

Original Research Article

DOI: <https://dx.doi.org/10.18203/2394-6040.ijcmph20214548>

Urban-rural difference in community willingness to isolate during COVID-19 pandemic in Benue State Nigeria 2021

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Received: 28 September 2021

Accepted: 03 November 2021

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ABSTRACT

Background: Coronavirus disease 2019 is a highly infectious viral disease reported across more than 210 countries of the world. Isolation is a very critical component of COVID-19 public health responses were infected or exposed persons are separated from the unexposed individual for the purposing of protecting and preventing or containing disease spread. Our study assessed and compared community willingness to isolate during COVID-19 pandemic among urban and rural dwellers.

Methods: A multi-stage comparative cross-sectional study was used to assess respondents' willingness to isolate between January and April 2021. Response was scored and each composite scores were converted to a percentage. The assessment was done using three questions with a maximum score of 15. A score of $\geq 80\%$ of the maximum score was categorized as more willing to quarantine or isolate, score from 51% to 79% was categorized as slightly willing to quarantine or isolate while $\leq 50\%$ was categorized as less willing to quarantine or isolate. Data was analysed using STATA SE 64 software and level of significance set at 5%. Categorical variables were summarised as frequency and percentages and presented in tables urban and rural comparisons were done with Chi square test and the corresponding p-values presented.

Results: One thousand three hundred and thirty-one respondents recruited into the study had a mean age of 33.7 ± 12.83 . Urban respondents aged 25-34 years were 36.64% (358) while rural respondents 31.94% (145) were aged 25-34 years ($p=0.013$). Most the respondents in both urban and rural communities were females 58.15% (574) and 55.73% (253) respectively. 549 (56.19%) of urban respondents were willing to be quarantined after contact with a suspected COVID-19 patient when compared with the rural respondent 292 (64.32%). Only 524 (53.63%) of urban respondents were willing to isolate after having had contact with a confirmed patient compared with the rural respondents 277 (61.01%). More than half of the respondents in urban and rural 629 (64.38%) and 303 (66.74%) respectively showed their willingness to isolate if confirmed to have COVID-19. Overall, 758 (77.58%) of the respondents were willing to go into isolation during COVID-19 pandemic when compared with rural communities 377 (83.04%) of respondents (p value =0.06).

Conclusions: Willingness to isolate during COVID-19 pandemic is higher among rural dwellers than the urban dwellers.

Keywords: Benue state, COVID-19 Pandemic, Isolation, Willingness

INTRODUCTION

Coronavirus disease-2019 (COVID-19) is a newly emerged disease of primarily the respiratory system, caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), a highly infectious novel corona virus first reported in the Hubei province of China on 29th December 2019 but has assumed a pandemic proportion since March 2020.^{1,2} There are 201 million cases of COVID-19 reported as at July 2021 with 4.26 million deaths with 180.5 million recorded across more than 210 countries. In Nigeria, the first confirmed case was reported in Lagos on the 27th of February 2020, followed by a rapid increase in the number of cases across all the states in the country.^{3,4} The country has experienced the first and second waves of COVID-19 transmission with the third wave gradually setting in amidst dwindling levels of adherence to control measures among the populace. On the 13th of July 2021, the number of new cases reported in the country was 154, bringing the total number of confirmed cases to 168,867 with 2,125 deaths.

On 30th January 2020, the WHO director-general declared COVID-19 a public health emergency of international concern. To prevent the spread of the virus, individuals testing positive for the disease should be placed in isolation.⁵ Discharge required clinical recovery with two negative sequential RT-PCR results within 24 hours, which was later updated to 10 days after symptom onset plus a minimum of 3 days without symptoms for symptomatic patients and 10 days after a positive test for asymptomatic patients.⁶ In addition to isolation, measures were introduced.⁵ Individuals identified as contacts such as providing direct care without the use of personal protective equipment, having face-to face-contact within 1 m >15 minutes of laboratory-confirmed cases required 14 days of quarantine from the last time they were exposed to the patient.⁷

