

RESEARCH ARTICLE

REVISOR **COVID-19 pandemic, psychological response to quarantine, and knowledge of the disease among inmates in a Nigerian custodial center [version 2; peer review: 1 approved, 1 approved with reservations, 1 not approved]**

Johnson Okoro ¹, Tobechukwu Odionye ², Benedicta Nweze²,
Martins Onuoha¹, Chinenye Ezeonwuka³, Jude Owoh ⁴, Joel Nkire²

¹Health and Welfare/Mental Health Department, Nigerian Correctional Service, Enugu, Enugu State, 40001, Nigeria

²Department of Clinical Services, Federal Neuropsychiatric Hospital, New Haven, Enugu State, 40001, Nigeria

³Information Office Department, Project Development Institute, Emene, Enugu State, 40001, Nigeria

⁴Department of Basic Sciences, Quinnipiac University, Connecticut, Connecticut, United States

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Abstract

This was a cross-sectional study to assess the psychological response to quarantine during COVID-19 pandemic and knowledge level about the disease among inmates of a Custodial Center in Enugu, Nigeria. A total of 66 new prison inmates were assessed for psychological distress using the Kessler Psychological Distress Scale (K10); and inmates' knowledge about COVID-19 using a COVID-19 Knowledge Questionnaire developed by the researchers. Participants had a mean age of 28.39±8.71 years; 63 (95.5%) were male inmates and 3 (4.5%) were female inmates. Sixty-one (92.4%) were awaiting-trial inmates, 43 (65.1%) had psychological distress, and 35 (53%) had completed at least secondary school. COVID-19 questionnaire mean score was 3.82±3.33. Thirty-one (21.8%) had adequate knowledge of COVID-19 (7-10 score), while 35 (53%) and 10 (15.2%) had poor (0-3) and average (4-6) knowledge, respectively. Adequate COVID-19 knowledge level was significantly higher among those that completed at least secondary school (48.6%) than those who did not (12.9%). Though not statistically significant, adequate COVID-19 knowledge level was commoner among those without psychological distress (43.5%) than those with psychological distress (25.6%).

Considering responses to specific questions contained in the questionnaire, knowledge about some questions was relatively high. For example, a majority of the participants 45 (68.2%) correctly responded that death can be a complication of COVID-19; whereas half of them 33 (50%) correctly responded that regular hand washing

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1. **Li Li**, University of Alabama at Birmingham, Birmingham, United States
2. **Paolo Roma** , Sapienza University of Rome, Rome, Italy
3. **Ahmed K. Ibrahim** , Assiut University, Assiut, Egypt

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with soap and water can help prevent the spread of the disease. Nevertheless, responses to some questions showed poor knowledge about the disease as 18 (27.3%) correctly answered that COVID-19 can affect the lungs, while 20 (30.3%) correctly responded that COVID-19 is caused by a virus.

Our study highlighted the need to have all quarantined persons educated about the disease for which they are being quarantined. It also provided the opportunity to raise awareness of COVID-19 among the inmates.

Keywords

Prison, Custodial center, Nigeria, COVID-19, Psychological distress



This article is included in the [Coronavirus \(COVID-19\)](#) collection.

Corresponding author: Johnson Okoro (doctordoctorjay@gmail.com)

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REVISED Amendments from Version 1

This second version differs from the first one in the following ways:

First, the introduction was overhauled to be more specific to the examined variables as contained in the objectives of the study.

Second, Table 3 was completely replaced; while Table 1 was modified to include a row for the categorized COVID-19 knowledge level. In the old table 3, COVID-19 knowledge level was not categorized. However, the new Table 3 and the modified Table 1 show categorization of COVID-19 knowledge level into poor, average and adequate; where poor knowledge is a score ranging from 0–3, average is for score ranging from 4–6, and adequate for a score of 7–10.

Third, there was also a major re-writing of the discussion segment to reflect the objectives of the study.

Finally, recommendation was included and new references added.

Any further responses from the reviewers can be found at the end of the article

Introduction

Coronavirus disease 2019 (COVID-19) is a novel viral disease caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), with clinical features including cough, fever, weakness, nasal congestion, difficulty with breathing, diarrhea, lung and other organ damage, and death in some cases (Wang *et al.*, 2020b). While the cause of early cases of the disease has been linked to transmission from animals such as bats and cats, later cases have indicated human to human transmission through respiratory droplet and close contact (Adhikari *et al.*, 2020; Hassan *et al.*, 2020).

According to the World Health Organization (WHO), COVID-19 is a pandemic (WHO, 2020b), and a public health emergency of international concern (WHO, 2020c). Globally, nations have adopted various preventive measures, in line with WHO guidelines, to reduce the spread of the virus. One of such public health control measures is to place people on quarantine (WHO, 2020a), and this is a way of preventing the spread of a disease outbreak by restricting activities or separating people who are not ill but may have been exposed to the disease (CDC, 2004).

