

# Unconventional Products for COVID-19 Prevention: Practices, Experiences and Perceptions of Frontline Workers in Borno State, Nigeria

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## Abstract

**Background:** Numerous unconventional products have been suggested for protection against COVID-19 infection, and health workers tend to be regarded as role models in terms of health behaviour. The study aimed at exploring the misuse of unconventional products for self-protection against COVID-19 by frontline health workers.

**Method:** This study utilised a mixed method design comprising a cross-sectional survey and in-depth interviews. Standardised questionnaires and interview guides developed based on the health belief model were used to collect information from the respondents. Statistical analysis used: The quantitative data obtained from the survey were analysed statistically to determine the predictors of using those products while thematic analysis was conducted for the qualitative data from the interviews.

**Result:** A total of 225 frontline workers comprising medical doctors, nurses, community health workers, environmental health workers, surveillance notification officers, laboratory scientists/technicians, cleaners/porters, drivers, and others, answered the survey. Half of the respondents (50.7%) reported they had taken some unconventional medications/products, majorly garlic, Chloroquine, and Vitamin C to protect themselves from COVID-19. Belief that those unconventional products were beneficial (OR = 2.37; 95% CI: 1.29-4.37) and having had COVID-like symptoms (OR = 3.63, 95% CI: 1.87-7.03), were predictors of unconventional medications/products use.

**Conclusion:** The high prevalence of abuse of unconventional products for COVID-19 prevention among frontline workers could adversely affect efforts by health authorities in discouraging the public from abusing them.

**Keywords:** COVID-19, prevention, perception, frontline workers, unconventional products, Nigeria

## Introduction

Coronavirus disease 2019 (COVID-19) was first reported in 2019 in the city of Wuhan in China.<sup>1</sup> It is

caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS Co-V-2), a member of the coronavirus family which is found in some animals, including sheep, bats, camels and cows.<sup>2</sup> The aetiology of SARS Co-V-2 has been linked to bats, but some grey areas regarding the aetiology still abounds.<sup>3</sup> It takes 5.6 to 6.7 days on average, for an infected person to develop signs and symptoms, however it could take up to 12.5 days.<sup>4</sup> COVID-19 presents with diverse symptoms which could range from mild to moderate to severe and even fatal, but the most common and definitive are the respiratory symptoms which include sneezing, dry cough, difficulty in breathing, anosmia, sore throat, headache, fever and malaise among others.<sup>5</sup>

The pandemic had led to unprecedented efforts in the development of vaccines and drugs for the prevention and treatment of SARS Co-V-2 infection.<sup>6</sup> Some agents were found to be effective in slowing the disease progression and reducing mortality from the infection<sup>7,8</sup> and some have even been recommended by the WHO for the management of COVID-19.<sup>9,10</sup> The respiratory symptoms of COVID-19 are similar to those of usual flu and hence a hint that they could possibly also share similar treatments.<sup>11</sup> This has led to an increase in cases of self-medication, some of which have had disastrous effects due to over dosage, drug interactions and other complications leading to hospital admissions.<sup>12,13</sup> Some orthodox medications and natural products that have been misused for protection against COVID-19 by many Nigerians include vitamin C, multivitamins, Chloroquine,<sup>14</sup> ginger, garlic, turmeric, lemon and a variety of traditional mixtures.<sup>15</sup> Chloroquine/hydroxychloroquine was however found to be non-effective against the virus and could even result in serious adverse events among persons with COVID-19.<sup>16-18</sup>

Frontline workers in COVID-19 include medical doctors, nurses, community health workers, drivers, and other field workers. The nature of their work involves likely contact with infected persons, these workers are at increased risks of contracting the virus.<sup>19</sup> The practices of these frontline workers are likely to be emulated and even referenced by the general public, as was seen with saltwater misuse during the 2014 Ebola outbreak.<sup>20</sup> Despite this, little is known about the extent of misuse of unconventional products among front-line COVID-19 workers in Nigeria. The health-belief-model (HBM) is an important theory that has been used to explain various health behaviours. Its constructs comprise perceived susceptibility, perceived severity, perceived benefits and cues to action.<sup>21</sup> The position is that frontline COVID-19 health workers in Maiduguri,

Nigeria misuse unconventional products or methods for self-protection against COVID-19 and this study aimed to determine and explore the extent of this misuse among them. The results of the study would improve our understanding of health behaviour among front-line COVID-19 workers in Nigeria, which will guide the planning of future public health interventions in that regard.

