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Research Article

Knowledge, Adherence to Non-Pharmaceutical Interventions, And Impact Of COVID-19 Lockdown Among Traders in Ibadan, Nigeria

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ABSTRACT

The COVID-19 is a major public health problem in Nigeria. Not enough is known about knowledge, adherence to Non-pharmaceutical Interventions (NPI), and impact of COVID-19 lockdown measures among traders in the informal sector in Nigeria. To address these gaps in knowledge, 383 traders in Alesinloye market in Ibadan metropolis were interviewed using a questionnaire. In-depth interviews were also conducted with 10 leaders of trader associations. There are slightly more females (51.2%) than male (48.8%) participants. The mean age was 42.9 years. The mean COVID-19 knowledge score is 9.4 out of 10. More females (9.5) than males (9.4) have higher mean knowledge score ($p=0.02$). Frequent hand washing with soap and water is the most frequently reported NPI adhered to (72.1%); the respective percentages that practiced physical distancing and wearing face mask are 44% and 33.3%. More females than males significantly practiced NPI ($p=0.01$). The main impact of lockdown measures include reduction in income (97.4%) and inability to restock items (79.1%). Most respondents (63.4%) reported that a member of their household skipped a meal due to lack of money to get food. Qualitative data reveal that a perception that COVID-19 was no longer a public health problem was responsible to the less-than-optimal adherence to NPI. The study participants are well informed about COVID-19, but many did not practice what they know. Female respondents had better knowledge and adherence to NPI. A gendered approach is recommended to motivate men for better adherence.

Keywords: *COVID-19, non-pharmaceutical interventions, informal sector, traders, Nigeria*

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INTRODUCTION

The COVID-19 pandemic is a global crisis. Infections with SARS-Cov-2, the cause of COVID-19, have been confirmed in virtually all countries and regions of the world. In Nigeria, the first case of COVID-19 was reported on February 27, 2020. As at end of March 2021, there were 162, 593 confirmed cases, 150, 308 recoveries and 2048 deaths (NCDC, 2021). However, these figures underestimate the true burden of infection because Nigeria is unable to conduct mass testing to detect persons that are asymptomatic for COVID-19 due to infrastructural and logistic constraints (NCDC, 2020).

In March 2020, the Nigerian government responded to the threat of COVID-19 by imposing several lockdown measures including closure of schools and markets, prohibition of events that attract mass gatherings such as weddings, burial ceremonies, and religious worships (Buhari, 2020; Ibrahim et al., 2020; Orjinmo, 2020) as part of efforts to control spread of the virus in the country.

Citizens were informed to adhere to Non-Pharmaceutical Interventions (NPI) proven (Odukoya et al., 2020) to prevent infection including frequent washing of hands with soap under running water, wearing face masks outside their homes, maintaining physical distancing, and practicing respiratory hygiene. Those employed in the formal sector of the economy were also advised to work from their homes.

These lockdown measures are unprecedented resulting in serious disruptions of the social and economic lives of citizens. Although the lockdown affected all citizens, those working in the informal sector of the economy, who own small businesses and earn daily income, were more vulnerable to the impact of the restrictions. Unlike their counterparts working in government and non-governmental organizations, most operators in the informal sector cannot work from home (UNECA, 2020) because they need to go to their shops daily and make face-to-face interactions with their clients to earn their income (Obiako, 2020).

The bulk of available COVID-19-related studies in Nigeria are knowledge, attitude, and practices surveys among online respondents (Adesegun et al., 2020; Reuben et al., 2020), patients (Edet et al., 2020) and the general population (Ilesanmi & Afolabi, 2020., World Bank, 2020). However, not enough is known about the knowledge, adherence to NPI and effects of COVID-19 lockdown among traders working in the informal sector. We present in this article results of a study designed to address these gaps in knowledge.

