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Residence-based differences in sociodemographic and medical characteristics during the COVID-19 lockdown among married primary care patients in Kano, Nigeria

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Abstract

Background

The COVID-19 pandemic prompted unprecedented global public health measures, including lockdowns and social distancing policies, which had negative effects. However, it remained unclear how residential locations were related to patients' sociodemographic and medical profiles during the lockdown in a populous state such as Kano in Nigeria.

Objectives

To assess residence-based differences in sociodemographic and medical characteristics during the COVID-19 lockdown at a primary care setting.

Methods

This cross-sectional study involved 432 married patients attending the general outpatient clinic of an urban tertiary hospital in Kano, Nigeria. The participants' sociodemographic and medical information was collected via a structured pretested questionnaire and analysed using Epi Info version 7.

Results

The mean age was 32.6 years, and most participants were male (67.8%). Most participants lived in urban areas (n = 397, 91.9%). Just over half of participants (n = 247, 57.2%) could afford food as they had before, while 277 (64.1%) did not receive any social assistance. Residential location was significantly associated with sex ($P = 0.047$), employment status ($P < 0.001$), and perceived ability to purchase food as usual ($P < 0.001$). The occurrence of illness in participants' families varied significantly by residential location during the lockdown ($P < 0.001$). However, the odds of living in urban areas were higher among those who were employed (OR = 15.91, 95%CI = 2.03-124.77, $P = 0.009$) and among those who could afford food as usual (OR = 4.22, 95%CI = 1.67–10.71, $P = 0.002$).

Conclusions

Findings suggest that participants living in rural areas were more likely to be unemployed and unable to purchase food as usual and therefore were important targets for social assistance (palliatives) during the lockdown.

Introduction

Globally, the COVID-19 pandemic had significant effects on health systems [1], socioeconomic structures [2, 3], and population well-being [4], particularly in low- and middle-income nations with fragile health infrastructure and pre-existing disparities [5–8]. Nigeria documented its first confirmed case of COVID-19 in February 2020 [9], which prompted the government to deploy an array of public health interventions, including movement restrictions, closures of educational institutions and businesses, and lockdowns designed to curtail community transmission, akin to strategies employed by other nations [10]. Although these measures were crucial in limiting viral dissemination, they also had unintended consequences for healthcare access [11, 12, 13], livelihoods [13, 14], and social functioning [15, 16, 17], particularly among vulnerable demographic groups.

Differences in residence, particularly between urban and rural areas, have been identified as key determinants of health outcomes during the pandemic [18]. Furthermore, sociodemographic factors, including age, gender, education, occupation, income level, and household structure, influence individuals' exposure risk, health-seeking behaviours, and capacity to adhere to preventive measures [19, 20]. Evidence from Nigeria indicates that factors such as wealth status, health insurance coverage, and urban residence are associated with variations in COVID-19 outcomes [21], thereby emphasizing the significant role of social determinants in shaping disease vulnerability and access to healthcare.

During the lockdown, disruptions to essential health services were widely reported across Nigeria. These included reduced access to primary healthcare, reproductive health services [11], chronic disease management [22], and immunisation services [23, 24]. Decreased utilisation of health services was attributed to movement restrictions, fear of infection, financial constraints, and limited transport, leading to increased reliance on informal care sources, self-medication, and alternative treatment pathways [11, 13]. Primary healthcare systems also showed varying degrees of resilience across localities, suggesting that factors such as infrastructure, governance, and community engagement were crucial to maintaining continuity of care during the COVID-19 crisis [25, 26]. At the household level, the pandemic lockdown was associated with unprecedented levels of food insecurity [14, 27], exacerbated by disparities in social protection, which were especially pronounced in low- and middle-income countries [28, 29].

In Kano, a major commercial and cultural centre in northern Nigeria, the impact of COVID-19 lockdown measures was particularly significant. This was attributable to high population density, socioeconomic disparities, and differences in healthcare access between metropolitan and peri-urban/rural communities. We have previously demonstrated in another study that married primary care patients in Kano reported the negative effects of the lockdown on health care access, food affordability, and family income [13]. Despite these insights, a gap remains in understanding how residential location intersects with people's sociodemographic and medical characteristics during public health emergencies such as the COVID-19 pandemic. Unfortunately, the COVID-19 pandemic also negatively affected concurrent research activities in many resource-limited settings [30]. Hence, this study was an attempt to bridge this knowledge gap. It used married patients (who are more likely to recall family experiences during the pandemic lockdown) presenting to a primary care facility in Kano. Investigating residence-based differences in sociodemographic and medical characteristics among primary care patients during the

lockdown could help identify vulnerable groups and inform equitable health and social policy responses. These findings can guide targeted interventions to strengthen primary health care delivery and reduce inequalities in future public health crises, particularly in resource-limited settings.