## Method

This study was conducted in Borno state of north-east Nigeria, with data collected over the period from October 2020 to January 2022. A mixed-methods approach was used, comprising a cross-sectional survey followed by in-depth interviews to collect information from front-line COVID-19 workers in Borno state, Nigeria. The inclusion criteria for participating in the study was to have been formally employed in the COVID-19 frontline team, irrespective of one's role and irrespective of their employer. The questionnaire survey provided the opportunity to quantitatively assess the problem, while the in-depth interviews provided an opportunity to understand the problem in deeper context beyond what could have been measured with questionnaire surveys. The study questionnaire was designed according to the HBM and comprised seven sections, containing questions on socio-demography, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and practices.

The questionnaire was developed following extensive literature review and was reviewed independently by experts from different fields comprising public health physician, social scientist and health educator. Translation to Hausa language was then done by a senior academic staff at the Hausa Language Department of the University of Maiduguri. The survey questionnaire was finally deployed as a bilingual questionnaire through self-administration as well as face-to-face interviews (for those who were not literate) were used for the questionnaires. Participants had the choice of choosing which language they preferred. The data retrieved from the survey were analysed using Statistical Package for Social Sciences (SPSS) version 22. Data from the HBM constructs had been collected on binary scales and were thus summarised as frequencies and percentages. Multiple logistic regression was used to determine the predictors of taking unconventional products among the respondents.

In-depth interviews were conducted among eight randomly selected COVID-19 frontline workers which comprised of medical doctors, nurses and community health workers. The interviews were conducted using

the same standard interview guide designed by the researchers. The interviews were tape recorded, notes were taken, and the transcripts were processed, coded and interpreted using thematic analysis. The study protocol, as well as methods of obtaining consent, had been approved by the Ethics Committee of the Borno state Ministry of Health (MOH/GEN/6679/1) before the study commenced. Written informed consent was obtained from each respondent after they had been taken through the respondent information sheet.

### Results

A total of 225 respondents completed the survey out of which close to two-thirds (65.3%) were males, as illustrated in Table 1. Almost all (89.3%) had education above secondary school level, and 45.8% had over 10 years of working experience.

Variable	n	%
<b>Age (years)</b>		
Mean (SD)	38.3	(9.6)
Range	18-66	(18-66)
<b>Gender</b>		
Male	147	(65.3)
Female	78	(34.7)
<b>Marital status</b>		
Single	47	(20.9)
Married	178	(79.1)
<b>Educational status</b>		
None	4	(1.8)
Primary	1	(0.4)
Secondary	19	(8.4)

Variable	n	%
Tertiary	201	(89.3)
<b>Senatorial zone</b>		
Maiduguri	79	(55.9)
Borno north	53	(30.1)
Borno central	69	(4.9)
Borno south	24	(7.5)
<b>Field of work</b>		
Medical doctor	31	(13.8)
Nurse	36	(16.0)
Community health worker	40	(17.8)
Environmental health worker	31	(13.8)
Surveillance notification officer	18	(8.0)
Cleaner/Porter	17	(7.6)
Laboratory scientist/technician	11	(4.9)
Driver	12	(5.3)
Others	29	(12.9)
<b>Years of Experience</b>		
Less than 5 years	50	22.2
5 to 10 years	72	32.0
More than 10 years	103	45.8

As presented in Table 2, most of them (92.4%) believed that their work placed them at increased risk of contracting the disease. Most (89.3%) also believed COVID-19 to be a serious disease and 49.3% believed that the unconventional medications/products being taken for protection against COVID-19 were beneficial.