Isolation is a very critical component of public health interventions, as it protects people by separating those who have been infected by communicable diseases from the general population and it has a great impact on preventing or delaying the spread of pandemics.⁸⁻¹⁰ Symptomatic individuals confine themselves to their homes.¹¹ Generally, isolation can take two forms: Mandatory and voluntary.^{12,13} Voluntary isolation means that infected (or possibly infected) individuals choose to confine themselves to their homes; this intervention is generally considered capable of limiting the transmission of pandemic influenza and is recommended by the Centre for Disease Prevention and Control.¹⁴⁻¹⁶ The early initiation of isolation can overcome the negative effects of a delay in antiviral drug distribution when enough symptomatic individuals comply with home confinement at symptom onset.¹⁵ Overall, isolating is of great importance for hampering the spread of pandemics and has been widely studied based on different methods. The effectiveness of isolating largely depends on public adherence to this intervention measure.¹⁵ Unfortunately,

voluntary isolation strategies may inconvenience individuals, lead to economic losses, or even contribute to moral conflicts; thus, isolation remains a controversial strategy.^{16,17}

Surveys conducted in the United States (US) and Australia during the 2009 pandemic showed that more than 80% of people were willing to stay home from work or school, while 53-76% of people were willing to self-isolate.¹⁸⁻²⁰ According to the self-reported behavioral intention regarding the H₁N₁ influenza of university students in southwestern US, Mas et al claimed that an array of issues may influence students' decision to self-isolate, including interpersonal, academic, environmental, and social factors; however, their analysis lacks an empirical basis.²¹ Risk perception has been widely established as a significant predictor of engagement in preventive health behaviours, including self isolation (SI); those who report being unfamiliar with the term "pandemic influenza," male respondents, and employed people who are not able to work from home have been found to be less willing to comply.^{22,23} A survey in two counties in North Carolina showed that 50% of households with children under 18 and 65% of working adults reported the ability to comply with SI at home for 7-10 days if recommended to do so by the authorities.²⁴ Concomitantly, recent polls have shown that the willingness to comply with an SI period strongly depends on the social condition and literacy of the individual.²⁵ Therefore, this study aims at assessing the willingness to isolate during the COVID-19 pandemic amongst the urban and rural dwellers in Benue State, Nigeria.

METHODS

This study was conducted in Benue State located in north-central Nigeria. The state shares boundaries with five other states namely: Nasarawa State to the North; Taraba to the East; Cross River State to the South; Enugu State to the South-west; and Kogi to the West. The state also shares boundary with the Republic of Cameroon on the southeast. Benue occupies a landmass of 34,059 square kilometres and has Makurdi because the capital city and 23 government Areas. Benue state features a population of 4,253,641. Made from 2,144,043 males and a couple of 109,598 females, the state features a sex ratio of 1.02, a literacy rate of 44.7% among the population aged 6 years and above, and a population density of about 130 persons per square kilometer consistent with 2006 census making it the 9th most populous state in Nigeria. The predominant occupation of the residents is farming especially within the rural areas. Benue state reported its first COVID-19 case on the 28th of March 2020. As at the time of this study, a total of 899 COVID-19 cases were reported with 25 deaths.

Study design

A comparative community-based cross-sectional study was conducted between January and April 2020.

Study population and eligibility criteria

The Study participants were consenting adults 18 years and above or emancipated minors aged 15 years to 17 years, living in selected households and present at the time of visit.

Sample size determination

The required sample size for the study was determined using the formula for two independent proportions with categorical outcome variables using a baseline positive COVID-19 risk perception level of 67.4% from a study conducted in Nigeria* and assuming a difference of 15% between the two populations as follows:

$$n \text{ (per arm)} = \text{DEFF} * \frac{\left[Z_\beta \sqrt{P_1(1-P_1) + P_2(1-P_2)} \right] + \left[Z_\alpha \sqrt{2P(1-P)} \right]^2}{[P_2 - P_1]^2}$$

Where:

n = the minimum sample size per community

P_1 = proportion of population with more willingness to isolate in the urban area was taken 65% (we proposed a difference between the urban and rural to be 15%).

P_2 = proportion of the population with positive COVID-19 risk perception in the rural area 50%.

Z_α = critical value of the normal distribution at 95% confidence level = 0.05.

