

COVID-19 Perception, Attitude and Communication (COVPAC) survey; the value of perceived risk to adherence

Adolf Kofi Awua¹, Edna Dzifa Doe¹, Deborah Nuro-Ameyaw², Eric Akortia^{3*}

¹Cellular and Clinical research Centre, Radiological and Medical Sciences Research Institute, Ghana Atomic Energy Commission, P.O. Box LG80, Legon - Accra, Ghana. ²Nutrition Research Centre, Radiological and Medical Sciences Research Institute, Ghana Atomic Energy Commission, P.O. Box LG80, Legon - Accra, Ghana. ³Radiation Protection Institute, Ghana Atomic Energy Commission, P.O. Box LG80, Legon - Accra, Ghana.

Abstract: The success of national epidemic and pandemic controls is hinged on insight on how the communication of related risk to the population is conducted and impacted by the extent of knowledge, the kind of perceptions, and attitudes there are among the population. This study therefore, sought to investigate the knowledge, perception, and attitude in respect of communication and adherence to Coronavirus disease-19 prevention protocols. This survey was conducted when the second global wave of the coronavirus infections started and schools were reopening in Ghana. An online cross-sectional survey was conducted between January and February 2021 which used a self-administered Knowledge-Attitude-Practise questionnaire. With a combination of convenience and snowball sampling, two hundred and eight (208) cohorts were reached via WhatsApp. In spite of a generally unbiased demographic information, the distribution showed that the findings were mainly skewed towards those with higher education. Further evidence showed that some prevention actions, which were not related to COVID-19 protocols complemented the COVID-19 prevention protocols. Conversely, “self-driven actions” were the least motivating of adherence to the prevention protocols. However, “other people’s behaviour” and “new COVID-19 related information” and related “risk of harm to pupils” were the most motivating of adherence to the COVID-19 prevention protocols. The study provides useful pointers to what should constitute the content of communications on adherence to COVID-19 prevention protocols, particularly since new SARS-COV-2 variants are more transmissible and infectious and COVID-19 vaccination is on-going.

Keywords: COVID-19, Risk Communications, Prevention, COVID-Protocol, Coronavirus.

Citation: Adolf Kofi Awua et.al, (2022) COVID-19 Perception, Attitude and Communication (COVPAC) survey; the value of perceived risk to adherence, Journal of PeerScientist 5(1): e1000038.

Received: October 26, 2021; **Accepted:** December 22, 2021; **Published:** January 15, 2022.

Copyright: © 2022 Adolf Kofi Awua et.al, This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Competing Interests: The author have declared that no competing interests exist.

*E-mail: sericuk@yahoo.co.uk | Phone: +233(0) 26 818 294

I. INTRODUCTION

One of the emerging respiratory viruses known to cause illness ranging from the common cold to Severe Acute Respiratory Syndrome (SARS) is the coronavirus [1]. The SARS-CoV-2 is a strain of coronavirus that causes coronavirus disease. The initial outbreak of coronavirus disease was detected in Wuhan, China, in late 2019, and in January 2020, the WHO recommended “2019 novel coronavirus” as the provisional nomenclature for the virus, and practically referred to the disease as COVID-19 [2]. The Euro surveillance editorial team further declared COVID-19 as a public health emergency of international concern [3]. Over time, almost all countries on the entire globe had reported some COVID-19 cases; however, the virus expanded extremely in Asia, the Americas, and Europe, then subsequently in Africa [4-5]. As of 2nd March 2021, over 115,096,040 cases had been recorded in the world, with 2,552,344 deaths and 90,802,759 recoveries.

Jin et al.(2020) reported that men are at higher risk of dying than women [6]. COVID-19 is spread by human-to-human contact through droplets, and direct contact, with an incubation period of 2–14 days [7]. The symptoms of COVID-19 illness range from very mild (fever and respiratory symptoms such as cough and shortness of breath) to severe (pneumonia, severe acute respiratory syndrome and kidney failure) with a mortality rate of around 4% [8]. Elderly persons and those suffering from co-morbidities like heart disease, lung disease and diabetes are at higher risk of developing severe COVID-19 illness [4]. However, in Ghana, as at 25th November 2021 about 130,920 cases have been recorded so far with about 1,209 deaths and 129042 recoveries according to the Ghana Health Service (GHS). The data from the GHS further indicates that 58% of men were infected against 42% women.

The acute impact of the unprecedented COVID-19 pandemic on the health, economy and the general

movement of humans has been felt across every facet of the world. Both developed and developing countries, individuals and communities are battling to respond to the impact of the pandemic with very different dynamics. It is worth noting that pieces of evidence in response to understanding the very nature of the COVID-19 are fast evolving, and the findings are subject to change. Thus, it would be imperative under the circumstances to exercise care in drawing definite conclusions on the prevailing findings.