**Table 2:** Participants’ perceived susceptibility severity for COVID-19 and perceived and benefits and barriers for taking unconventional products

Variable	n	%
<b>Perceived susceptibility</b>		
Do you think your workplaces you at more risk of contracting COVID-19? (SUSCEPTIBILITY_1)		
Yes	208	92.4
No	17	7.6
Can people of your age get infected with COVID-19? (SUSCEPTIBILITY_2)		
Yes	207	92.0
No	18	8.0
<b>Perceived severity</b>		
Do you believe COVID-19 is a serious illness? (SEVERITY)		
Yes	201	89.3
No	24	10.7
<b>Perceived benefits</b>		
Do you believe that taking medicines (orthodox medicines and/or herbal medicines) which are not licensed by the ministry of health for protection against COVID-19 is beneficial? (BENEFITS)		
Yes	111	49.3
No	114	50.7

Variable	n	%
<b>Perceived barriers</b>		
Do you believe that taking medicines (orthodox medicines and/or herbal medicines) which are not licensed by the ministry of health for protection against COVID-19 could result in serious consequences? ( <b>BARRIERS</b> )		
Yes	110	48.9
No	115	51.1

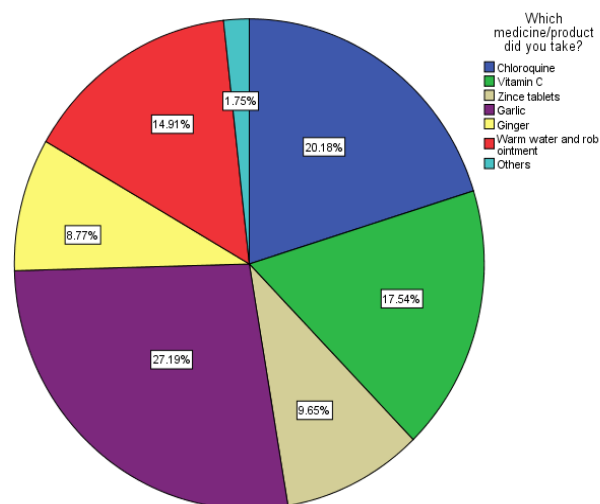
Table 3 shows the possible cues for taking unconventional medications/products for protection against COVID-19. Around a half of the respondents (41.7%) reported having had a close one who had contracted COVID-19 and 61.3% had had symptoms similar to those of COVID-19. About a quarter (26.7%) had ever been tested for COVID-19.

**Table 3:** Cues to action for taking unconventional products for preventing COVID-19

Variable	n	%
Has anyone close to you contracted COVID-19? ( <b>CUE_1</b> )		
Yes	105	46.7
No	120	53.3
Has anyone close to you died of COVID-19? ( <b>CUE_2</b> )		
Yes	29	12.9
No	196	87.1
Have you had any symptoms similar to that of COVID-19 since the pandemic started? ( <b>CUE_3</b> )		
Yes	138	61.3
No	87	38.7
Have you been tested for COVID-19? ( <b>CUE_4</b> )		
Yes	60	26.7
No	165	73.3
If you have not been tested, are you willing to get tested?		
Yes	76	43.9
No	97	56.1

**Practice**

Half (50.7%) of the respondents had taken some unconventional medications/products to protect themselves against COVID-19. Out of these, the majority had taken garlic, Chloroquine, and Vitamin C as shown in Figure 1.



**Figure 1:** Distribution of products misused for protection against COVID-19 among the respondents. According to Table 4, around a third (31.6%) of those who had taken those unconventional medications/products had not received any concurrent contrary messaging. About half mentioned that they would not have taken those unconventional medications/products if they had received any concurrent contrary messaging from the ministry of health (56.1%).