MATERIALS AND METHODS

The setting: The study was conducted in Alesinloye, a major market in Ibadan, a metropolis of 3.5 million persons in Oyo state, South West, Nigeria. Established by government in 1990, Alesinloye consists of 4,926 shops ranging in size between 5 × 10 feet and 10 × 10 feet (Ojifinni et al., 2018) and laid out in four sections by type of goods sold including clothing, jewelry, shoes, household utilities, foodstuff, paints, building materials, and meat. The market is opened for business six days a week (Monday-Saturday). The business activities of the traders in this market were seriously affected in March 2020 when the Oyo state government closed it as part of efforts to control spread of the virus in the state. The traders in the market are self-employed professionals who manage their own businesses in a shop and whose income depend on daily interactions with clients (Obiako, 2020). These persons acquire their skills through apprenticeship (Ajuwon et al., 2002) and play a significant role in the Nigerian economy, accounting for 65% of employment and the country's Gross Domestic Product (Bank of Industry, 2018). However, lack of government recognition, insurance, income insecurity, limited access to credit, are the major challenges affecting citizens working in this sector (Obiako, 2020; Meagre, 1995).

Study Design: A mixed method approach, consisting of administration of a questionnaire and in-depth interviews, was used for data collection. This approach was aimed at triangulating the variables of investigation that yielded both breadth and depth of data, offering valuable insights that will contribute to the COVID-19 prevention and control efforts in the state. Data collection occurred in October 2020.

The Quantitative Component

Sampling Procedures

The sample for the survey was estimated to be a minimum of 382 respondents. A simple random procedure was adopted for the selection of respondents. Trained interviewers randomly selected shops from each of the four sections of the market and each shop owner found on a day of visit was invited to participate in the survey. The fact that the market is well demarcated with a good road network and that each shop has an identified number, enabled interviewers to select a shop and prevented duplication of selection of shops and respondents. Of the 455 traders approached and invited to participate, 383 agreed, giving a response rate of 84%.

Procedure for data collection: Six trained interviewers conducted face-to-face interviews in Yoruba, the language

widely spoken in Ibadan, with selected respondents inside their shops. Face-to-face interviews was adopted because investigators envisaged that many of the potential study participants are low literate persons who may be more comfortable answering questions in Yoruba than in English. The training of interviewers focused on objectives of the study, interview techniques, inter-personal communication skills, knowledge about COVID-19, and ethical issues. Interviewers skills were verified during role play sessions.

Tool for data collection: The questionnaire had 30-items divided into four sections for ease of administration. Section A focused on the demographic profile while Section B consisted of questions on awareness of COVID-19, source of information, and knowledge of prevention measures. This section also included questions on citizens' satisfaction with the lockdown measures. In Section C, respondents were requested to report on their adherence to NPI including washing of hands with soap and water, use of face mask, and physical distancing, in the seven days preceding the survey. The options of responses for this section were 'most of the time', 'some of the time', 'rarely', 'never' and 'don't know'. Section D assessed the financial problems experienced and food security situation four weeks prior to the survey. The questionnaire had both open-ended and closed-ended questions and was first drawn in English and translated in Yoruba. It was an adaptation of the instrument used in iCare study (Lavoie, 2020) and the COVID-19 Impact Assessment developed by the Nigerian National Office of Statistics (NBS, 2020). A draft of the questionnaire was field tested in Mokola, a similar market in Ibadan, to verify interviewers' skills, clarity, and comprehension of questions by respondents.

The Qualitative Component: A purposive approach was used to select ten leaders from the local trader associations in the market with whom in-depth interviews were conducted. Trained interviewers conducted the interviews which were recorded on mobile telephones after approval was received from each participant. The guide used for the interview consisted of four generic questions focusing on knowledge of COVID-19, adherence to NPI, opinion on, and impact of the lockdown on business activities of traders.