Close observation among sections of the Ghanaian public suggests that individuals may be holding and spreading false senses of not going to be infected by SARS-CoV-2, thereby potentially creating confusion among others as to what to do regarding adhering to the main prevention protocols. These most likely are influenced by limited knowledge on the acquisition and transmission of SARS-CoV-2 infection and its prevention. If felt without an understanding of it, this situation will greatly limit the national effort at fighting the spread of the infection and limit the number of persons who may be going for COVID-19 vaccination.

The survey will provide fundamental information for further insight into the coronavirus pandemic in Ghana. Responses from a selected group of individuals on their knowledge, perception and awareness of COVID-19 will help understand the issues driving public response to the national efforts and help strategize for the larger population. It will offer the opportunity for planned evidence targeted at health policy formulations and interventions that can contribute to decreasing the coronavirus pandemic and encouraging vaccination. There is an African adage that says “what happens may not matter as much as how one chooses to respond to it”. Undoubtedly, actions are influenced by information and the perception of it. People do respond by behaving less cautiously when risk-reducing innovations are becoming effective (i.e., risk compensation) [9-11]. Therefore, to avoid non-adherence, communication of prevention must be tailored to targeting what people may likely respond to over time aside the regular prevention approaches. The present survey has been designed to assess the level of awareness and the growing perceptions of the COVID-19 prevention protocols and communication following the gradual ease of restrictions, the second wave being in force, nationwide vaccination being rolled out and a third wave being anticipated.

The study was aimed at determining the level of knowledge on the cause, symptoms of COVID-19 and the preventive protocols, as well as estimating the proportion of different infection statuses among the respondents. Furthermore, the study sought to determine the perceptions on the preventive/adherence to protocols

among respondents, and prevention by means other than the prevention protocols. The study also determined the attitudes and related reasons of respondents regarding communication about COVID-19.

II. RESULTS & DISCUSSION

Distribution of respondents' characteristics

Based on the use of a WhatsApp platform for the recruitment of participants, it was not determined how many persons were reached with the questionnaires. However, of the 208 respondents, the data of two (2) indicated they did not consent to the study and so their data were not analysed. Meanwhile, the sex distribution turned out to be even and the age distribution showed that most (40.8%) of the respondents were within the age range of 30 – 39 years. The proportion of the other age groups that ranges lower and higher than that progressively reduced (Table 1). Furthermore, Table 1 shows that the respondents to this survey were predominantly (96.6%) persons with tertiary level education and a few (3.5%) with educational levels not lower than junior high school and its equivalent levels. It was also derived that the respondents worked in diversectors of the Ghanaian economy; with education (14.1%), finance (12.6%), and research (11.7%) being the most representative.

Table 1: Distribution of the demographic characteristics of respondents:

Demographic category	Frequency	Percentage (%)
Sex		
Female	102	49.51
Male	104	50.48
Age		
< 20 years	3	1.45
20 – 29 years	68	33.00
30 – 39 years	84	40.77
40 – 49 years	47	22.81
50 – 59 years	1	0.48
> 60 years	3	1.45
Education		

No formal education	0	0.00
Primary	0	0.00
JSS/JHS/O Level	1	0.48
SSS/SHS/A Level	3	1.45
Post-secondary	3	1.45
Tertiary	199	96.60
Sector of Occupation		
Education	29	14.07
Finance	26	12.62
Research	24	11.65
Student	21	10.19
Health	19	9.22
Administration	15	7.28
National Service	14	6.79
Service	14	6.79
Businesses	11	5.33
Communication	10	4.85
Industry	5	2.42
Others	10	4.85
Unemployed	6	2.91
No response	2	0.97
Total	206	100

The distribution of the regions of residence and workplace of the 206 respondents showed that most of them worked and lived in the Greater Accra region (Table 2) where the capital city is located. A detailed analysis showed that these locations in the Greater Accra region were in more than two-thirds of its districts. Additionally, the number of respondents decreased as one moved towards the northern part of the country, with no respondents in and beyond the Bono East and Ahafo regions.

Table 2: Regional distribution of respondents' locations:

Region	Number (%) of respondents'	
	Residence	Workplace
Accra	163 (79.1)	160 (77.7)
Central	13 (6.3)	8 (3.9)
Ashanti	10 (4.9)	9 (4.4)
Eastern	8 (3.9)	6 (2.9)
Western	4 (1.9)	6 (2.9)
Other regions	7 (3.4)*	10 (4.8)^
No response	1 (0.5)	7 (3.4)
Total	206 (100.0)	206 (100.0)

*Ahafo; Bono; Bono East; Oti; Volta. ^Bono; Oti; Volta.