Z_β = critical value of the Normal distribution at desired power of 80% = 0.84.

P = the mean of the proportion i.e. $(P_1+P_2)/2 = 65+50/2 = 57.5\% (0.575)$.

DEFF = Design effect (to account for the multistage sampling technique) = 1.5.

Plugging in the values:

$$n = 1.5 * \frac{\left[[0.84\sqrt{0.65(1-0.65) + 0.50(1-0.50)}] + [1.96\sqrt{2(0.575)(1-0.575)}] \right]^2}{(0.65 - 0.5)^2}$$

$n = 254$

Adjusting for anticipated non-response rate of 10% using the formula:

Final sample size = Effective sample size/(1- nonresponse rate anticipated)

Final sample size = $254 / 1 - 0.1 = 283$.

The sample size for urban and rural areas was 566 however we recruited 1,431 respondents in the 14 communities to increase the robustness of the study.

Sampling procedure

Multi-stage sampling technique was used to select respondents for the study as follows:

Stage 1: Selection of three study LGAs through purposive sampling

Makurdi, Otukpo and Gboko Local Government Areas (LGAs) were purposively selected from the list of 23 LGAs in the state because they have the largest population of urban and rural communities.

Stage 2: Selection of study communities (7 urban and 7 rural) by stratified random sampling

The communities in each of the three selected LGAs were first stratified into urban and rural communities with the random selection of three urban and three rural communities from Makurdi LGAs, followed by four communities (two urban and rural) selected from Gboko and Otukpo LGA giving a total of 8 communities and an overall total of 14 communities (7 urban and 7 rural) spread across the 3 LGA Government Areas selected for the study.

Stage 3: Selection of study households through simple random sampling

The number of households to be selected from each of the 14 study communities were proportionately allocated and therefore the assigned number was then sampled through simple sampling from the frame/listing of households in each community gotten from the National Population Commission.

Stage 4: Selection of study participants through simple random sampling

From the selected households, two eligible respondents were selected by simple random sampling using table of random numbers.

Data collection

Data collection instruments: a pretested validated semi-structured interviewer administered electronic questionnaire on android devices, adapted from similar studies* was used by the principal investigator and trained research assistants to elicit information on respondents' sociodemographic characteristics, awareness, knowledge, and personal risk perception of COVID-19. Check codes, skip patterns and restriction logics were used to minimise wrong and incomplete entries during data collection.

Data management and analyses

Computation of level of willingness to isolate

The willingness to isolate or quarantine when one has had contact with a suspected or confirmed case or when confirmed to be infected with COVID-19 was assessed by the proportion of participants reporting the willing option. The assessment was done using three questions with a maximum score of 15. A score of $\geq 80\%$ of the maximum score was categorized as more willing to Quarantine or Isolate, score from 51% to 79% was categorized as slightly willing to quarantine or isolate while $\leq 50\%$ was categorized as less willing to quarantine or isolate.

Statistical analyses

Data was analysed using STATA SE 64 software with level of significance set at 5%. Categorical variables were summarised as frequencies and percentages and presented in tables while numerical variables were summarised using means and standard deviation. Urban and rural comparisons were done with Chi square test and the corresponding p-values presented.

Ethical considerations

Ethical Approval (reference: MOH/STA/204/VOL.1/38) was obtained from the Research ethics panel of Benue State Ministry of Health. A written informed consents/assent was obtained from each of the study participants after detailed explanation of the study purpose, procedures, and voluntariness of participation. Data privacy and confidentiality were maintained during the study and access to collected data was restricted to only the first investigators. Participants' records were de-identified and stored in pass-worded folders.

RESULTS

One thousand three hundred and thirty-one respondents recruited into the study had a mean age of 33.7 ± 12.83 . Respondents aged 25-34 years were 36.64% (358) among the urban when compared with rural respondents among whom 31.94% (145) were aged 25-34 years with a statistical difference between the urban and rural areas ($p=0.013$). Most the respondents in both urban and rural communities were females 58.15% (574) and 55.73% (253) respectively. Being married accounted for 53.53% (523) and 59.42% (270) among the urban and rural dwellers respectively, followed by being single in both communities; urban 43.19% (422) and rural 35.90% (163). Most of the respondents among the urban and rural settlements were secondary school holders 46.16% (451) and 48.90% (222) respectively. Considering the religious status, most respondents were Christians; urban 98.16% (959) and rural 96.92% (440). More of the respondents in the urban settlement lived in a rented house 53.22% (520)

when compared with those in the rural areas where most respondents own their houses 63.22% (287).