In addition to the public health concerns raised by the outbreak of COVID-19, the negative mental health effects are tremendous and worrisome. A disease outbreak as well as an infection control measure such as quarantine has overwhelming effects on people's mental health. Findings in the general population have demonstrated relationship between quarantine, disease outbreak, and psychological distress (Bai *et al.*, 2004; Chatterjee & Chauhan, 2020; El-Zoghby *et al.*, 2020; Taylor *et al.*, 2008).

In one study that assessed the impact of COVID-19 pandemic on mental health and social support in the general population in Egypt, there was a high negative psychological effect of COVID-19 outbreak (El-Zoghby *et al.*, 2020). In

another study which was a national survey of the associated factors of psychological responses and distress among Italian people during the COVID-19 pandemic, a high prevalence of psychological distress was associated with quarantine. It was further found that factors such as female gender, being young, detachment and negative affect domains of personality trait, and a history of stressful situation and medical problems contributed to the observed high level of psychological distress (Mazza *et al.*, 2020).

Furthermore, Hawryluck *et al.* (2004) found that the psychological effects of quarantine range from depression to anxiety and other emotional disturbances. These findings have been replicated in another study in which quarantine was observed to be associated with psychological distress and other behavioural problems (Dong & Bouey, 2020; Robertson *et al.*, 2004).

Though literatures on the mental health effects of quarantine and disease outbreak in custodial centers are scarce, one study found that psychological distress is more prevalent when the quarantine takes place in institutional setting such as custodial centers (Pfefferbaum & North, 2020).

Fear, financial stress, work stress (El-Zoghby *et al.*, 2020), loss of freedom, loneliness, strangeness of the disease, uncertainty surrounding the disease, and inadequate information about the disease (Brooks *et al.*, 2020) are some of the unpleasant experiences of disease outbreak and quarantine; and these increase the vulnerability to anxiety, depression, and other symptoms of psychological distress (Brooks *et al.*, 2020; El-Zoghby *et al.*, 2020).

Having knowledge and awareness of a disease outbreak can give a sense of relaxation which may further reduce the psychological distress that may be associated with it (El-Zoghby *et al.*, 2020). This is further supported by Mishra *et al.* (2016) in which it was found that health care workers have a lower level of psychological distress; and this was attributed to their high level of awareness, knowledge, and attitude during the outbreak. The role of adequate information and knowledge about a disease outbreak in reducing the negative impact of the disease on mental health has been further buttressed in a survey that assessed stress reactions among health care workers involved with the SARS outbreak (Bai *et al.*, 2004).

Studies have also shown that people who have adequate information and knowledge about COVID-19 pandemic are less likely than others to develop psychological distress (Wang *et al.*, 2020a). Similarly, it has been reported that during disease outbreak, inadequate information and knowledge about the disease is associated with psychological distress among quarantined persons (Johal, 2009).

Following the announcement of the index case of COVID-19 in Nigeria on 27th February 2020, and the increasing spread of the disease, the National Judicial Council suspended all court activities on the 24th of March 2020, with the

exception of cases that are urgent, essential, or time-bound (Nigeria's COVID-19 Regulation, 2020; Yahaya, 2020). Therefore, while the nation was on lockdown, a few of these exceptional cases were arraigned in court and then remanded in custody.

Considering that the COVID-19 status or a history of exposure to the disease could not be ascertained among these new inmates, there was a great need for them to be quarantined for 14 days. When it became obviously difficult to effectively and appropriately quarantine new inmates in custodial centers across the nation, the Controller-General of the Nigerian Correctional Service in collaboration with other arms of the justice system, completely suspended the remand of all inmates in the custodial centers on the 8th of April, 2020. Consequently, new inmates were no longer remanded in Enugu Custodial Center (*Nigerian Correctional Service*).

Objectives

Knowledge about inmates' psychological responses to quarantine will help in early identification and intervention to those that are vulnerable to developing psychological problems after the quarantine period. Hence the need for this study that aimed at: (1) assessing the level of knowledge about COVID-19 pandemic among quarantined inmates (2) determining the level of psychological distress among quarantined inmates (3) evaluating the relationship between level of Knowledge about COVID-19 and psychological distress (4) and to evaluate the relationship between COVID-19 knowledge and demographic variables.

Methods

Ethical considerations

Permission and approval for this study was obtained from the Nigerian Correctional Service. The objectives of the study were explained to all the participants, and they were assured of confidentiality of their information. They were made to understand that they could withdraw from participation in the study at any time without being victimized. They were then asked to provide their answers voluntarily after giving their consent.

Study design and setting

This was a cross-sectional study conducted in Enugu Maximum Security Custodial Center, located in Enugu metropolis, South East Nigeria. It has a statutory capacity for 638 inmates (Okoro *et al.*, 2018). However, at the time of this research, the number of inmates fluctuated between 2,041 and 2,088, including the 46 female inmates. While two cells were made available for the purpose of quarantining new male inmates, one cell was provided in the female wing for this purpose.