**Table 4:** Source and impact of information for unconventional products misuse

Variable	n	%
What was your first source of the information to take this medicine(s)?		
Social media	33	28.9
Friend(s)	26	22.8
Family	14	12.3
Others	41	36.0
At the time you received the information to take those medicines, did you also receive a contrary information stating that it was wrong to do so?		
Yes	36	31.6
No	78	68.4
If you had received an announcement from the Ministry of Health or other		

Variable	n	%
strong health agency/organisation not to use those medicines, would you have still used it?		
Yes	50	43.9
No	64	56.1

Table 5 shows the results of the multiple logistic regression analysis to determine the predictors using unconventional products for COVID-19 prevention, the model was fit, as indicated by a non-significant

Hosmer and Lemeshow test ( $p=0.114$ ). The Nagelkerke R indicated that 23.3% of variation in unconventional product misuse can be explained by the model. Those who believed that taking those unconventional medications/products was beneficial were twice more likely to have taken them compared to those who did not believe that they were beneficial. Also, those who had had symptoms similar to those of COVID-19 were thrice more likely to have taken them compared to those who had not had such symptoms.

**Table 5:** Predictors of taking an unconventional medicine/product for protection against COVID-19

Factors	B	SE	Wald	df	p	Adjusted OR	95% CI
<b>Age</b>							
Less than 40						1	
40 years and above	-0.27	0.32	1.98	1	0.159	0.64	0.34-1.19
<b>Marital status</b>							
Single						1	
Married	-0.45	0.40	1.30	1	0.254	0.64	0.29-1.38
<b>SUSCEPTIBILITY_1</b>							
No						1	
Yes	0.02	0.66	<0.01	1	0.977	1.02	0.28-3.71
<b>SUSCEPTIBILITY_2</b>							
No						1	
Yes	1.19	0.75	2.49	1	0.115	3.28	0.75-14.38
<b>BENEFITS</b>							
No						1	
Yes	0.86	0.31	7.72	1	0.005	2.37	1.29-4.37
<b>CUE_1</b>							
No						1	
Yes	-0.23	0.32	0.48	1	0.488	0.80	0.42-1.51
<b>CUE_2</b>							
No						1	
Yes	0.53	0.50	1.14	1	0.287	1.70	0.64-4.53
<b>CUE_3</b>							
No						1	
Yes	1.29	0.34	14.59	1	<0.001	3.63	1.87-7.03
<b>CUE_4</b>							
No						1	
Yes	0.14	0.37	0.14	1	0.71	1.15	0.55-2.37

### **Knowledge**

From the in-depth interview (IDI) discussions, the respondents knew about the misuse of unconventional products which was from their personal experience or experience of others and/or hearsay. Majority of them noted that common products were misused, which included black seed, ginger, garlic, onion oil, chloroquine, ivermectin, erythromycin, azithromycin, zinc, vitamin C, camphor (naphthalene balls) and olive oil.

A 37-year-old community health officer described his knowledge of the unconventional products.

*“I think the prevalence of use of unconventional products for prevention among frontline workers is very common. What I can perceive from interaction with my group and some other people in the community is that people usually take hot drinks like tea that is made of either ginger or black seed popularly known as ‘habbatus-sauda’, which they think will boost their immunity and will prevent them from being infected by COVID-19.”*

Majority shared the experience of others using unconventional product for self-protection. However, only a few of the respondents agreed to using them.

A 46-year-old medical laboratory technician confessed to the use of unconventional products for self-protection thus;

*“Well, during my first time of engaging as a frontline worker, that is, as a contact tracing team member, I had exposure to COVID-19 disease at the isolation centre and other places where covid-19 cases were prevalent. So actually, I made use of the products, that is, the azithromycin and vitamin C.”*

### **Perception of drugs being misused by frontline health workers**

Majority of the respondents perceived that Chloroquine was the mostly misused drug. Another drug believed to be misused was Azithromycin. Other drugs that were misused were erythromycin and ivermectin. The drugs were believed to be used without correct dosages and with serious side effects.

A 52 year old professor of medicine explained the nature of the misuse.