Table 1a: Demographic characteristics of dwellers in urban and rural areas in Benue State North Central Nigeria.

Variables	Urban	Rural	χ^2	P value
	Frequency (%)	Frequency (%)		
Age (years)	(n=977)	(n=454)		
15-24	224 (22.93)	127 (27.97)		
25-34	358 (36.64)	145 (31.94)		
35-44	224 (22.93)	85 (18.72)		
45-54	97 (9.93)	52 (11.45)	16.1	0.013
55-64	44 (4.50)	25 (5.51)		
65-74	24 (2.46)	10 (2.20)		
≥ 75	6 (0.61)	10 (2.20)		
Gender				
Male	403 (41.25)	201 (44.27)		
Female	574 (58.75)	253 (55.73)		
Marital status				
Married	523 (53.53)	270 (59.42)		
Separated	3 (0.31)	5 (1.10)		
Divorced	7 (0.72)	1 (0.22)		
Widowed	20 (2.05)	13 (2.86)	12.4	0.03
Single	422 (43.19)	163 (35.90)		
Preferred not to answer	2 (0.20)	2 (0.44)		
Educational status				
Never attended school	23 (2.35)	44 (9.69)		
Primary school	57 (5.83)	73 (16.08)		
Secondary school	451 (46.16)	222 (48.90)		
Post-secondary diploma	190 (19.45)	62 (13.66)	119.4	0.000
Basic degree	214 (21.90)	44 (9.69)		
Postgraduate	34 (3.48)	1 (0.22)		
Prefer not to answer	8 (0.82)	8 (1.76)		
Religious status				
None	2 (0.20)	0 (0.0)		
Christianity	959 (98.16)	440 (96.92)		
Islam	10 (1.02)	1 (0.22)		
Traditionalist	2 (0.20)	8 (1.76)	16.7	0.002
Prefer not to answer	4 (0.41)	5 (1.10)		

Most of the respondents interviewed in both urban and rural areas were self-employed; 471 (48.21%) and 207 (45.59%) respectively followed by students 161 (16.48%) in the urban areas and unemployed 99 (21.81%) in the rural areas. Monthly income, more than half of the respondents in both urban and rural communities earns less than Nigeria minimum wage of 30,000 Naira (71

USD), 397 (69.04%) urban and 217 (69.04%) rural communities.

Table 1b: Demographic characteristics of dwellers in urban and rural areas in Benue State North Central Nigeria.

Variables	Urban Frequency (%)	Rural Frequency (%)	χ^2	P value
Type of residence				
Own your home	292 (29.89)	287 (63.22)		
Rent a home or apartment	520 (53.22)	70 (15.42)		
Live with friends or family without paying them rent	161 (16.48)	94 (20.70)	196.1	0.000
Others (specify)	3 (0.31)	2 (0.44)		
Prefer not to answer	1 (0.10)	1 (0.22)		
Employment status				
Government employed	68 (6.96)	24 (5.29)		
Privately employed	90 (9.21)	27 (5.95)		
Self employed	471 (48.21)	207 (45.59)	17.4	0.004
Student	161 (16.48)	83 (18.28)		
Retired	44 (4.50)	14 (3.08)		
Unemployed	134 (14.64)	99 (21.81)		
Income in the last Month (n=598) (n=232) (Naira)				
≤29000 (USD 71)	397 (69.04)	217 (85.10)		
30000-74000 (\$72-\$180)	143 (24.87)	27 (10.59)		
75000-100000 (\$181- \$245)	20 (3.48)	6 (2.35)	28.4	0.000
101000-139000 (\$182- \$339)	1 (0.17)	1 (0.39)		
≥140000 (\$340)	14 (2.48)	3 (1.18)		
Ethnic or tribal group				
Tiv	547 (55.99)	252 (55.51)		
Idoma	225 (23.03)	171 (37.61)		
Igede	35 (3.58)	12 (2.64)		
Igbo	99 (10.13)	12 (2.64)		
Etulo	71 (7.27)	7 (1.54)		
Others specify				