Participants

Two cells in Enugu Custodial Center which were hitherto occupied by old inmates were emptied and reserved for the purpose of quarantining new male offenders remanded in custody. Similarly, one cell was made available for new female inmates. During this period, these new inmates were quarantined and restricted from having contact with other inmates. Hence, two cells were used to quarantine all 63 male inmates, while one

was used for all 3 female inmates. All male inmates remanded in custody between 24th and 31st March, 2020 were quarantined in the first cell, while those remanded between 1st and 8th April, 2020, were quarantined in the second cell. The 14-day count for each cell began on the last day of the week for each quarantine cell (i.e., 31st March for the first cell, and 8th April for the second cell).

The three female inmates in this study were remanded between 24th and 31st March, 2020. Hence, they were all kept in one quarantine cell in the female wing of the custodial center.

Upon arrival at the quarantine cells, the reason for the quarantine and the number of days (14 days) it would last was explained to the inmates; and at completion of the 14-day quarantine, all the inmates in a particular quarantine cell appeared before the custodial center's admission board for the usual admission process for all new entrants brought to the custodial center. This process entails the proper documentation of inmates' information, allocation of cells, and other administrative processes. Thereafter, they were taken to the clinic of the custodial center where the interview was conducted.

All 66 inmates (34 in the first week, and 32 in the second week) that completed the 14-day quarantine gave their consent to participate in the study after the objectives were explained to them. They were made to understand that they could withdraw from participation in the study at any time without being victimized. In order to minimize frequent contact between the researchers and the participants, the instruments (The socio-demographic questionnaire and K10) were interviewer administered and were read aloud for each participant to indicate the answer as it applied to him/her. Additionally, for the purpose of privacy and confidentiality, this was done for one participant at a time in the consulting room of the clinic.

Inclusion criteria were all new inmates that completed the 14-day quarantine and gave consent to participate in the study. Exclusion criteria were inmates with florid psychosis and those with severe physical illness. However, no participant was excluded for the study as none met the criteria for exclusion.

Variables

The outcome variable in our study was the level of knowledge about COVID-19 which was measured on a continuous scale; whereas demographic variables and psychological distress were the independent variables which were categorical variables.

Measurement

Socio-demographic questionnaire

A socio-demographic questionnaire (see *Extended data; Okoro, 2020*) designed by the researchers has two sections (A and B) which were used for data collection. Age, marital status, highest level of education, previous prison remand, and the number of days spent in police jail were the variables contained in "Section A" of the socio-demographic questionnaire.

“Section B” contained questions that assessed each participant’s knowledge about COVID-19. The development of the “Section B” was guided by the survey of [Zhong *et al.* \(2020\)](#). Pilot-testing was done on 10 randomly selected inmates of the custodial center that were not part of the main study. Ambiguous questions noted during the testing were modified to obtain the final version of the COVID-19 knowledge questionnaire. It contains 10 items measuring the respondents’ knowledge about COVID-19 in 6 domains: aetiology (B1 and B2), transmission (B3 and B4), symptoms (B5), complications (B6 and B7), treatment (B8), and prevention (B9 and B10). The responses to each item of the questionnaire are “yes,” “no,” and “I do not know.”

A correct answer has a score of 1, while a wrong or “I do not know” response has a score of 0. Therefore, the total score ranged from 0 to 10; and a higher score indicates a greater knowledge of the disease. Our study further categorized COVID-19 knowledge into three groups of poor knowledge (total score of 0–3), average knowledge (4–6), and adequate knowledge (7–10). A Cronbach’s alpha of 0.89 was obtained on test of reliability (internal consistency) of the questionnaire, and this is within acceptable range.

Kessler Psychological Distress Scale (K10)

This is a 10-item self-reported or interviewer administered questionnaire used to screen for psychological distress. Each item score ranges from 1 (none of the time) to 5 (all of the time); hence, a minimum score of 10 and a maximum of 50 can be obtained. A higher score indicates more psychological distress such that a score of 10–19 means the respondent is likely to be well; 20–24 indicates mild distress, 25–29 indicates moderate distress, while 30–50 indicates severe distress ([Andrews & Slade, 2001](#); [Kessler *et al.*, 2002](#)). The K10 scale has been used in the prison population ([Ibrahim *et al.*, 2015](#)).

Given that the assessment was for the period of two weeks the participants had stayed in custody, the present study adopted the Kessler Psychological Distress Scale (K10) with a slight modification of the opening sentence to reflect the duration. Therefore, the opening sentence for all the 10 items on the scale started with “In the past two weeks.” This was against the usual opening sentence of “In the past four weeks.”

For example, an item on the scale which read “In the past four weeks, about how often did you feel nervous?” was modified to read “In the past two weeks, about how often did you feel nervous?”

Statistical analysis

Data analyses were done using the Statistical Package for Social Sciences (SPSS) statistical software, version 20. Results were presented in frequency table; and a chi-square-test was used to determine the association between COVID-19 Knowledge Questionnaire and the independent variables. The significant value was set at $p < 0.05$.

