the consumption of contaminated foods. There was a significant difference (P<0.001) between the respondents' geographical settings and their knowledge of contaminated foods as transmission routes of SARS-CoV-2. Meanwhile, 238(61.7%) of the 386 respondents who rely partially or fully on wells, dugouts, and dams as sources of water for domestic purposes revealed that such sources of water could lead to the spread of SARS-CoV-2, especially when water was left untreated before usage.

A summary of the responses indicated some knowledge of the spread of the novel coronavirus (Figure 1). About 113(37.0%) of the 305 respondents in rural communities who know the spread of COVID-19 believed that contact with an infected person is the most important transmission route for contracting SARS-CoV-2. Conversely, 68(37.8%) of the 180 respondents from the peri-urban or urban settings emphasized handshaking as the highest transmission route of the virus.

Preparedness and observance of precautionary measures

Information on respondents' preparedness and adherence to preventive measures against COVID-19 was also sought. A total of 388 respondents (70.2%) revealed that there had not been any sensitization program on COVID-19 in their respective communities. Of the 353 respondents from rural settings, 294(83.3%) reported that there has not been any direct educational program by government institutions, NGOs, or private bodies in their communities. Conversely, 106(53%) of the 200 respondents in peri-urban or urban settings admitted going through a community sensitization program on COVID-19.

The majority, 65.8% (364/553) of the respondents interviewed in the study, reported that they have been practicing social/physical distancing as recommended by health experts. Despite this, 155(43.9%) of the rural population revealed their inability to practice health experts' social/physical distancing protocol. Meanwhile, only 34 respondents (17%) in the peri-urban or urban settings indicated their inability to adhere to or practice the social/physical distancing protocol.

Also, nearly all 547 respondents (98.9%) practiced hand washing. However, 18(5.1%) and 9(4.5%) of the rural and urban populations, respectively, did not use soap when washing their hands. Again, it was revealed that 101(28.6%) and 54(27.0%) of the rural and urban populations, respectively, practiced hand washing, which could be described as ineffective or unsatisfactory compared to the protocol outlined by the Ghana Health Service. There was no significant difference (P=0.685) in how respondents in the rural and urban settings underwent hand washing.

Health experts have advised using alcohol-based hand sanitizers to complement hand washing, mainly when hand washing is impossible. Of the 553 respondents, 411(74.3%) neither possess nor practice using alcohol-based hand sanitizers. Only 80(22.7%) and 62(31%) of the respondents in rural and urban settings, respectively, either possess or practice using alcohol-based hand sanitizer when necessary. There was a significant difference (P<0.001) between respondents using alcohol-based hand sanitizer in rural and urban or peri-urban areas.

Also, the majority (59.1%; 327/553) of the respondents indicated they did not possess or practice the use of face masks, particularly when going to public places. Of the 353 respondents from rural settings, 238(67.4%) did not possess or practice the use of masks. In contrast, 111(55.5%) of the respondents from the peri-urban or urban settings possess or practice using masks, particularly in public places. Again, there was a significant difference (P<0.001) between the rural and urban or peri-urban respondents.