Data Management and Analysis: Serial numbers were assigned to each of the administered questionnaire for easy identification and entry for analysis using the SPSS statistical software version 22. The analysis performed was descriptive and inferential. Respondents who provided correct answer on each of the ten questions on knowledge were assigned 1 point leading to the creation of a 10-point COVID-19 knowledge score. Higher scores indicate better knowledge. Respondents who reported that they adhered to each of 14 NPI statements 'most of the time' 'some of the time' and 'rarely' were assigned 3, 2, 1 point respectively leading to a 42-NPI score; higher score indicate better adherence. Mean scores were compared by demographic variables and significant values were subjected to regression analysis to further explore the associations between the variables.

With respect to qualitative data, the recordings from the in-depth interviews were first transcribed and analyzed using NVivo QSR 12.1 software. The authors read the transcripts and identified the themes that emerged after subjecting the data to content analysis. The themes were illustrated by verbatim quotations that describe the word-view of the interviewees.

Ethical Considerations: The University of Ibadan/University College Hospital Ethics Committee approved the study protocol (UI/EC/20/0392) prior to the commencement of data collection. Written informed consent was obtained from each participant after he/she was provided with information about the objectives of the study, that participation was voluntary, that information collected will be kept confidential and used only for research purposes. Anonymity was ensured because the questionnaire did not include any identifier such as name or telephone number. Each consenting participant was provided a 500 ml of liquid soap and a disposable medical face mask valued at approximately \$1 as incentive for participation. Physical distancing rule was applied during all interviews. Interviewers and study participants wore face mask and used hand sanitizers as appropriate.

RESULTS

Profile of study participants: The profile of the respondents is summarized on Table 1. There are slightly more females (51.2%) than male participants. Their mean age was 42.9 years; more than half (53.8%) had secondary education. The mean duration of years of trading is 17.4.

Knowledge about COVID-19: Virtually all (99.7%) of the respondents had heard about the virus; the radio was the primary source of information (55.5%), followed by television (24.3%), Facebook (16.8%) and newspaper (3.4%). The percentage of respondents with correct knowledge on three prevention measures of handwashing, physical distancing of 2 meters and use of face masks are 99.2, 98.2 and 99.5 respectively (Table 2).

The overall mean COVID-19 knowledge score of the participants is 9.4 out of 10. However, more females (9.5) than males (9.4) have higher mean score ($p=0.02$). None of the other demographic variables is significant when these were compared by knowledge.

Findings from the qualitative data indicate that interviewees are aware of the means of transmission of the virus. As one interviewee put it 'someone sneezes and does not do it into the elbow' and through 'coughing continuously', 'handshake, touching, hugging, and close contact' (Male tailor).

Evidence of knowledge of prevention are exemplified in the following quotes:

'We can prevent the spread of the virus by practicing proper hygiene, by being neat, keeping a neat surrounding... We should wash our hands regularly' (Male Butcher).

We can 'desist from a place where there are too many people' (Female Utensils Seller).

'We can prevent our self by using our nose mask' (Female Tailor).

Awareness of symptoms of the virus are illustrated by the following quotes:

'What I heard is sneezing, coughing and high body temperature, they said the temperature will be very high, sneezing and coughing continuously, the person will also be complaining of tiredness such a person will not be able to eat well and so on' (Male shoe seller).

'The symptoms are cold, cough, catarrh, headache, and high temperature, that is what I know' (Female Tailor).

Table 1
Sociodemographic profile of traders

Variable	Number	Percentage
Sex		
Male	187	48.8
Female	196	51.2
Age Group		
<30	54	14.2
30 – 39	96	25.3
40 – 49	120	31.6
50 – 59	66	17.4
>60	44	11.6
Mean Age: 42.9 ±12.2		
Type of Business		
Trading: Cloth	72	18.9
Trading	70	18.4
Plastics/plates		
Trading: Paints/paints materials	60	15.7
Food Stuff	33	8.7
Tailoring	32	8.4
Meat seller	27	7.1
Building Materials	22	5.8
Others*	65	17.0
Mean no of years in Business: 17.4 ±11.6		
Mean daily income: ₦48,665.30**		
Highest level of education		
No formal education	11	2.9
Primary school	95	24.8
Secondary school	206	53.8
Tertiary Education	71	18.5
Religion		
Traditional religion	3	0.8
Islam	169	44.1
Christianity	211	55.1
Ethnicity		
Igbo	80	20.9
Yoruba	295	77.0
Others	8	2.1
Marital Status		
Single	64	16.7
Married	296	77.3
Divorced	23	6.0

*Sale of cosmetics, bottles, frozen food.