Results

Participant backgrounds

[Table 1](#) shows the characteristics of all 66 participants. In total, 63 (95.5%) of them were male inmates, while the remaining 3 (4.5%) were female inmates. The mean age and mean score of COVID-19 knowledge were 28.39 ± 8.71 and 3.82 ± 3.33 , respectively. A total of 35 (53%) of the participants had poor knowledge of COVID-19, while only 21 (31.8%) had adequate knowledge. Of the participants, 14 (21.2%) were recidivists, and 61 (92.4%) were awaiting-trial inmates. A total of 23 (34.9%) had no psychological distress, while 20 (30.3%), 14 (21.2%), and 9 (13.6%) had mild, moderate, and severe psychological distress, respectively.

Table 1. Demographic, forensic, and other characteristics of the participants.

Socio-demographic variables	N=66	Percentage	Mean±SD
Mean age			28.39±8.71
Gender			
Male	63	95.5	
Female	3	4.5	
Marital status			
Never married	36	54.5	
Married	21	31.8	
Separated/divorced/widowed	9	13.7	
Level of education			
primary school is the maximum	17	25.8	
did not complete secondary school	14	21.2	
completed sec or tertiary school	35	53.0	
Prison category			
Awaiting-trial inmates	61	92.4	
Sentenced inmates	5	7.6	
Recidivist			
Yes	14	21.2	
No	52	78.8	

Socio-demographic variables	N=66	Percentage	Mean±SD
Kessler's scale			
well	23	34.9	
mild distress	20	30.3	
moderate distress	14	21.2	
severe distress	9	13.6	
Time jailed in Police			
before COVID-19 index case in Nig	29	43.9	
after COVID-19 index case in Nig	37	56.1	
Time spent in Police jail (days)			32.20±34.41
Minimum	0		
Maximum	180		
Knowledge of COVID-19			
Poor (score of 0–3)	35	53.0	
Average (score of 4–6)	10	15.2	
Adequate (score of 7–10)	21	31.8	
Knowledge of COVID-19			3.82±3.33

N=total number of participants; S.D=Standard deviation. Nig=Nigeria

Participant knowledge about COVID-19

Table 2 shows the responses of the participants to COVID-19 knowledge questionnaire. A majority of the participants (68.2%) correctly responded that death can be a complication of COVID-19. Half of them (50%) correctly responded that regular hand washing with soap and water can help prevent the spread of the disease. A little above one-quarter (27.3%) correctly answered that COVID-19 can affect the lungs, and less than one-third (30.3%) correctly responded that COVID-19 is caused by a virus. Individual-level answers to each question are available as *Underlying data* (Okoro, 2020).

Associations between knowledge of COVID-19 and other measured variables

COVID-19 knowledge was divided into three groups of poor knowledge (total score of 0–3), average knowledge (4–6), and adequate knowledge (7–10). Table 3 shows the relationship between the groups and other variables. Education was significantly associated with COVID-19 knowledge as 17 (48.6%) of those who completed at least secondary school had adequate knowledge of the disease; whereas it was 4 (12.9%) among those who did not complete secondary school.

Ten (43.5%) of those without psychological distress had adequate knowledge, while it was 11 (25.6%) among those with psychological distress. Additionally, 10 (34.5%) of those who were already in police jail before the index case of the disease was announced in Nigeria had adequate knowledge of the disease, while it was 11 (29.7%) among those who were arrested and brought to police jail after the index case.

Discussion

COVID-19 is a high infectious disease that is currently ravaging the world and has led to threat and loss of lives. Its novelty and high transmission rate remain a major concern; as a result, information about it is speedily and recently being gathered through research (Adhikari *et al.*, 2020; Hassan *et al.*, 2020). Our study showed that the overall and specific knowledge about

COVID-19 is poor among prison inmates, and this is lower than the knowledge level of COVID-19 among the general population in Nigeria, India and China. (Ayinde *et al.*, 2020; Bhagavathula *et al.*, 2020; Zhong *et al.*, 2020). For example, only 21 (31.8%) of our participants had adequate knowledge about COVID-19, and this is far lower than the knowledge level of 78.6% among health care workers in Nigeria (Ayinde *et al.*, 2020).

Several explanations may be attributed to these differences. First, the participants in our study had lower educational qualification compared to those in India and Nigeria where the participants were health care workers, who unsurprisingly, should have more exposure and access to information regarding COVID-19. Second, the study in China was an online survey, and the participants' ability to use the internet requires a certain level of intelligence. Hence, it is likely that the participants in the study in China have a higher level of intelligence than our participants.

On the factors associated with adequate knowledge about COVID-19, our study found that adequate knowledge of COVID-19 was significantly higher among those who had higher educational level. This replicates the findings of a study among health care workers in Nigeria in which adequate knowledge of COVID-19 was higher among doctors and nurses when compared with others (Ayinde *et al.*, 2020). This may be explained by the fact that knowledge is believed to be founded upon the gathering of information through education (Bilge & Keskin, 2014; Sani *et al.*, 2016).