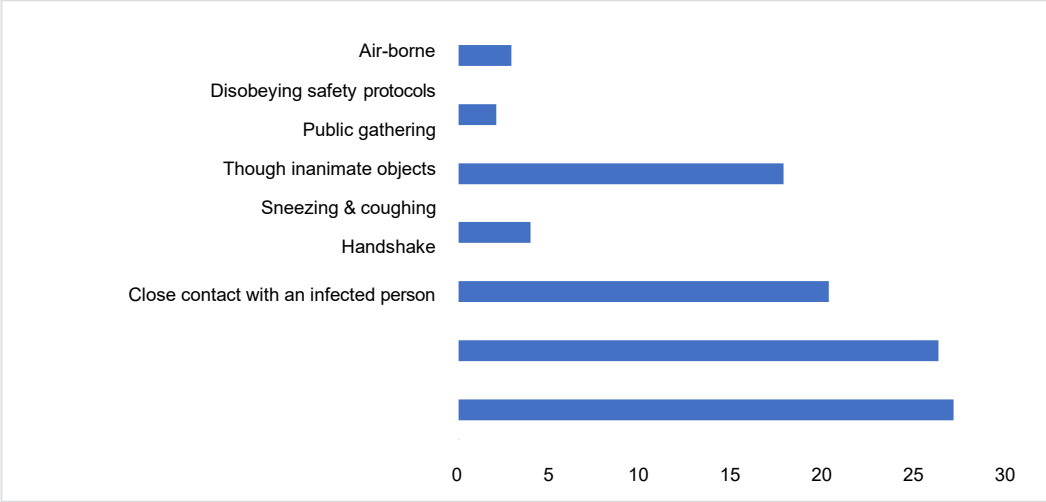

Figure 1. Means of spread of SARS-CoV-2

Ranking of respondents' precautionary measures against COVID-19

Even though most respondents have indicated their awareness of the existence of the virus, 39(7.1%) revealed that they were not involved in any measure that sought to protect or prevent them from contracting the virus. Nonetheless, 514(93.7%) indicated they observe the social distancing protocols by health experts or professionals. Upon ranking, 336(65.4%) of the respondents carried out regular hand washing as the top precaution against COVID-19. Also, 65(12.6%) and 28(5.4%) of the respondents mentioned the observance of social/physical distance and avoiding public gatherings, respectively, as their precautionary measures against contracting the SARS-CoV-2 (Figure 2). There was a significant difference (P<0.001) between the geographical setting (rural and peri-urban/urban) of respondents and the choice of precautionary measure against COVID-19.

Source of water for handwashing

Respondents were also interviewed about the source of water used for hand washing. About 316 respondents (57.1%) relied on potable water. Almost all 194 respondents (97.0%) in the peri-urban and urban settings used potable water for handwashing. However, nearly half of the respondents (164, 46.5%) in rural settings depended on water from dams for handwashing, whereas 11(3.1%) depended on the dugouts (Table 2). There was a significant difference (P<0.001) between respondents' geographical settings and the water source for handwashing, as expected.

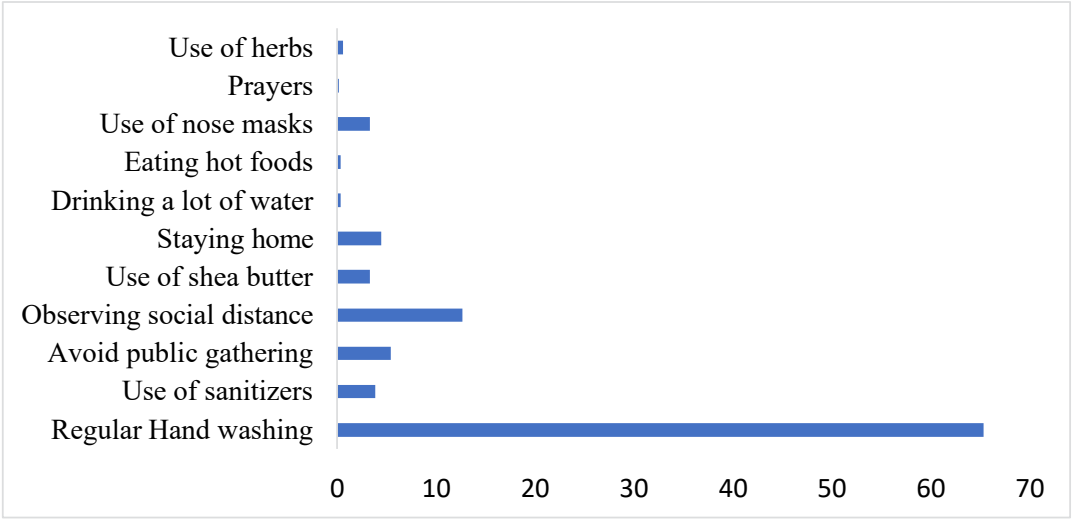

Figure 2. Ranking of respondents' precautionary measures against COVID-19

Table 2. Source of water for hand washing

Source of Water	No.(%)				
Description of setting	Dam	Dugout	Well	Pipe	Borehole
Rural	164(46.5)	11(3.1)	6(1.7)	122(34.6)	50(14.2)
Urban	-	-	4(2.0)	194(97.0)	2(1.0)

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Respondents who depended solely or partially on water from dams, dugouts, and wells were further interviewed on whether such water was treated by boiling before being used for hand washing; of the 185 respondents who depend solely and or partially on these sources of water for hand washing, 176(95%) indicated that they do not boil the water before using it for hand washing (Figure 3).

Discussion

Globally, understanding of SARS-CoV-2 ecology and its disease has progressed steadily since its outbreak in the last quarter of 2019 to early 2020. Many aspects of virus biology, such as its transmission mode and pathogenesis, are still unclear. As a pandemic of global proportion, its spreading, knowledge, perception, and awareness by all people are needed for national and international efforts in its control. There has been resistance in many countries, including the USA, to adherence to some of the protocols. The current study was conducted to unravel the knowledge level, perceptions, and attitudes of rural, peri-urban, and urban communities in Northern Ghana on COVID-19. It is to be noted that most of the respondents in this study were young (below 46 years), which also reflects the typical demography of Ghana [8, 9]. Apart from being the majority of Ghana's population, the youth are also considered the most sophisticated and up-to-date with current trends [10, 11], as would be expected for COVID-19. Views held by this group are, therefore, very crucial.