Knowledge on cause, symptoms and prevention

The outcome of the survey indicated that the majority (201/206; 97.6%) of the respondents knew that the causative agent of COVID-19 is a virus. The other five (5) participants either did not respond (1/206) or indicated wrongly that the causative agent is a bacterium (n = 4; 1.9%). Regarding the symptoms of COVID-19, although, the WHO indicated symptoms were appropriately known, with a composite WAI of 1.4 (on a scale of -2.0 to 2.0), the most acknowledged symptom was difficulty in breathing (WAI = 1.7) and the least known was headache. Table 3 shows the relative levels of knowledge on all the studied symptoms.

Table 3: Extent of knowledge on the different symptoms of COVID-19:

Symptoms	weighted average index*	Inference
Difficulty breathing	1.7	Appropriate
Dry cough	1.5	Appropriate
Loss of taste and smell	1.5	Appropriate
Fever	1.4	Adequate / Good
Sore throat	1.3	Adequate / Good
Headache	1.3	Adequate / Good
Composite measure	1.4	Adequate / Good

*On a scale of 2 to -2 where > 0 is good knowledge, 0 is neutral/balanced; < 0 is inappropriate knowledge.

Table 4 shows the ranged levels of knowledge on the five main prevention protocols. The overall level of knowledge on the prevention protocols among the respondents was good and high (composite WAI of 1.5) but not as high as that of the level of knowledge on the wearing of facemask, which was the highest and good (WAI of 1.7). Interestingly, washing of hands with soap was the least acknowledged prevention protocol, with the lowest but a good level of knowledge (WAI of 1.1).

Table 4: Extent of knowledge on the different COVID-19 prevention protocols:

Prevention Protocol	weighted average index*	Inference
Wearing of face mask	1.7	Appropriate
Use of alcohol-based hand	1.6	Appropriate
Keeping a distance of	1.6	Appropriate
Alcohol content	1.3	Adequate
Washing of hands	1.1	Adequate
Composite measure	1.5	Appropriate

*On a scale of 2 to -2 where > 0 is good knowledge, 0 is neutral/balanced; < 0 is inappropriate knowledge.

Infection status

The prevalence of testing (recent/previous) among the 206 respondents was determined to be 25% (n = 52). As presented in Fig 1, 40 (76.9%) of the respondents who took a COVID test were negative and 35% of them indicated they had symptoms. Again, of the 52 respondents who tested, 7 (13.5%) indicated they were positive at the time of the test but were negative at the time of the survey (i.e., recovered), and out of these 7, 71% indicated they had symptoms. Out of 12 who tested positive, 5 were positive at the time of study but only 60% of them reported having symptoms.

Perception on infection and prevention

Each of the five perceptions on what may influence the likelihood of not getting infected with coronavirus, irrespective of adhering to the main prevention protocols were all determined to have been generally denied by the respondents (Table 5). Of the five perceptions assessed in this study, the most denied perception (WAI of -1.2) was that self-medication with orthodox medicine reduces the likelihood of getting infected, and the least denied (-0.7) was that prayer to God for protection reduces the likelihood of getting infected.

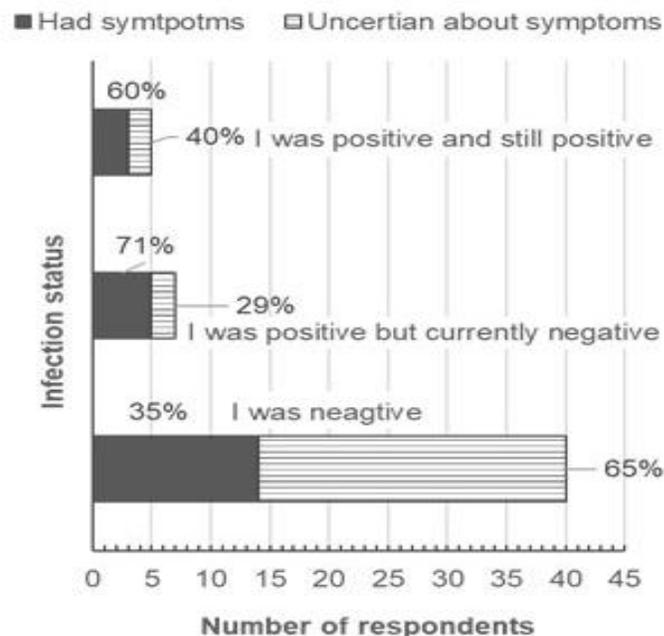


Figure 01: Infection status of respondents who had taken the SAR-COV-2 test.

Table 5: Perception of not going to be infected with SARS-CoV-2 irrespective of the extent of adherence to COVID-19 protocols:

Perceptions irrespective of adherence to protocols	Weighted average index*	Inference
Self-medication with orthodox medicine	-1.2	Moderate Denial
Not destined to be infected with the coronavirus	-1.1	Moderate Denial
Eat healthy foods	-1.0	Denial
Taking herbal preparations to boost immunity	-0.9	Limited denial
Prayer to God to protect me from the coronavirus	-0.7	Limited denial

*On a scale of 2 to -2 where > 0 is hold the perception, 0 is neutral/balanced; < 0 is denying the perception.