Quarantine, together with other factors such as fear of the disease and overcrowding associated with it can result in a high level of psychological distress among people during disease outbreak (Blendon *et al.*, 2004; Blendon *et al.*, 2006; Pfefferbaum & North, 2020; Robertson *et al.*, 2004). Psychological distress was found in 43 (65.2%) of our participants, and this is higher than the 34% reported in Australia (Taylor *et al.*, 2008) using the same scale

Table 2. Knowledge of COVID-19 among quarantined inmates in custodial center.

	Questions	Wrong answer n(%)	Correct answer n(%)
B1	COVID-19 is believed to have originated from animal	46(69.7)	20(30.3)
B2	COVID-19 is caused by a virus	46(69.7)	20(30.3)
B3	COVID-19 is transmitted by respiratory droplet and close contact	37(56.1)	29(43.9)
B4	COVID-19 can be transmitted from human to human	35(53.0)	31(47.0)
B5	Cough is one of the symptoms of COVID-19	35(53.0)	31(47.0)
B6	COVID-19 can affect the lungs	48(72.7)	18(27.3)
B7	COVID-19 can lead to death in some cases	21(31.8)	45(68.2)
B8	COVID-19 has a cure	62(93.9)	4(6.1)
B9	COVID-19 can be prevented by regularly washing of hands with soap and water	33(50.0)	33(50.0)
B10	For new entrants (including new inmates) into a community, placing them on quarantine for 14 days may help prevent the spread of COVID-19	45(68.2)	21(31.8)

Table 3. The association between COVID-19 knowledge level and participants' variables.

VARIABLES	COVID-19 LEVEL OF KNOWLEDGE			X ²	p-value
	poor (0–3) n (%)	average(4–6) n (%)	adequate(7–10) n (%)		
Psychological distress				2.18	0.33
No	10 (43.5)	3 (13.0)	10 (43.5)		
Yes	25 (58.1)	7 (16.3)	11 (25.6)		
Education				17.94	<0.01
pry/sec school drop-out	25 (80.6)	2 (6.5)	4 (12.9)		
completed sec or tertiary sch	10 (28.5)	8 (22.9)	17 (48.6)		
Age (years)				0.65	0.73
Less than 30	23 (54.8)	7 (16.7)	12 (28.5)		
30 and above	12 (50.0)	3 (12.5)	9 (37.5)		
In police jail				1.84	0.40
Before index case	13 (44.8)	6 (20.7)	10 (34.5)		
After index case	22 (59.5)	4 (10.8)	11 (29.7)		

n=number; pry=primary; sec=secondary; sch=school; %=percentage.

(K10) to measure anxiety. Some of the explanations for the difference are; first, the prison population is associated with overcrowding, fear, and loss of freedom and privacy, which may likely heighten the level of stress, therefore, increasing the rate of psychological distress (Okoro *et al.*, 2018). Second, social support from family members and friends has been found to be protective against psychological distress. The participants in our study lacked complete social support from their family members and friends during the quarantine period as visitors were not allowed into the custodial center during this period; whereas those in the Australian study were not completely separated from their family members.

With respect to the relationship between psychological distress and knowledge about the disease, we found that adequate knowledge about COVID-19 was higher among those without psychological distress than among those with psychological

distress. This is similar to previous research findings where adequate knowledge and information about a disease outbreak was associated with better appraisal and emotional response (Blendon *et al.*, 2004; Wang *et al.*, 2020b).

Finally, we observed that those that were already in police jail before the COVID-19 index case in Nigeria were more knowledgeable about the disease than those that were brought to police jail after the index case. With the announcement of the index case and subsequent increase in the spread of the disease, there was great emphasis on decongestion of detention centers. This may have afforded the inmates already in police jail the opportunity of having access to information regarding COVID-19, thus, increasing their knowledge about the disease.

Our findings have several implications including the need for Nigerian Correctional Service to have adequate cells for isolation

of contagious diseases, since social distancing is almost impossible in the prison population. There is need for the implementation of alternative to imprisonment such as community service to help reduce the overcrowding in prison. Given that crime is still being perpetrated despite the suspension of court activities, online trial of cases should be considered by the judiciary. Additionally, those offenders that may still be remanded in custody should have testing for COVID-19, and other contagious diseases. Finally, the on-going decongestion of custodial centers by the judiciary should be encouraged and sustained beyond COVID-19 era and effort should be made by the authority to transfer some inmates from congested custodial centers to centers with fewer inmates across the nation.

Our work is the first study about COVID-19 knowledge and impact among offenders in Africa. It also provides opportunity for educating both the inmates and staff of the custodial center about the disease. We were limited by the fact that the inmates, especially those that had psychological distress on the screening scale, could not be further examined with a diagnostic instrument to confirm any case of Psychological disorder. Another limitation was not assessing the inmates' exposure and access to information regarding COVID-19 while in police detention cells or prior to that, as this may affect their level of knowledge regarding the disease.