Awareness of COVID-19 in our study area was 100%. Although the disparity in numbers of those with formal education and those without, the use of multiple media platforms and local languages besides English in awareness creation and education of Ghana's population on the disease ensured that all population groups were informed, as observed in this study. With the several media outlets that provided information on COVID-19, radio and TV were the most common information platforms. This is especially true for radio among rural folks and TV in the peri-urban and urban areas. This finding was attributed to the availability of several local and national radio and TV stations or channels, wide coverage of radio and TV, and radio availability on different appliances, such as mobile phones, etc. These modes of transmission made

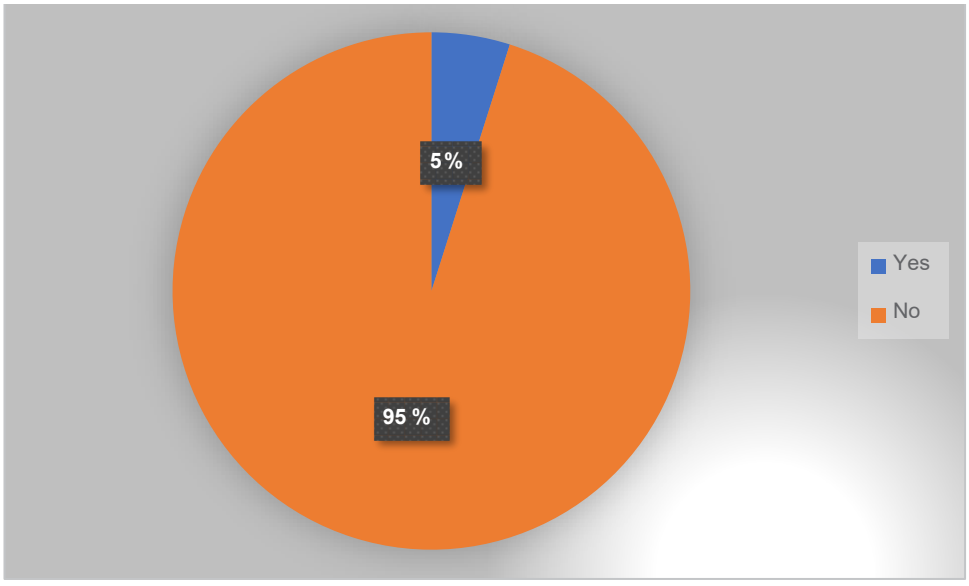

Figure 3. Treating water before using for hand washing

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them very effective in communicating information on COVID-19 in the region and achieving maximum impact. Media houses are, therefore, very significant partners in the fight against COVID-19. It is recommended that in these difficult times, the radio/TV stations, as part of their cooperate-social responsibility, should make airtime available for the provision of relevant information on COVID-19, such as the safety protocols, signs, and symptoms, contact information of responsible health institutions for COVID-19 management as well as any new development about the virus. Efforts should also be made in such on-air or on-TV education to provide information in the relevant Ghanaian language of the target ethnic groups. A similar study that sought to understand the knowledge and awareness of young adults (mean age: 20.9±2.30 years) in Karachi, Pakistan, found that the most pursued platform for coronavirus information was social media, followed by television and print media [12]. The majority (58%) of their respondents had graduate degrees, unlike our respondents, who only a few (10.3%) had tertiary level education, and the majority (41%) belonged to the non-formal education group.

It is important to indicate that most respondents became aware of COVID-19 in March 2020. This fact is not surprising because Ghana's first two cases of COVID-19 were first announced on March 12, 2020, making media headlines and scaring and arousing national discourse. Because COVID-19 broke out in Wuhan, China, in December 2019, information on its spread did not spread to Ghana's population until it was declared a pandemic on March 11 and local cases were recorded. Indeed, the firm initial response of the government of Ghana to close schools, prohibit social gatherings, including religious worship, enforce social distancing, and lockdown some cities, as well as happenings in other countries around the globe, brought massive awareness of COVID-19 in all parts of Ghana.