Following the determination of the extent to which these perceptions were denied overall, the study further assessed the occurrences of actions related to them and the perceptions based on the COVID-19 prevention protocols. It was determined that the four actions perceived to prevent SARS-CoV-2 infection based on the COVID-19 prevention protocols were more prevalent; specified between 59.7% and 85.0% of respondents, than those not related to the COVID-19 protocols; also quantified between 29.1% and 55.8% of respondents. While the use of hand sanitisers was the most prevalent COVID-19 protocol-based action (85.0%), seeking God's protection was the most prevalent non-COVID-19

protocol-based action (55.8%). Interestingly, 7.3% of the respondents reported that they did not adhere to any of the eight perceived actions to prevent being infected with SARS-CoV-2. Table 6 presents the prevalence of all perceived actions for both categories.

Table 6: Prevalence of actions perceived to prevent SARS-CoV-2 infection:

Perceived actions that prevent SARS-CoV-2 infection	Occurrences	(%)*
COVID-19 Protocol related		
I mostly use hand sanitisers	175	85.0
I mostly wear a face mask when I am outdoors	167	81.1
I mostly wash my hands with soap and running water	163	79.1
I mostly keep at least a 1-meter distances from the next person	123	59.7
Non-COVID-19 Protocol related		
God is protecting me from the infection	115	55.8
I am eating well	103	50.0
I am taking herbal preparation to boost my immune system	60	29.1
I am taking orthodox medications to boost my immune system	31	15.0
None of the above	15	7.3
None response	2	1.0

*Percentages are of the 206 respondents

Since the adherence to all the perceived action was considered beneficial, the study further assessed the number of these actions (Table 6) taken by each member of the cohorts in their efforts to prevent infection with SARS-CoV-2. It was determined that the proportion of the respondents who took six of the eight actions was the highest but only 27.7% and the proportion of the respondent who took all eight actions were even fewer (3.4%) than those who took only one action (4.4%). Figure 2 depicts the distribution of the respondents who different number of the eight reported actions.

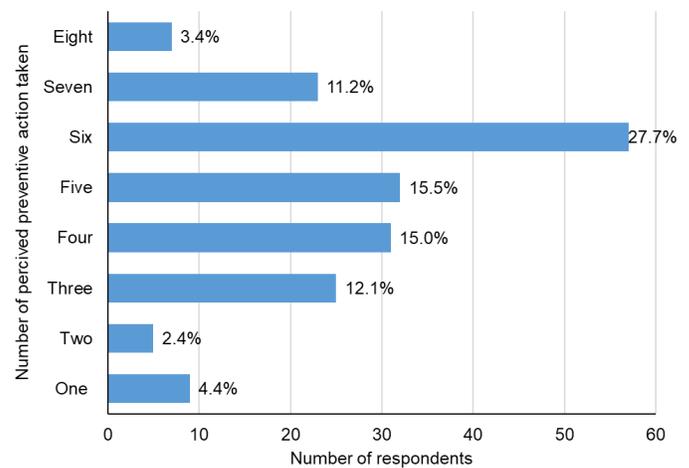


Figure 02: Prevalence of taking multiple actions perceived to prevent SARS-CoV-2 infection.

The study again sought to determine the contribution of each action to the combination of actions taken. The outcome of the determination (Table 7) shows that the respondents who washed their hands with soap under running water always took at least one additional action. Those who took actions related to praying to God, taking orthodox medications to boost their immune system or taking herbal preparations to boost their immune system, did so at least with two other perceived actions. On the other hand, those who took only one action either used hand sanitisers, wore a facemask, ate well, or kept at least a 1-meter distance from the next proximal person. Additionally, those who took six or more actions always used hand sanitisers, wore facemask and washed hands with soap and running water.

Attitude towards communication on COVID-19

An assessment of the attitude of respondents to communication on COVID-19 within four different categories was conducted in this study; these were those driven/influenced by self, external/actions of others, COVID-19 information, and adequacy of information (Table 8). The respondents' denial of self-driven factors polled highest for loss of interest in adhering to the prevention protocol, however, it was to a lesser extent (WAI of -1.1). Consequently, there was an overall indifferent attitude towards the Presidential update (WAI of 0.0). Again, the denial of the influence of the actions of others on respondents' loss of interest were all very weak (WAI of -0.3 and -0.4). On the other hand, the drivers of interest of respondents in the information on COVID-19 were the emergence of the reopening of schools and the onset of the new strain of the virus; these were strong (WAI of 1.0 and 0.8, respectively). In regard to the nature of the information provided, respondents had the perception that there was a need for further information, and there was inadequate detail regarding the measures