Conclusion

COVID-19 is a highly contagious disease currently affecting the general population as well as the prison population. As much as social distancing is almost impossible in prison because of overcrowding, placing new inmates on quarantine appears much easier and practicable. Considering the low level of knowledge about COVID-19, the high level of psychological distress, and the relationship between high educational level and knowledge about the disease among inmates placed on quarantine; there is a need to regularly educate people before, during and after quarantine. The essence of adequate information about a disease outbreak is its impact on reducing the negative psychological effects the disease may have on people placed on quarantine.

Recommendation

The environment in custodial centers is extremely stressful. Future studies should consider the factors contributing to stress

in a custodial center and their associations with psychological distress. Similarly, future studies should consider a longitudinal study that assessed the level of psychological distress among inmates at entry into the quarantine cells and at the end of the 14-day quarantine period.

Data availability

Underlying data

Figshare: COVID-19 pandemic, psychological response, and knowledge of the disease among inmates of a custodial center in Nigeria.sav. <https://doi.org/10.6084/m9.figshare.12227543.v2> (Okoro, 2020).

This project contains the following underlying data:

- COVID-19 pandemic, psychological response, and knowledge of the disease among inmates of a custodial center in Nigeria (SAV). (Underlying dataset in SAV format; see *Extended data* questionnaire for question codes.)
- COVID-19 Pandemic, Psychological Response to Quarantine and Knowledge of the Disease among inmates of a Custodial Center in Nigeria (CSV). (Underlying dataset in CSV format; see *Extended data* questionnaire for question codes..)

Extended data

Figshare: COVID-19 pandemic, psychological response, and knowledge of the disease among inmates of a custodial center in Nigeria.sav. <https://doi.org/10.6084/m9.figshare.12227543.v2> (Okoro, 2020).

File 'COVID-19 Questionnaire to participants' contains the questionnaire given to each participant.

Data are available under the terms of the [Creative Commons Attribution 4.0 International license](#) (CC-BY 4.0).

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Version 2

Reviewer Report 14 January 2021

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Ahmed K. Ibrahim 

Community Health School, Faculty of Medicine, Assiut University, Asyut, Egypt

Summary: This was a cross-sectional study to assess the psychological response to quarantine during COVID-19 pandemic and knowledge level about the disease among inmates of a Custodial Center in Enugu, Nigeria. A total of 66 new prison inmates were assessed for psychological distress using the Kessler Psychological Distress Scale (K10); and inmates' knowledge about COVID-19 using a COVID-19 Knowledge Questionnaire developed by the researchers.

Participants had a mean age of 28.39 ± 8.71 years; 63 (95.5%) were male inmates and 3 (4.5%) were female inmates. Sixty-one (92.4%) were awaiting-trial inmates, 43 (65.1%) had psychological distress, and 35 (53%) had completed at least secondary school. COVID-19 questionnaire mean score was 3.82 ± 3.33 . Thirty-one (21.8%) had adequate knowledge of COVID-19 (7-10 score), while 35 (53%) and 10 (15.2%) had poor (0-3) and average (4-6) knowledge, respectively. Adequate COVID-19 knowledge level was significantly higher among those that completed at least secondary school (48.6%) than those who did not (12.9%). Though not statistically significant, adequate COVID-19 knowledge level was commoner among those without psychological distress (43.5%) than those with psychological distress (25.6%).

Methods:

1. No sample size calculation, the small sample can't reflect robust findings
2. No Reliability/validity assessment of the Knowledge scale which the author claimed to develop
3. The study design is inappropriate to fulfill the objectives
4. Using univariate analysis to infer adjusted relationships are invalid
5. Multiple confounders should be accounted for before getting to conclusion "i.e. mental state of prisoners, crime type etc.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

No

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

No

Are the conclusions drawn adequately supported by the results?

No

Is the argument information presented in such a way that it can be understood by a non-academic audience?

No

Does the piece present solutions to actual real world challenges?

No

Is real-world evidence provided to support any conclusions made?

No

Could any solutions being offered be effectively implemented in practice?

No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Behavioral (public health and community) medicine

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Reviewer Report 25 June 2020

<https://doi.org/10.21956/emeraldopenres.14873.r26934>

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Paolo Roma 

Department of Human Neuroscience, Sapienza University of Rome, Rome, Italy

The authors adequately responded to the suggestions provided in the first round of reviews, at least by including criticisms of the study's limitations.

The article deserves for the particularity of the population, even if the research design could have been studied more accurately.

I suggest accepting it, just taking into account the specificity of the population examined.

Is the work clearly and accurately presented and does it cite the current literature?

No

Is the study design appropriate and is the work technically sound?

No

Are sufficient details of methods and analysis provided to allow replication by others?

No

If applicable, is the statistical analysis and its interpretation appropriate?

No

Are all the source data underlying the results available to ensure full reproducibility?

No

Are the conclusions drawn adequately supported by the results?

No

Is the argument information presented in such a way that it can be understood by a non-academic audience?

No

Does the piece present solutions to actual real world challenges?

No

Is real-world evidence provided to support any conclusions made?

No

Could any solutions being offered be effectively implemented in practice?