*‘Yes, especially during the first wave of the Covid pandemic, people misused hydroxyl chloroquine, and I can tell you it is basically because of the utterances from some of our top government officials and decision-makers. Due to those utterances a lot of people misused this drug (chloroquine). In fact it went to the extent that this particular drug that used to be sold at a cheap price became very expensive and even difficult to get. Hydroxyl chloroquine comes with a lot of cardiovascular effects such as arrhythmias. So, we have seen a lot of people coming down with arrhythmias just because of taking a lot of this hydroxyl chloroquine.’*

A disease surveillance and notification officer explained further,

*‘Yes, they misuse it because there is no dosage. They use it like they take water. The erythromycin has no prescription or dosage. They use it as they like, by themselves. This leads to adverse events following, which could be life-threatening.’*

### **Effect of socio-demographic characteristics on the constructs of the health belief model (perceived susceptibility, perceived severity and cues for action) of the respondents**

Socio-demographic characteristics define an individual’s level within a hierarchical social structure. It is a very important determinant of the health status of a population. Therefore, socio-demographic characteristics such as age, gender, level of education, level of income and occupation are variables which affect peoples’ activities, beliefs and actions. The health belief model is an important tool used in health education to improve peoples’ health decisions. Some of the participants reported that some people do not believe in COVID-19 at all and so they do not have perceived susceptibility or severity.

The professor of medicine gave this example,

*“I once admitted a very well-learned person in the hospital with confirmed Covid-19. He was telling people that the doctors and I were paid to heighten the issue of Covid-19 in Borno state. He made an audio message and spread it around that doctor so..so.. so injected him with Covid-19 just to make money and he learned that each Covid-19 injection comes with like 1 thousand or is it 1million dollars?”*

### **Perceived susceptibility**

Majority of the respondents perceived that there was no difference in the association between sociodemographic factors and perceived susceptibility. They believed that everyone is susceptible regardless of their socio-demographic status. All the participants had views on all the socio-demographic characteristics except gender.

The professor of medicine remarked,

*‘In fact, well-educated people behave the same way as the uneducated people when it comes to Covid 19. Even a professor telling you that he does not even believe that there is anything like Covid-19 and of course, they feel they are not susceptible.’*

Furthermore, a 37 year old Community Health Officer noted,

*“There is virtually no difference, because from what I can see, both low and high-level personalities in the field of academia, political group, and even the military to certain extent do not believe they are susceptible. To me, the level of educational attainment and the rest does not have any influence.”*

On the contrary, some of the respondents believed that sociodemographic characteristics are associated with perceived susceptibility to COVID-19. While a larger

proportion noted that the elderly, the rich, health workers and highly educated were more susceptible, a few said that the poor and those with low educational status were more likely to be infected with COVID-19.

A 35 year old nurse gave an example of age and exposure as factors associated with perceived susceptibility,

*“The elderly and the socioeconomic characteristics of those people actually affects it (perceived susceptibility). Let's say for example, an elderly person who has gone out or has traveled out to a place where confirmed cases have been reported is more susceptible to Covid-19 than a person that is confined to a place where no confirmed case was reported.”*

#### **Perceived severity**

Nearly all the respondents believed that there is an association between sociodemographic characteristics and perceived severity. They remarked that age (especially the elderly), low income, low level of education and occupation (especially health workers) were factors associated with perceived severity.

A medical laboratory technician remarked,

*“Actually, the socio-demographic characteristics have effect on the perceived severity of the disease, because if a person is not educated, the severity of the disease will continuously increase, because he has no access to medical attention.”*

#### **Cues for action**

Perception of susceptibility and severity are factors that determines a person's cue for action. A person who knows that they are at risk of a disease will likely adopt measures to prevent or cure the disease. All the respondents believe that sociodemographic factors are associated with people's cue for actions as regards Covid-19 disease. Therefore, it was discussed that health workers like doctors and nurses would most likely misuse orthodox methods for self-protection against Covid-19 while people in other fields are more likely to use natural methods. Majority of the participants also commented that older age groups tended to seek conventional treatment than the younger age groups.