Data showed that most respondents in both urban and rural areas were Tiv by tribe 547 (55.99%) and 252 (55.51%) followed by Idoma who represented 225 (23.03%) and 171 (37.61%) of the respondents in the urban and rural areas, respectively. The results on the

Table 2: Comparative analysis of willingness to isolate during COVID-19 pandemic among urban and rural community in Benue State.

Variables	Urban Frequency (%)	Rural Frequency (%)	χ^2	P value
Willingness to be quarantined after contact with a suspected COVID-19 patient				
Not willing	134 (13.72)	38 (8.37)		
Not really willing	26 (2.66)	12 (2.64)	11.92	0.018
Undecided	53 (5.42)	20 (4.41)		
Somewhat willing	215 (22.01)	92 (20.26)		
Willing	549 (56.19)	292 (64.32)		
Willingness to be quarantined if had close contact with PCR confirmed COVID-19 patient				
Not willing	82 (8.39)	30 (6.61)		
Not really willing	16 (1.64)	15 (3.30)	14.09	0.007
Undecided	41 (4.20)	20 (4.41)		
Somewhat willing	314 (32.14)	112 (24.67)		
Willing	524 (53.63)	277 (61.01)		
Willingness to be quarantined if PCR confirmed to have COVID-19 patient				
Not willing	100 (10.24)	31 (6.83)		
Not really willing	18 (1.84)	11 (2.42)		
Undecided	41 (4.20)	21 (4.63)	5.84	0.304
Somewhat willing	189 (19.34)	88 (19.38)		
Willing	629 (64.38)	303 (66.74)		
Level of willingness to isolate				
Less willing	123 (12.59)	43 (9.47)		
Slightly willing	96 (9.83)	34 (7.49)	5.62	0.06
More willing	758 (77.58)	377 (83.04)		

Table 2 showed that 549 (56.19%) of the respondents in the urban dwellers were willing to be quarantined after contact with a suspected COVID-19 patient when compared with the respondents in the rural areas 292 (64.32%) while 134 (13.72%) of the respondents in the urban were not willing to isolate when compared to 38 (8.37%) of the rural respondents. Only 524 (53.63%) of the respondents were willing to isolate after having had contact with a confirmed patient when compared with the respondents in the rural areas 277 (61.01%), while 82 (8.39%) of the respondents in the urban were not willing to isolate when compared to 30(6.61%) of the rural respondents. Table 2 also showed that more than half of the respondents in urban and rural 629 (64.38%) and 303 (66.74%) respectively showed their willingness to isolate if confirmed to have COVID-19, while 100 (10.24%) of the respondents in the urban were not willing to isolate when confirmed to have COVID-19 compared to 31 (6.83%) of the rural respondents. Overall, 758 (77.58%) of the respondents were willing to go into isolation during COVID-19 pandemic when compared with rural

communities 377 (83.04%) of respondents while 123 (12.59%) of the respondents in urban communities were not willing to isolate during COVID-19 pandemic when compared with rural communities, 43 (9.47%) (p value=0.06).

DISCUSSION

Our study revealed that majority of the respondents in both urban (77.58%) and rural (83.04%) communities were willing to go into isolation during the Covid-19 pandemic. Regarding participants in the urban communities willing to go into isolation, findings are in line with a study which was done in China which demonstrated that urban residents in general have better preventive practices, which may be associated with the fact that they have a high level of health literacy and are exposed to a high degree of health publicity.²⁶ However, our findings are contrary to another study which was done in China regarding rural communities as it revealed that regarding urban-rural differences in COVID-19 preventive behaviours, rural residents were less likely to engage in preventive behaviours, reported less positive attitude toward the effectiveness of performing preventive behaviours, and had lower levels of information appraisal skills.²⁷ These findings were consistent with previous studies unveiling rural/urban health disparities in other preventive behaviours, such as wearing sunscreen and receiving preventive care services including cancer screening and influenza vaccinations.²⁸⁻³⁰