Table 7: Distribution of the occurrence of Perceived actions that prevent SARS-CoV-2 infection stratified by number of the actions taken together by each respondent:

Perceived actions that prevent SARCOV-2 infection	Occurrences, (%) in the number of the actions taken together by each respondent							
	One	Two	Three	Four	Five	Six	Seven	Eight
I mostly use hand sanitisers	11.1	100.0	96.0	93.5	90.6	100.0	100.0	100.0
I mostly wash my hands with soap and running water	0.0	60.0	48.0	93.5	100.0	100.0	100.0	100.0
I mostly wear a face mask when I am outdoors	11.1	20.0	76.0	93.5	93.8	100.0	100.0	100.0
I am eating well	11.1	0.0	12.0	16.1	53.1	82.5	100.0	100.0
I mostly keep at least a 1-meter distances from the next person	66.7	20.0	44.0	35.5	50.0	86.0	95.7	100.0
God is protecting from the infection	0.0	0.0	8.0	48.4	62.5	86.0	95.7	100.0
I am taking orthodox medications to boost my immune system	0.0	0.0	4.0	12.9	15.6	12.3	30.4	100.0
I am taking herbal preparation to boost my immune system	0.0	0.0	12.0	6.5	34.4	33.3	78.3	100.0

for children going back to school (WAI of 1.1 and 0.5 respectively). The respondents’ denial that the time between the recent communication and its implementation was inadequate was very weak (WAI of -01).

Discussion

A descriptive survey, with an online-based sampling method, was conducted to gain an understanding of the perceptions and attitudes towards communications on COVID-19 prevention and control in Ghana. The study was aimed at contributing information to improve the outcomes of efforts at preventing the spread of COVID-19 and maximizing the benefits of vaccination. A look at the representation of the participants showed a bias for persons with tertiary level education (Table 1). This implies that the views analysed in this report are of those with the ability and capacity to seek further information, and who are most likely able to better understand most of the information on COVID-19. They are also expected to be able to verify and identify misinformation and disinformation. Therefore, it is reasonable to expect that the levels of knowledge, perceptions, and attitudes will be the high-end among the populace in Ghana. Wherefore, although arguable, it is expected that the general populace will not have levels of knowledge, perceptions and attitudes that are better than determined in this study.

With these limitations and assumptions in mind, the levels of knowledge on the cause (97.6%) and symptoms (Table 3) were expected to be as high as was determined given sharing of information on the COVID-19 pandemic that had been going on for a little over a year before this study. Additionally, this finding correlates with the findings of a study carried out in Nigeria among 589 participants, where a majority (99.5%) of them had good knowledge about COVID-19 [12]. Furthermore, it can be deduced from this study that the levels of knowledge on all the symptoms of the disease were at least adequate. Comparing this to an earlier study conducted in Ghana among a specific group of health professionals [13], “difficulty in breathing” was similarly the most and appropriately known symptom (WAI of 1.7 on a scale of 2 to -2 for this study and WAI of 4.7 on a scale of 1 to 5 for the other study). However, the levels of knowledge on some of the symptoms were lower in the other studies. The observed difference is most likely because the respondents in this study are at the high-end of the level of knowledge and/or that there has been an improvement in knowledge gained over time between the two studies. This finding may explain the commonly stated perception held by some section of Ghanaians that the disease does not exist in Ghana because they do not see Ghanaians diagnosed with COVID-19 present with dyspnea and needing ventilators, as was observed in Europe and the USA and China. That is to say, if the most known symptoms (difficulty in

breathing and dry cough) are rarely observed, then the virus may not be present in Ghana, which is the faulty logic of that perception.

Table 8: Extent of different factors influencing attitudes towards COVID-19 communications:

Attitude towards COVID-19 communication	Weighted Average Index*
Self-driven	
Fed-up with or have lost interest in adhering to the preventive protocols.	-1.1
Fed-up with following up on the COVID-19 related numbers despite the recent upsurge in cases.	-0.2
Lost interest in the presidential update.	0.0
<i>Composite_Self-driven</i>	<i>-0.5</i>
Externally driven	
The attitude of persons in responsible positions towards COVID-19 contributes to me being fed-up with/losing interest in following the protocols on COVID-19 prevention.	-0.4
Irregular reporting of COVID-19 cases contributes to my being fed-up or losing interest in COVID-19 issues	-0.3
<i>Composite extent Externally driven</i>	<i>-0.4</i>
COVID-19 information-driven	
More interested in the information on COVID-19 following the re-opening of schools	1.0
More interested in the information on COVID-19 due to the emergence of the new strain	0.8
<i>Composite extent_information-driven</i>	<i>0.9</i>
Nature of information	
There is a need for further information for the populace to know what to do regarding the preventive measures for children going to school	1.1
Limited detail on the COVID-19 measures related to school reopening, contributed to parent/guardian not being clear as to what to do.	0.5
The timing between the recent communication and its implementation is inadequate.	-0.1

*On a scale of 2 to -2 where > 0 is supportive attitude, 0 is balanced; < 0 is denying attitude.