No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: 1) Clinical Psychology 2) Mental Health 3) Forensic Psychology 4) Correctional Psychology

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 05 June 2020

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**Paolo Roma**

Department of Human Neuroscience, Sapienza University of Rome, Rome, Italy

"COVID-19 pandemic, psychological response to quarantine, and knowledge of the disease among inmates in a Nigerian custodial center" is a simple yet interesting study, considering the population of interest.

Introduction and Objectives.

This section, as it stands, is too generic and should be reformulated taking into account the examined variables. For instance, regarding lockdown measures it would be useful to cite already published study on the general population. Among the others, my suggestions are: a) Mazza *et al.* (2020)¹; b) El-Zoghby *et al.* (2020)²

Study design.

In the study design, two variables, which I believe are extremely important in light of the obtained results, are missing: a) an assessment – even an approximate one – of the inmates' intellectual level, which clearly can impact their level of understanding regarding COVID-19; b) an assessment of inmates' exposure to information regarding COVID-19, that is inmates' opportunity to hear or obtain information regarding COVID-19 pathology. This element is particularly discriminant regarding COVID-19 knowledge and, furthermore, it is important since some inmates, even before the quarantine in the maximum-security prison, had already spent a period in a police jail. Authors should add these variables or properly explain their absence.

In the study design, the assessment of the actual problematic that is causing stress for inmates is also missing. In other words, inmates' stress is primarily deriving from what? The start of the detention? The absence of contacts with family? Quarantine conditions? Prison overcrowding? Something else? Stress needs to be qualified. Authors should add this variable or properly explain its absence

Results.

Regarding COVID-19 knowledge, it would be important to look into a frequency analysis of total scores in order to understand whether inmates with little to no knowledge regarding COVID-19

interfere significantly with the total score. In other words, the inmates' group could be divided in: little to no knowledge, average knowledge, full or almost full knowledge.

At pag. 6 (also Table 3), results indicate that inmates with low education have less knowledge regarding COVID-19. This result, without the aforementioned variables (intellectual level and exposure to information regarding COVID-19), does not say anything substantial. Moreover, in the study design, it would have been useful to explore if having no knowledge regarding the virus was linked to stress.

Regarding stress analysis, it would be very useful to conduct correlation analyses and not just mean differences between groups. For example, the total knowledge could be correlated with the years of education and with age.

Discussions.

Discussions should be reformulated in light of the aforementioned suggestions. Furthermore, there is again mention of the low level of knowledge regarding COVID-19 among inmates. However, this data can't be taken as an absolute, since it is not compared with a population outside the prison. Authors should revise their discussions focusing on what knowledge inmates are lacking and what it would be useful for them to know regarding COVID-19.

References

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2. El-Zoghby SM, Soltan EM, Salama HM: Impact of the COVID-19 Pandemic on Mental Health and Social Support among Adult Egyptians. *J Community Health*. 2020. [PubMed Abstract](#) | [Publisher Full Text](#)

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

No source data required

Are the conclusions drawn adequately supported by the results?

Partly

Is the argument information presented in such a way that it can be understood by a non-

academic audience?

Partly

Does the piece present solutions to actual real world challenges?

Partly

Is real-world evidence provided to support any conclusions made?

Partly

Could any solutions being offered be effectively implemented in practice?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: 1) Clinical Psychology 2) Mental Health 3) Forensic Psychology 4) Correctional Psychology

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 09 Jun 2020

Johnson Okoro, Nigerian Correctional Service, Enugu, Nigeria

Responses to questions from the second reviewer

(1) Reviewer's comment on Introduction and Objectives.

This section, as it stands, is too generic and should be reformulated taking into account the examined variables. For instance, regarding lockdown measures it would be useful to cite already published study on the general population. Among the others, my suggestions are:

a) Mazza *et al.* (2020)¹; b) El-Zoghby *et al.* (2020)²

Response from authors: The introduction has been re-written to be more specific of the examined variables and to include more references such as Mazza *et al* and El-Zoghby *et al.* as suggested.

(2a) Reviewer's comment on Study design.

In the study design, two variables, which I believe are extremely important in light of the obtained results, are missing: a) an assessment – even an approximate one – of the inmates' intellectual level, which clearly can impact their level of understanding regarding COVID-19: b) an assessment of inmates' exposure to information regarding COVID-19, that is inmates' opportunity to hear or obtain information regarding COVID-19 pathology. This element is particularly discriminant regarding COVID-19 knowledge and, furthermore, it is important since some inmates, even before the quarantine in the maximum-security prison, had already spent a period in a police jail. Authors should add these variables or properly

explain their absence.

Responses from authors: These have been included as some of the limitations of the study.

(2b) Reviewer's comment on the study design. The assessment of the actual problematic that is causing stress for inmates is also missing. In other words, inmates' stress is primarily deriving from what? The start of the detention? The absence of contacts with family? Quarantine conditions? Prison overcrowding? Something else? Stress needs to be qualified. Authors should add this variable or properly explain its absence.