**Approximately \$100

Table 2

Respondents with correct Knowledge of COVID-19 preventive measures

Preventive Measures	Percentage with correct knowledge
Hand washing with soap and water	99.2
Use of sanitizer	98.7
No Handshake/Physical greetings	97.3
Maintain enough distance at least 1-2 meters	98.2
Avoid Traveling	87.7
Use of face mask	99.5
Avoid crowded places	98.9
Avoid touching your face/nose/eyes	94.0
Coughing/sneezing into your elbow	93.7
Mean Score and Standard Deviation:	9.4 (1.1)
Range	0-10

Opinion about lockdown : When asked for their opinion on the prevention and control measures imposed by government, the majority (60.3%) reported that they are satisfied, 39.7% are not. More females (66.3%) than males (54.0%) are significantly ($p=0.01$) satisfied with government handling of the virus (Table 3). The regression models show that females are twice more likely than males to be satisfied with lockdown: those divorced were also twice more likely than never married and married participants to be satisfied with government handling of control measures (Table 4).

Most of the in-depth interviewees claimed that government has adequately handled the COVID-19 prevention and control measures in the country as illustrated by the following quotes:

'The measures put in place by the government is good. The government had the best interest of the people at heart when

putting down the measures. The relaxed lockdown has made it easier for us to go to our respective place of businesses to make sales' (Male Butcher).

'Very, very, effective. The people of Oyo State are cooperating, and our Governor is trying his best to make sure that the virus did not spread across to other towns' (Male Clothier).

'Well, it was very hard initially, but at the end of the day we discover it is to prevent us from sudden death and being affected suddenly by this virus' (Male Interior Decorator).

However, a few of the interviewees are not satisfied with the measures because of concern that government failed to provide relief package for traders. As one interviewee put it: *'My own opinion is that things that government supposed to do for us during the lockdown, we are just hearing about it, but it didn't get to us here. We heard of how they gave out things during the lockdown, but it did not get to us' (Male tailor).*

Adherence to non-pharmaceutical interventions

Table 5 shows reported adherence to NPI to prevent spread of COVID-19. Frequent hand washing with soap and water is the most widely reported NPI (72.1%); this is followed by physical distancing (44%), wearing face mask (33.3%), and coughing and sneezing into the elbow (14.4%).

Overall score for NPI adherence for the group is 16.7 (SD: 7.7) out of a maximum of 42. More females (17.7) than males (15.6) significantly adhered to NPI ($p=0.01$); older citizens aged ≥ 60 years had better adherence (17.9) than younger persons aged ≤ 30 years (13.6) ($p=0.03$). The regression model shows that more females adhered to the NPI while age disappeared in further analysis.