Despite the absolute awareness of COVID-19 among all communities in this survey, the perception or beliefs about COVID-19 could be quite unscientific. The perception that COVID-19 is a punishment from God, as seen by most respondents, is very intriguing. In particular, they firmly believed that witches or wizards did not cause the pandemic. The bias of all religious respondents might have influenced this popular perception. A few respondents explained their conviction that God sent the pandemic unto Earth to punish humankind for wrongdoings (sins). The spread of this perception is certainly a problem in local, national, and international efforts towards managing COVID-19. We call on stakeholders for targeted populace education to address this belief.

Regardless of the origin of COVID-19, whether divine or natural, it was well understood among most people that the virus can affect anyone of any race or economic strata. In addition, the transmission mode was also well understood by contact, as well as droplets from cough and sneeze that could be picked up in public gatherings and from contaminated surfaces. It was, however, difficult to reconcile the familiarity of the people with the means of transmission of COVID-19 with their impression that the transmission route is mainly through sexual contact. It is possible that the survey tool used to seek respondents' views presented too few probable transmission routes for selection. However, there are reports about the presence of SARS-CoV-2 in the semen of patients, although a lot more investigations proved otherwise [13, 14].

The broad penetration of the mass media in the study area means that every mention or discussion of SAR-CoV-2 in human semen on the airwaves would inform many people of its possible sexual transmission route. Thus, any misinformation on air can damage the efforts to manage the pandemic. Governments and World Health Organization (WHO) expect people to protect themselves by observing all the precautionary protocols to reduce or avoid the risk of COVID-19 infection. Many responded positively when asked about their actions or preparedness to mitigate or prevent COVID-19 risk. They even demonstrated satisfactory handwashing exercises when an on-field test was done. However, the researchers observed that most people in the studied communities did not observe the risk avoidance act of social distancing or the risk reduction act of putting on face masks or frequently using hand sanitizers. Though most claim to wash their hands under running water, it was not substantiated. It must be acknowledged that, even before COVID-19, people washed their hands and did so for different purposes. Still, the present hand washing and enhanced hygiene movement is more geared toward reducing the risk of contracting COVID-19. As seen in our study, most people washed their hands using untreated water, which may damage the essence of the act. These untreated water sources could also be a source of other pathogenic organisms that may contaminate their hands [15]. There must be proactive and practical sensitization of the people on the COVID-19 pandemic since the prevention of diseases is known to hinge on how people perceive them [5].

Respondents from the rural population attributed their inability to observe the social or physical distancing protocol as outlined by health experts to some traditional activities like eating together. Again, most rural communities have a common place to rest or relax during the daytime, usually under the shade of a tree. A respondent

to justify why social/physical distancing would be challenging to observe in the rural communities said, "As you can see, we have all gathered here to dehusk our harvested groundnut for sale. This work will be difficult for one person to do and thus require us to come together". Nevertheless, some respondents indicated that they are family and know themselves, but they do not understand why they should fear each other. Justifying why they were grouped, a respondent said, "…I don't understand why we should practice social or physical distancing when we are outside because we eat together and sleep in the same room".

Conclusion

Most respondents were aware of the COVID-19 pandemic in Ghana and around the globe. A belief held by most respondents is that it is a punishment from God. Hygiene practices, especially in rural settings, are highly compromised since most respondents use water from untreated sources for hand washing. Extensive and evidence-based education is required to harness the existing awareness level about the disease in most communities, especially in light of the new findings from investigations being carried out by scientists worldwide. Our findings may help local government fight COVID-19 since social distancing and other preventive measures are not fully embraced, and these are important in light of the increasing number of cases and deaths in the country.

Limitations of the study

A larger sample size could not be attained due to financial constraints. However, the random sampling approach adopted gave the study the scientific rigor to be used as a baseline study for intervention measures to prevent and contain the spread of COVID-19.

Recommendations

Similar studies should be conducted in other parts of Ghana as well as sub-Saharan Africa to understand the knowledge, perception, and attitudes of the people regarding the COVID-19. Since the virus is commonly perceived as God's punishment, religious leaders will play an important role in disseminating relevant information on the disease. Community sensitization and evidence-based information will be the key to reducing further disease spread in the communities. Communities without access to treated water for hand washing should be advised to boil or use other methods to purify water before use.

Ethical Considerations

Compliance with ethical guidelines

Verbal informed consent was sought from all participants before data collection.

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Authors' contributions

Conceptualization: Courage Kosi Setsoafia Saba; Data collection: Joseph Nzeh; Questionnaire developement: Courage Kosi Setsoafia Saba and Joseph Nzeh; Writing the original draft: Courage Kosi Setsoafia Saba, Joseph Nzeh, Francis Addy and Akosua Bonsu Karikari; Data analysis and final approval: All authors.

Conflict of interest

The authors declared no conflict of interest.

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