The Community health officer noted thus,

*“Sincerely, the health workers especially if it is health-based background like Medicine and Nursing do not take unconventional products because they have the in-depth background knowledge as compared to other personalities (other cadres). They are always in the frontline handling vaccines. In this group of people, there is adherence to the conventional approach. Conventional preventive measures and the rest is highly practiced among the health personalities.”*

#### **Perceived benefits of the use of unconventional products for self-protection**

Nearly all the respondents had no success story to share about the use of unconventional products. Most of them believed that there were no benefits from the use of unconventional products in the prevention of Covid-19. However, one of the participants talked about the effectiveness of steam inhalation and the use of onion oil.

A 35-year old nurse described,

*“When you have difficulty in breathing, catarrh, runny nose and when your nose is blocked, the use of steaming is very effective. Also, taking one teaspoon of onion oil every morning helps to boost the immunity and has improved the symptoms of COVID 19.”*

#### **Lessons learnt**

Lessons learnt prevent people from making the same mistakes. In the use of unconventional products for self-prevention by health workers, some of the respondents thought that the use of the unconventional products was ineffective.

A medical laboratory technician noted:

*“It is inadvisable to use an unconventional product for this Covid-19 diseases. If you have any symptoms of Covid-19 disease, please go to the hospital and see a doctor, and seek for doctor's advice appropriately, and be guided.”*

#### **Discussion**

The study aimed to determine and explore the extent of misuse of unconventional products for self-protection among front-line COVID-19 workers in Borno state, North-eastern Nigeria. Half of the surveyed health workers had taken some unconventional products to protect themselves against COVID-19 infection during the pandemic. The predictors of taking those substances were having perceived benefits for the products and having experienced any COVID-like symptoms.

The prevalent misuse of these products among the respondents compared to the general population<sup>14</sup> could be explained by the easy access they have to such drugs and the poorly regulated retail pharmaceutical products in Nigeria. Some natural products such as garlic,<sup>23</sup> ginger and black seed have been documented to have properties which prevent inflammation, apoptosis, tumours and fever.<sup>22</sup> They also have antioxidant properties.<sup>24,25</sup> For products such as Ivermectin (not reportedly misused in this study), there were misleading evidence to suggest its effectiveness.<sup>26</sup> However, these substances had neither been proven to prevent SARS-COV-2 infection nor recommended by any reputable public health authority. During the surveys, half of the respondents (49.3%) believed that taking those products were beneficial, but in the interviews conducted later, none of the respondents had that viewpoint. This could be attributed to the greater

awareness about COVID-19 over time as the interviews were conducted much later after the surveys.

Although some of these drugs had been studied for effectiveness against the SARS COV 2 virus,<sup>6-9</sup> these have been in controlled settings, and their unprescribed and unsupervised use could result in serious health problems. The high prevalence of their misuse among frontline workers has high tendencies of being emulated by members of the community.<sup>20</sup>

#### **Strengths and Limitations of the study**

Among the strengths of the study were the mixed-method design, which ensured triangulation, as well as the multivariate analysis to control for potential confounding factors. Some limitations include the possibility for recall bias with regards to information collected during the interviews, as they were conducted after some considerable time from the period with peak COVID-19 cases. Secondly, there could be social desirability bias as some health workers may not want to volunteer information on some of their practices that do not align with best practices. Lastly, because only health workers in a part of the country participated in the study, the findings may not be generalisable and should be interpreted with caution.

#### **Conclusion**

The prevalence of misuse of unconventional products for COVID-19 prevention was high among the frontline workers in this study. This could adversely affect efforts by health authorities in discouraging the public from abusing them. Intervention programmes aimed at promoting desirable health behaviours should thus start by targeting frontline workers, before extending to the general public. Strict regulation of drug dispensation could potentially also play a vital role in minimizing this problem.

#### **Declarations**

**Authors' contribution:** Ahmed DB, Mohammed AM, Jamilu N and Salamatu SA participated in the study design for the quantitative component. Ahmed DB did the quantitative data analysis. Olubiyi OA was responsible for the qualitative study design and data analysis. All authors participated in the manuscript writing and had read and approved the final manuscript.

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