Table 3

Satisfaction with COVID-19 intervention measures by socio-demographic variables

Variable	Satisfied?			X ²	p-value
	Yes	No	Total		
Sex				6.06	0.014
Male	101 (54.0)	86 (46.0)	187		
Female	130 (66.3)	66 (33.7)	196		
Highest Level of education				17.8	0.00
No formal education	5 (45.5)	6 (54.5)	11		
Primary school	70 (73.7)	25 (26.3)	95		
Secondary school	126 (61.2)	80 (38.8)	206		
Tertiary Education	30 (42.3)	41 (57.7)	71		
Religion				19.9	0.00
Islam	123 (72.8)	46 (27.2)	169		
Christianity	106 (50.2)	105 (49.8)	211		
Traditional Religion	2 (66.7)	1 (33.3)	3		
Marital Status				10.6	0.005
Single	27 (42.2)	37 (57.8)	64		
Married	189 (63.3)	107 (36.1)	296		
Divorced	15 (65.2)	8 (34.8)	23		
Age group				14.9	0.05
<30	26 (48.1)	28 (51.9)	54		
30 - 39	53 (55.2)	43 (44.8)	96		
40 - 49	69 (57.5)	51 (42.5)	120		
50 - 59	45 (68.2)	21 (31.8)	66		
>60	36 (81.8)	8 (18.2)	44		

Table 4

Logistic regression on satisfaction with COVID-19 intervention by the government

Variable		UOR* (95%CI) p	AOR** (95%CI) p
Sex	Male*	1	1
	Female	1.7 (1.1-2.5) 0.01	2.1 (1.3-3.3) 0.002
Highest Level of education	No formal education*	1	-
	Primary/Elementary school	3.4 (0.9-11.9) 0.6	-
	Secondary school	1.9 (0.6 –6.4) 0.3	-
	Tertiary Education	0.8 (0.2 – 3.1) 0.8	-
Religion	Islam*	1	1
	Christianity	0.5 (0.2–0.6) 0.0	0.3 (0.2–0.5) 0.0
	Traditional Religion	0.7 (0.06–8.4) 0.8	0.5 (0.05–6.4) 0.6
Marital Status	Single*	1	1
	Married	2.4 (1.4–4.2) 0.002	2.0 (1.1–3.6) 0.02
	Divorced	2.6 (0.9–6.9) 0.062	2.3 (0.8–6.4) 0.1

*UOR: Unadjusted Odd Ratio, **AOR: Adjusted Odd Ratio

The qualitative data provides some clues into why many participants do not adhere to the NPI. According to the interviewees, the general belief is that COVID-19 is no longer a public health concern in the country. As one participant explains:

‘You know our people, when something just happens afresh and its prevalent, our people will over-do, I saw someone in this market in the earlier days of coronavirus that used face mask and face shield, but when the pandemic died down and

we were relieved, people forgot to continue the use of the facemask’ (Female Utensils Seller).

Another interviewee said that:

‘It’s only the pandemic that made it compulsory for traders to use facemask, and once the pandemic has gone, why do we want to discomfort ourselves?’ (Male Interior Decorator).

The inconvenience involved in use of face mask and perceived exorbitant cost of hand sanitizer were also identified as disincentives for their use as exemplified in the quotes below: ‘People are using face masks, it’s not as though they aren’t using face masks, but the reason is because breathing while wearing face mask is not convenient and easy (Male Butcher).

‘Some people are using it, but many are not using it because they cannot afford it, is it people that are yet to get money to buy food (garri) that would buy hand sanitizer to use? You know how food is now expensive’ (Male Butcher).

‘We were not used to it.... the hand sanitizer is at a high cost and there is no money’ (male Interior Decorator).

The main reason why people do not sneeze into their elbow is the fact that it is a new behavior which people are not familiar with. As one interviewee explains,

‘We normally use our hands when we wanted to cough, before coughing into the elbow will become a custom, it will take a lot of time all what is happening and these precautions we were not used to them before, gradually we will be used to it and normally it is to our own advantage, if you are used to it’ (Male Interior Decorator).

‘You see, so many people are not used to sneezing in the elbow. Many believe if they can only sneeze into their handkerchief, there is no problem... People don’t really fancy sneezing into elbow’ (Male Tailor).

Table 5

Reported adherence to non-pharmaceutical intervention by traders in Ibadan.