Response from authors: This has formed our recommendation for future studies.

(3). Reviewer's comment on Results.

Regarding COVID-19 knowledge, it would be important to look into a frequency analysis of total scores in order to understand whether inmates with little to no knowledge regarding COVID-19 interfere significantly with the total score. In other words, the inmates' group could be divided in: little to no knowledge, average knowledge, full or almost full knowledge.

At pag. 6 (also Table 3), results indicate that inmates with low education have less knowledge regarding COVID-19. This result, without the aforementioned variables (intellectual level and exposure to information regarding COVID-19), does not say anything substantial. Moreover, in the study design, it would have been useful to explore if having no knowledge regarding the virus was linked to stress.

Regarding stress analysis, it would be very useful to conduct correlation analyses and not just mean differences between groups. For example, the total knowledge could be correlated with the years of education and with age.

Response from authors: The knowledge level has been categorized as suggested. This necessitated a modification of table 1 and a new table 3.

The assessment of sources of stress was not done in our study as it was not part of the objectives of the study. However, it has been added in our recommendation for future studies.

(4) Reviewer's comment on Discussions.

Discussions should be reformulated in light of the aforementioned suggestions. Furthermore, there is again mention of the low level of knowledge regarding COVID-19 among inmates. However, this data can't be taken as an absolute, since it is not compared with a population outside the prison. Authors should revise their discussions focusing on what knowledge inmates are lacking and what it would be useful for them to know regarding COVID-19.

Response from authors: The discussion segment has been revised as suggested by the reviewer

(5) Reviewer's comment on reference being inadequate.

Response from authors: References to Mazza et al and E-Zoghby et al have been made as suggested by the reviewer. More references were also added to address the comment of the reviewer.

(6) Reviewer's comment on conflict of interest.

Response from authors: The authors declared no conflict of interest. The authors also declared that there was no grant received for the study

Competing Interests: The authors declare that there was no conflicting interest

Reviewer Report 29 May 2020

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Li Li

Department of Psychiatry and Behavioral Neurobiology, University of Alabama at Birmingham, Birmingham, AL, United States

Thank you for the opportunity to review this manuscript. This is an interesting topic. However, there are many concerns which should be addressed prior to the passing peer review.

My largest concern is the design and interpretation of the study. For example, the scale to assess inmates' knowledge for COVID. Although it was developed by the authors, it should be compared with other available/similar scales, and validated it. If could not, then it is a limitation. Another concern is that inmates' psychological status at baseline was not adjusted. Anyone was tested positive for COVID/or any symptoms consistent with COVID? These were missed. What medications are these participants taking? How to covariate these medications in the data analysis? Discussion is somewhat poorly organized and did not discuss/interpret own data well.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

I cannot comment. A qualified statistician is required.

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Partly

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Partly

Does the piece present solutions to actual real world challenges?

Partly

Is real-world evidence provided to support any conclusions made?

Partly

Could any solutions being offered be effectively implemented in practice?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Mental health

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 29 May 2020

Johnson Okoro, Nigerian Correctional Service, Enugu, Nigeria

(1): Reviewer's concern: My largest concern is the design and interpretation of the study. For example, the scale to assess inmates' knowledge for COVID. Although it was developed by the authors, it should be compared with other available/similar scales, and validated it. If could not, then it is a limitation.

Authors' response: The questionnaire on COVID-19 knowledge is to some extent similar to what was used by Zhong et al. (Zhong BL, Luo W, Li HM, et al.: Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. Int J Biol Sci. 2020; 16(10):1745–1752).

The authors recognized the importance of validating the questionnaire for the population it was to be used on. This necessitated the conduct of a test of reliability (internal consistency) on 10 inmates, that were not part of the study, through a pilot study. The cronbach alpha obtained from the pilot testing was within acceptable range

(2): Another concern is that inmates' psychological status at baseline was not adjusted. Anyone was tested positive for COVID/or any symptoms consistent with COVID? These were missed. What medications are these participants taking? How to covariate these medications in the data analysis? Discussion is somewhat poorly organized and did not discuss/interpret own data well.

Authors' response: Baseline psychological status and then a follow-up at 15th day (termination of quarantine) would have been lovely. However, it was not done in this study which was a cross-sectional one.

Inmates brought to the custodial center were not suspected, probable, or confirmed cases of COVID-19. They neither had any symptom of COVID-19 nor the disease itself. They were quarantined and not isolated. The choice of word (quarantine cell and not isolation cell) was carefully used to represent its meaning in the medical parlance.

Isolation is for confirmed cases.

Quarantine is for those without the disease or any of its symptoms, but are needed to stay within the period of the disease incubation time to see if they will manifest the disease

The inmates were quarantined since they could not be tested before remand as suggested in our discussion. Therefore, none of the 66 inmates was expected to be on COVID-19 treatment,

Our discussion has been revised to cover the objectives.

(3) Reviewer's question: No competing interests were disclosed.

Authors' response: There was no competing interest

Competing Interests: There was no competing interest