Aside from the low level of testing, 25.0% and a relatively lower level of active cases indicated by our findings (Figure 1), it was unclear why the prevalence of COVID-19 cases, a year after the outbreak of the pandemic, was relatively very low in Ghana. More important in our data was the extent to which those who had recovered from COVID-19, and those who had active cases at the time of the survey were uncertain about their symptoms (Figure 1). It may be intuitive that as much as 65.0% of those who were negative would be uncertain about their symptoms. However, the fact that those who had an active case and/or had recovered indicated that they were not certain about their symptoms, at the time of the survey, may imply one of the three possibilities. Firstly, this may be because they did not experience the most known symptoms (as indicated in Table 3), Secondly, it may also be because the common symptoms in Ghana at the time of this study, were less known as symptoms of COVID-19 and non-specific (associating with other common diseases aside COVID-19). Thirdly, this may be suggestive of a moderate level of asymptomatic cases circulating in the country, which our findings suggest was between 29.0% and 40.0%.

Table 5 shows that each of the five (5) anticipated perceptions that were not related to COVID-19 prevention protocols, irrespective of the extent of adherence to the COVID-19 prevention protocols, were generally denied. This denial implies that the perceptions were not likely to interfere with the adherence to the prevention protocols. Therefore, were not likely promoters of transmission of the virus as were speculated. For a religious population, it was not surprising that the least denied perception (the most held perception) was “prayer to God for protection against coronavirus”. This is because it is common for Ghanaians to include religion in their health-seeking behaviour. Cases of patients going to prayer camps to seek cancer treatment are quite common in Ghana [14]. Again, the finding that self-medication with orthodox medicine was the most denied perception (the least held) was not surprising since there was no clear orthodox medication confirmed for COVID-19 treatment at the time of this study. The speculation about Hydroxychloroquine as a treatment for COVID-19 had been debunked at the time of this study and over time during the pandemic. In the absence of a confirmed orthodox medicine, the perception of the use of herbal preparations to boost immunity was understandably the second least denied (second most held) perception among the five.

The finding that “adherence to the prevention protocols” was the most perceived action to prevent infection by SARS-CoV-2 was a positive to the prevention of COVID-19, particularly during the onset of

the second wave (Table 6). Another positive to the prevention of COVID-19 was that “eating well”, which is eating a well-balanced diet, (55.8%) was more common than “use of herbal preparations to boost immunity” (29.1%) by a greater margin. Of concern was the proportion of respondents who indicate that both the adherence to prevention protocols and the non-COVID-19 protocol related prevention action would protect against the viral infection (Figure 2 and Table 7). This was not expected among respondents of such demographic characteristics and imply that a greater proportion of the general population may have held this view too. These point to a need for more explanation on how specifically the protocols work to prevent infection. The lesson should also be applied in the educational campaign to encourage vaccination in addition to adherence to the prevention protocols. Specifically, the finding that about 42.5% (Figure 2) of the respondents adhered to six or more of both the COVID-19 and non-COVID-19 prevention protocols implied the need to keep a look at the extent of adherence to the prevention protocol in this conjunction of actions.

However, the good news was that additional analysis showed that three of the four COVID-19 prevention protocols (except social distancing) were always part of the conjunction of six or more prevention actions taken (Table 7). The analysis revealed that three of the four non-COVID-19 prevention actions were always taken in addition to two or more of the other prevention protocols (never done alone); a situation which is very encouraging since these non-COVID-19 protocols were being used in addition to the COVID-19 protocols. However, comparing the present findings to that observed from the beginning of the pandemic in Ghana, particularly, focusing on participants that were generally at the lower end of the educational status indicated that the level of adherence revealed by this study was high than during the onset of the pandemic [15].

The present findings showed that self-driven factors do not enhance adherence as much as externally driven factors do (Table 8). More so, both were not as much as COVID-19 related information that indicated how each individual and/or their loved ones were at high risk of an infection or an undesirable outcome (Table 8). Therefore, communication on COVID-19 related prevention should emphasize to the public how individuals were on their own at risk and will have to act as they will to protect themselves and to protect their loved ones, particularly whenever there is a new wave of infection and during the call for vaccination. Additionally, information on how the COVID-19 situation is evolving, and how new facts put individuals, their loved ones, and other groups they care about at

immediate danger and foreseeable high risk, should be communicated. These recommendations are consistent with those of Ning et al., who recommended that communication is essential for the public to obtain knowledge and comply with COVID-19 interventions, which did so without such nuances [16]. However, Dryhurst et al. [17] indicated that people are generally less tolerant of risks arising from new, unfamiliar knowledge than they are, based on risk arising from familiar or usual information. Other studies on COVID-19 had reported similar results with such nuances [18-19]. Traditionally, when self-driven factors do not contribute to adherence, specifically, when a population is at risk, the need for some level of enforcement or mandatory action may be necessary. Such paternalism to avert much population-level harm may not be ethically impermissible [20].