Action/Behavior	Frequency of adherence in 7 days preceding survey			
	Most of the time N (%)	Some of the time N (%)	Rarely N (%)	Never N (%)
Hand washing with soap and water	276 (72.1)	69 (18.0)	29 (7.6)	9 (2.3)
Using hand sanitizer	133 (34.7)	132 (34.5)	71 (18.5)	47 (12.3)
Wearing a face mask	129 (33.3)	152 (39.8)	66 (17.3)	35 (9.2)
Coughing/sneezing into your elbow	83 (21.8)	59 (15.5)	41 (10.8)	198 (51.9)
Coughing/sneezing into a tissue, throwing it away and washing your hands	55 (14.4)	55 (14.4)	47 (12.2)	226 (59.0)
Staying at least 1-2 meters away from other people	168 (44.0)	140 (36.6)	42 (11.0)	32 (8.4)
Staying/working at home rather than going to shop	14 (3.7)	12 (3.1)	25 (6.5)	332 (86.7)
Self-isolating if you are returning from a trip	34 (8.9)	6 (1.6)	17 (4.4)	326 (85.1)
Self-isolating if you have or believe you have the virus	28 (7.3)	3 (0.8)	7 (1.8)	346 (90.1)
Avoiding going out to bars/pubs	93 (24.3)	20 (5.2)	19 (5.0)	250 (65.5)
Avoiding going to restaurants	91 (23.8)	27 (7.0)	39 (10.2)	226 (59.0)
Avoiding all social gatherings such as church and mosque services	51 (13.3)	57 (14.9)	125 (32.6)	150 (39.2)
Avoiding any non-essential travel	138 (36.1)	11 (2.9)	23 (6.0)	210 (55.0)
Avoid using public transportation	68 (17.8)	69 (18.1)	90 (23.6)	155 (40.5)

Table 6
Reported adherence to non-pharmaceutical interventions among traders

Variable	N	Mean	SD	Test statistics	p-value
Sex					
Male	183	15.6	7.4	2.6	0.01
Female	192	17.7	7.9		
Highest Level of education					
No formal education	10	19.6	6.7		
Primary/Elementary school	91	16.2	7.7	0.8	0.5
Secondary school	203	16.5	7.9		
Tertiary Education	71	17.3	6.7		
Religion					
Islam	163	16.8	8.2	0.07	0.9
Christianity	209	16.5	7.3		
Traditional Religion	3	16.0	11.0		
Marital Status					
Single	64	14.9	7.7	2.01	0.1
Married	289	17.1	7.7		
Divorced	22	16.4	6.3		
Age group					
<30	54	13.6	7.6		
30 - 39	93	17.1	6.9		
40 - 49	118	17.0	7.7	2.6	0.03
50 - 59	65	17.1	8.6		
>60	42	17.9	7.5		
Ethnic Group					
Yoruba	287	16.4	7.8	0.8	0.4
Igbo	80	17.3	7.3		
Others	8	18.9	5.8		

The interviewees gave three suggestions that may improve adherence with NPI. The first suggestion is that government should intensify public enlightenment so that ‘People can be encouraged through adverts, through media, we need to be sensitized, to be educated more (Male Interior Decorator).

Second, face masks and hand sanitizers should be distributed in the market. As one interviewee puts it ‘if you

bring it to this market now and distribute it accordingly, you will see that traders will use it’ (Female Utensils Seller).

Third, use of force may be needed. According to one interviewee ‘law enforcement agency should be looking into cars and drivers should ensure that they don’t transport those that do not use face mask.... The awareness has died down.... The government should still create more awareness and ask buyers to desist from buying things from any trader who does not provide hand sanitizer and who does not use face masks’ (Female Pot Seller).

Impact of lockdown on business and food security

Virtually all the respondents (95.6%) confirmed that they experienced low business activities because of the lockdown. The main financial difficulties experienced include reduction in income (97.4%) inability to restock items (79.1%) difficulties with payment of daily contributions (76.1%) (Figure 1). Concerning food insecurity, 63.4% reported that a member of their household skipped a meal because there was not enough money or other resources to get food; 55.1% ran out of food and 8.9% reported that a member of their household did not eat for the whole day.