It was noted in our study that among the dwellers living in the urban communities, gender and marital status were found to be associated with willingness to isolate during COVID-19 pandemic. Being a female and single were independent factors of willingness to isolate during COVID-19 pandemic than being a male among urban community' dwellers. It also showed that females were 10 times more likely to stay in isolation during COVID-19 pandemic than their male folks. These findings are similar to a study which was done in China with regards the COVID-19 pandemic which showed that young women's knowledge acceptance and behavioural changes were better than their male counterparts and in addition, most women are more compliant and more willing than men to choose appropriate behaviour to protect themselves and their families.³¹ Other studies also show that women had a higher literacy level of prevention and control of infectious diseases than men, and men were more likely to engage in risky behaviour.^{32,33}

Our study also revealed that singles are 9 times more likely to stay in isolation than other forms of marital status however, these findings are contrary to a cross sectional study that was done in China which revealed that married people demonstrated greater positive behaviours than their single counterparts and in addition, married residents did not consider themselves as just individuals, but they often considered family factors and acted accordingly. Meanwhile, if family members chose

positive behaviours, under their influence, they would act in accordance with them, which was conducive to the positive behaviour of married people.³¹

Among dwellers living in the rural communities, those who attained secondary school to bachelor's degree as well as self-employed respondents were independent factors of willingness to isolate during COVID-19 pandemic as they are 2 to 3 times more likely to stay in isolation and these findings are in line with a study in China which found that lower income and education were associated with lower levels of behavioural performance, positive attitude, and knowledge related to COVID-19 preventive behaviours.²⁷ Previous studies also found that vulnerable populations like the unemployed and less educated are more likely to use and trust health information from social media where information accuracy and quality are questionable.^{34,35} Public health efforts should therefore be made to help the public better identify the rumours and misinformation related to COVID-19 pandemic. For example, creating easy-to-understand messages through the official social media accounts of government and health organizations can be an effective strategy to reach the rural communities.

Another study conducted in China also reveals that the higher the level of education, the greater is the motivation to share news and the higher is the utilization of preventive behaviour.³⁶ Related studies have demonstrated that college-educated individuals have better health habits and higher awareness of self-protection. This finding might be explained by the excellent ability to retrieve and understand health information and the strength of convictions in controlling the disease.³⁷ In a survey in Chicago, those with low health literacy were less likely to believe they could be infected and were less willing to adopt corresponding preventive behaviours.³⁸ This finding demonstrated the helplessness of these individuals to change their social environment and their lack of clear and actionable public health communication.^{37,39} Our finding is also in line with the existing studies that higher socioeconomic status groups were more likely to adopt appropriate preventive measures.⁴⁰ This finding might be related to higher-income groups being less prone to financial hardship due to epidemics.⁴¹ They could focus on the quality of life as much as possible and be more likely to develop a good sense of protection. By contrast, low-income people were six times less likely to be able to work from home and three times less likely to be able to self-isolate.⁴² Possible reasons for this observation were that low-income people tend to be employed in occupations that do not offer work-at-home opportunities (e.g., nursing services, transportation, food, and restaurants).⁴³

CONCLUSION

The respondents in the urban setting were more willing to isolate during pandemic when had contact with suspected COVID-19 patients than those in the rural setting while

rural respondents were more willing to isolate when had contact with a confirmed COVID-19 patients than the urban respondents. There is no difference in the willingness to isolate among urban and rural respondents who were confirmed to have COVID-19. Generally, rural study respondents were more willing to isolate during pandemic than the urban respondents.

ACKNOWLEDGEMENTS

We want to acknowledge all that have worked tirelessly from the protocol development to data collection and the manuscript completion. We want to thank God for making it possible.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Benue State Ministry of Health Ethics Review Committee (Reference: (MOH/STA/204/VOL.1/38)

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Cite this article as: Okon UA, Olayinka A, Mwansa P, Mwansa H, Usman R. Urban-rural difference in community willingness to isolate during COVID-19 pandemic in Benue State Nigeria 2021. *Int J Community Med Public Health* 2021;8:5627-34.