III. CONCLUSIONS

The levels of knowledge on the cause, symptoms and preventive protocols of COVID-19 among respondents were adequate to enhance the control of the transmission or spread of COVID-19. It is also confirmatory that there was a low level of active infection among the categories of the population with similar demographics in this study and that asymptomatic cases may form an appreciable proportion of cases in Ghana. Furthermore, the findings of this study suggest that there is a need to improve the perceptions and related attitude towards adherence to prevention protocols. Perception of prevention by other means other than the prevention protocols, although prevalent did not affect the adherence to the prevention protocols, rather it served as an additional means of prevention. The study showed that the attitudes of respondents towards communication on COVID-19 are enhanced by new COVID-19 related information much more than other people’s behaviour and more than self-driven factors.

Educators of the public on COVID-19 should seek to improve knowledge on the lesser appreciated symptoms which were determined in this study to be the less severe and non-specific like the initial symptoms such as fever and headache and seek to improve perceptions and attitudes with more specific COVID-19 information that show a high risk of severity of the outcome. Additionally, public health communicators and implementers should work to ensure that adherence to prevention protocols should not be relegated to self-driven behaviour of the populace, albeit a stricter level of enforcement is needed.

IV. MATERIALS & METHODS

Study design and sampling

A cross-sectional survey that used a self-administered questionnaire was carried out online via the social media handle, WhatsApp. The link to the questionnaire was made available via WhatsApp, first by convenience sampling of WhatsApp platforms of identifiable cohorts, and then secondly by snowballing; where respondents were requested to forward the link to other WhatsApp platforms that are linked to them. Respondents were then requested to partake in the online survey if they were resident in Ghana and were able to respond to the questions on a smartphone or a web browser on a personal computer. Collection of data was between January 2021 and February 2021, when it appeared that the second wave of infections (including that of some new variants) was increasing.

Data collection and Management

A self-administered and structured questionnaire was used to collect socio-demographic data such as sex, age, educational level and occupation among others. Data on respondents' level of knowledge on the cause, symptoms and prevention were derived. Additionally, data on infection status and perception on COVID-19 protocol and non-COVID-19 protocol-related prevention actions and attitude toward the virus were collected. Finally, data on perceptions on COVID-19 related communication were collected. See supplementary information file for the data set generated in this study. Descriptive statistics and proportions were used to summarize the distribution of the responses using the software SPSS version 20.0 was used for the analyses.

The responses to question were by indication of agreement on a Likert scale as follows, strongly agree, agree, neutral, disagree, and strongly disagree. All questions were composed in the positive sense and the Likert scale were rated (R_L) as 2, 1, 0, -1, and -2 respectively. The scale was made to include negative and positive points based on the influence these responses regarding the question will have on the respondent possible adherence. Non-response/blank entries were not included in the analysis and response indicated as "not applicable" was rate (R_L) as 0. The frequency (f_L) for each of the indication of agreement were recorded. The WAI was calculated by taking the quotient of the sum of the individual product of the frequency of each indicator of agreement and its rate, and the total number of respondents as indicated in this formula:

$$WAI = \frac{\sum_{L=1}^6 (f_L \times R_L)}{206}$$

A composite outcome for each major indicator of the study, for example, knowledge on prevention protocols, was calculated as an arithmetic mean of the WAI for all questions related to that major indicator (for example, the mean of the WAIs for the questions on "washing of hands", "use of alcohol-based hand sanitizer", "alcohol content of hand sanitizer", "wearing of face mask", and "keeping a distance" was calculated as the outcome measure of knowledge on prevention).

Ethical Issues

This study presents minimal risk with no identifiable study-related harm to participants of the study. Participation in the survey was entirely voluntary and anonymous. A written (online indication) informed consent was obtained from each prospective participant in a manner that a prospective participant would not have access to the questions except after giving consent. Ethical approval (RAMS/ERC/SS/04/2020) was obtained from the Ethical Review Committee of the Radiological and Medical Sciences Research Institute of the Ghana Atomic Energy Commission.

Supplementary Material: This file presents a table of the distribution (proportion of respondents) of the responses to the questions of the different sections of the study questionnaire.

Consent to participate: Informed consent was obtained from all individual participants included in the study.

Consent for publication: Additional informed consent was obtained from all individual participants for whom identifying information is included in this article.

Availability of data and material: Data is available from the Supplementary material file and from the corresponding author upon request.

Acknowledgment: The authors are grateful to all who forwarded the link to the questionnaire to other WhatsApp platforms.