The qualitative data indicate the dimensions of the challenges traders encountered due to the lockdown. The following quotes are illustrative of the problems citizens experienced:

‘People are not going to work and have resorted to begging, in my street in Felele they are plenty there like water, there are three men going from house-to-house begging for food, they will collect food from “aiyefele” (Fresh FM CEO), collect from Lagelu. Market is not selling and moving as before, we put things down, we didn’t see people to come and buy there is no money to spend, there are wares to sell, but people are not buying, our customers that we are calling said they are under lockdown; they are not going out ooo and as such no money’. (Female Pot Seller).

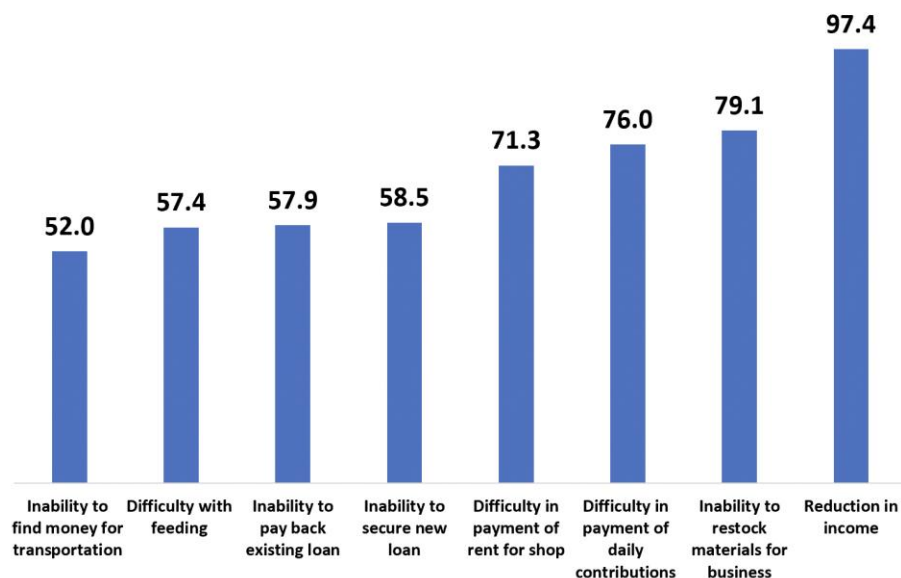


Figure 1
The financial difficulties experienced by traders due to the lockdown

'Challenges people faced in adopting the measures are many such as hunger, lack of income. Out of which people were expecting support from government but there was none, and this is not good enough, people faced a lot of challenges of lack, it affected business a lot, may God have mercy' (Male Tailor).

DISCUSSION

Knowledge and understanding of COVID-19 as a disease condition, mode of spread and prevention was generally high among the study participants. Previous authors have reported similar findings among different Nigerian population including online respondents (Adesegun et al., 2020; Ekpeyong et al., 2020; Reuben et al., 2020) and those interviewed in households (World Bank, 2020). This is an indication of the effectiveness of public enlightenment programming on COVID-19 through the social and traditional media. This intervention need to be sustained to keep the population informed about the risk posed by the virus and that individuals should take personal responsibility for preventing infection. However, unlike previous studies (Adesegun et al., 2020; Reuben et al., 2020) in which the social media was found to be the primary source of information, the majority of the participants in the current study relied on the radio as their major source of information about the virus. There are two possible explanations for this finding. First, unlike online survey respondents many of whom have tertiary education (Reuben et al., 2020), the majority of respondents in the current study have secondary education and as a result rely on radio as their primary source of information. Secondly, the portable nature of the transistor radio make it a popular source of information that enables participants to listen to it virtually anywhere including inside the shop.

Despite the hardship encountered, the majority of participants were satisfied with the lockdown imposed by government to control the spread of the virus in the country. This is encouraging as it indicates citizens understanding of the seriousness of the problem. The fact that lockdown measures is the standard response of most governments in many countries including those in Africa may have contributed to the understanding of the citizens on these measures. However, the concern expressed by participants that government did not provide any support to cushion the impact of the lockdown is also legitimate because remote working from homes was not an economically realistic option for citizens working in the informal sector.

Adherence to NPI is less than optimal because not enough respondents used face mask or practice physical distancing. Findings on use of face mask in the Nigerian population have been inconsistent since the beginning of the pandemic. For example, Adesegun and colleagues (2020) reported that only 23% respondents used face mask in a study conducted in April/May of 2020, the World Bank (2020) reported 61% of members of households used this device most of the time in July of the same year. This inconsistency reflects pandemic fatigue, a reduction in motivation to adhere to NPI, due to low perception of risk to COVID-19 infection in the country. This perception may have been fostered by the fact that government had already lifted most of the restrictions when the study was

conducted. However, this perceived low risk is problematic because Nigeria is experiencing a second wave of infection with reported higher infection rates and severity in mortality (NCDC, 2021). The implication is that there is need to intensify educational interventions to promote consistent adherence to all NPI.

Females have superior knowledge and better adherence to NPI. Similar results have been reported among Saudi (Alshammary et al., 2020) and Bangladeshi (Ferdous et al., 2020) women. There are gender dimensions to COVID-19 testing, adherence to NPI, infection, hospitalization, and deaths. Globally, more females than males have been tested for COVID-19, but more males than females have been hospitalized and have died from infection (Global Health 50/50, 2021). Furthermore, women are more likely than men to adopt preventive measures (Ferdous et al., 2020) including abstinence from smoking (Guindon & Boisclair, 2003) and use of seat belts (Sangowawa et al., 2015). The possible explanations are the fact that women have greater access to health care system and thus exposed to frequent health information resulting in the higher motivation to practice the knowledge they have acquired. These data underscore the need to adopt a gendered approach to COVID-19 educational programming in the country.

The lockdown exerted severe impact on the trading and household food security among study participants. Previous surveys found similar reports of impact of the lockdown on food insecurity in Nigeria (World Bank, 2020) as well as in Ghana (Adom et al., 2020). Government and other agencies urgently need to implement welfare and safety nets programs including food distribution and financial assistance to support Nigerian households to survive the impact of the COVID-19 crisis in the country (World Bank, 2020). The interventions are particularly necessary for the population working in the informal sector who make face-to-face interactions with clients daily to earn their income. However, implementing meaningful programs among this population is fraught with many potential challenges due to lack of appropriate statistics of the number of persons working in this sector. To overcome this challenge, government need to work with NGOs that have direct contact with traders and are better positioned to offer help that will meet the immediate needs of the populations working in this sector. Government can also use the existing social organization among different categories of traders in the markets to develop appropriate intervention package for this population. For example, traders in the market organize themselves into local affiliates of national associations with well-defined leadership structure. Some of such associations include those for tailors, shoemakers, patent medicine vendors, beauticians, and hairdressers, among others. Although membership of these associations is voluntary majority of traders join them because the association provide economic support, play self-regulating, and mentoring roles for their members (Liu et al., 2016).

We acknowledge the limitations of our study. The study focused only on traders in one market in Ibadan. Although Alesinloye is one of the biggest markets in Oyo state, findings from this market may not be generalized to other markets in the state or in Nigeria. Data on adherence to NPI are self-

reported and may be subject to recall bias. However, the fact that we used both quantitative and qualitative methods have contributed to the reliability of both data.

In conclusion, most of the study participants are well informed about COVID-19, but adherence to NPI is less than optimal. Female respondents had better knowledge and adherence suggesting that a gendered approach will be needed to reach men with appropriate interventions. Interventions are urgently needed to cushion the impact of lockdown measures on trading activities and food security among traders working in the informal sector.

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