Authors' contribution: AKA, EDD, DNA and EA contributed to the conceptualization of the study, development and design of methodology including the creation of the study tool and Investigation. AKA performed data curation, formal analysis, and interpretation, and was involved with writing the original draft manuscript. EDD was involved with writing the original draft manuscript. AKA, EDD, DNA and EA reviewed the manuscript and approved it for submission.

REFERENCES

1. Yin, Yudong, and Richard G. Wunderink. "MERS, SARS and other coronaviruses as causes of pneumonia." *Respirology* 23.2 (2018): 130-137.
2. World Health Organization. "Novel Coronavirus (2019-nCoV): situation report, 11." (2020). Available from: <https://www.who.int/docs/default->

- source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf?sfvrsn=20a99c10_4
3. Eurosurveillance Editorial Team. "Note from the editors: World Health Organization declares novel coronavirus (2019-nCoV) sixth public health emergency of international concern." *Eurosurveillance* 25.5 (2020): 200131e.
 4. Olaimat, Amin N., et al. "Knowledge and information sources about COVID-19 among university students in Jordan: a cross-sectional study." *Frontiers in Public Health* 8 (2020): 254.
 5. COVID, WHO. "Cases Top 10000 in Africa." *WHO. Regional Office for Africa. Available online: https://www.afro.who.int/news/covid-19-cases-top-10-000-africa (accessed on 22 July 2020)* (19).
 6. Jin, Jian-Min, et al. "Gender differences in patients with COVID-19: focus on severity and mortality." *Frontiers in public health* 8 (2020): 152.
 7. Arslan, Muhammad, Bin Xu, and Mohamed Gamal El-Din. "Transmission of SARS-CoV-2 via fecal-oral and aerosols-borne routes: Environmental dynamics and implications for wastewater management in underprivileged societies." *Science of the Total Environment* 743 (2020): 140709.
 8. Singhal, Tanu. "A review of coronavirus disease-2019 (COVID-19)." *The indian journal of pediatrics* 87.4 (2020): 281-286.
 9. Cassell, Michael M., et al. "Risk compensation: the Achilles' heel of innovations in HIV prevention?." *Bmj* 332.7541 (2006): 605-607.
 10. Peltzman, Sam. "The effects of automobile safety regulation." *Journal of political Economy* 83.4 (1975): 677-725.
 11. Sadowski, Nicole Cornell, and Daniel Sutter. "Hurricane fatalities and hurricane damages: Are safer hurricanes more damaging?." *Southern Economic Journal* (2005): 422-432.
 12. Reuben, Rine Christopher, et al. "Knowledge, attitudes and practices towards COVID-19: an epidemiological survey in North-Central Nigeria." *Journal of community health* 46.3 (2021): 457-470.
 13. Hasford, Francis, et al. "Knowledge and perception on the transmission and control of SARS-COV-2 infection among allied radiation medicine professionals in Ghana." *Health and Technology* 11.1 (2021): 119-126.
 14. Della Atuwu-Ampoh, Vivian. "Quality of life of gynaecological cancer patients undergoing radiotherapy treatment at the oncology department at the komfo anokye teaching hospital, ghana." *asia-pacific journal of clinical oncology*. 111 RIVER ST, HOBOKEN 07030-5774, NJ USA: Wiley-Blackwell, 10 (2014): 1- 263.
 15. Bonful, Harriet Affran, et al. "Limiting spread of COVID-19 in Ghana: compliance audit of selected transportation stations in the Greater Accra region of Ghana." *PloS one* 15.9 (2020): e0238971.
 16. Ning, Liangwen, 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* 20.1 (2020): 1-12.
 17. Dryhurst, Sarah, et al. "Risk perceptions of COVID-19 around the world." *Journal of Risk Research* 23.7-8 (2020): 994-1006.
 18. Malecki, Kristen MC, Julie A. Keating, and Nasia Safdar. "Crisis communication and public perception of COVID-19 risk in the era of social media." *Clinical Infectious Diseases* 72.4 (2021): 697-702.
 19. Yıldırım, Murat, and Abdurrahim Güler. "Positivity explains how COVID-19 perceived risk increases death distress and reduces happiness." *Personality and Individual Differences* 168 (2021): 110347.
 20. Kates, Olivia S., Douglas S. Diekema, and Emily A. Blumberg. "Should healthcare institutions mandate SARS-CoV-2 vaccination for staff?." *Open Forum Infectious Diseases*. (2021).

Submit your next manuscript to Journal of PeerScientist and take full advantage of:

- High visibility of your research across globe via PeerScientist network
- Easy to submit online article submission system
- Thorough peer review by experts in the field
- Highly flexible publication fee policy
- Immediate publication upon acceptance
- Open access publication for unrestricted distribution

Submit your manuscript online at:
<http://journal.peerscientist.com/>