Materials and methods

Study design, setting, participants and sampling

We analyzed data from a broader survey exploring family experiences during the COVID-19 pandemic lockdown. The study involved 432 married primary care patients who were systematically selected from attendees of an urban primary care clinic at Aminu Kano Teaching Hospital located in Kano, Kano State, Northwest Nigeria. It was conducted over a twelve-week period from September to November 2021. It included all patients or their caregivers who had been married for at least 24 months and were residents in Kano state during the lockdown. Those who were too ill to answer questions or declined consent to participate were excluded. We believed that married people were more likely to recall household experiences during the 2020 COVID-19 lockdown. The sample size calculation and detailed methodology have been published in the study that focused on the prevalence and sociodemographic predictors of family functionality, marital satisfaction, and intimate partner violence in this population [15].

Data collection

We developed a pretested, interviewer-administered questionnaire with multiple sections aligned with the study objectives (**in the supplementary file**). The questionnaire was initially in English, then translated into Hausa by a linguist experienced in health surveys, and then back-translated into English by two family physicians to check for consistency and cultural sensitivity. Data collected from participants included their sociodemographic (including residential location during the COVID-19 pandemic lockdown) and medical profiles. The other details of the questionnaire have also been published elsewhere [13, 15]. Among the 44 Local Government Areas (LGAs) in Kano State, northwestern Nigeria, seven LGAs, namely Dala, Fagge, Gwale, Kano Municipal, Nasarawa, Tarauni, and Ungogo, constitute the urban core of Kano, or the Kano Metropolis. The remaining LGAs are predominantly rural, with a few peri-urban. Consequently, participants' residential location was dichotomised into those living within the Kano Metropolis (i.e., residing in the seven LGAs, considered urban areas) and those living outside the Metropolis (i.e., residing in the remaining 37 LGAs, considered rural areas). We assessed perceived food affordability using the question: "*Were you able to afford food during the lockdown as you used to*? The responses were "Yes" or "No".

Data analysis

Data were entered and analysed using Epi Info Version 7.2.4 (Centre for Disease Control and Prevention, Atlanta, GA, USA). Absolute numbers and percentages were used to summarise categorical variables, while the Chi-square test or Fisher's exact test was used to determine the association between

categorised sociodemographic variables, medical characteristics (the independent variables) and residential location (outcome variable), as appropriate. The level of significance was set at a p-value < 0.05. To determine the predictors of residential location, variables with p-values < 0.2 at the bivariate level of analysis were included in a multivariable logistic regression model [31].

Results

Comparison of the sociodemographic characteristics of participants by residential location

Table 1 presents a comparison of sociodemographic characteristics by residential location during the COVID-19 pandemic lockdown. Most participants (n = 397, 91.9%) lived in the metropolis (urban area). Sex (χ^2 =3.94, *P* = 0.047), employment status (Fisher's exact, *P* < 0.001), and perceived food affordability (χ^2 =15.40, *P* < 0.001) had statistically significant associations with residential location.

Table 1
Sociodemographic characteristics by residential location during the COVID-19 lockdown

Characteristics	Total, n (%)	Residential location		χ^2	*P*-value
		Rural	Urban		
35 (18.1%)		**397 (91.9%)**			
Type of respondents					0.291[f]
Patient	376 (87.0)	33 (8.8)	343 (91.2)		
Caregiver	56 (13.0)	2 (3.6)	54 (96.4)		
Age (years) mean = 32.6 ± 10.3				0.13	0.723
<33	259 (60)	20 (7.7)	239(92.3)		
≥33	173 (40)	15 (8.7)	158(91.2)		
Sex				3.94	0.047*
Male	293 (67.8)	29(9.9)	264(90.1)		
Female	139 (32.2)	6(4.3)	133(95.7)		
Religion				1.42	0.234
Islam	374 (86.6)	28(7.5)	346 (92.5)		
Christianity	58 (13.4)	7(12.1)	51(87.9)		
Tribe				3.17	0.075
Hausa / Fulani	356 (82.4)	25 (7.0)	331 (73.0)		
Others	76 (17.6)	10 (13.2)	66 (86.8)		
Family type				1.52	0.217
Monogamous	216 (50)	21 (9.7)	195 (90.3)		
Polygamous	216 (50)	14 (6.5)	202 (93.5)		
Educational level				0.001	0.993
Low [a]	99 (22.9)	8 (8.1)	91(91.9)		
High [b]	333 (77.1)	27 (8.1)	306(91.9)		

*Significant; [a] no formal education and primary education; [b] secondary and tertiary education; [f] Fisher's exact test; Palliative: relief materials.

Characteristics	Total, n (%)	Residential location		χ^2	*P*-value
		Rural	Urban		
35 (18.1%)		**397 (91.9%)**			
Employed during lockdown					0.00006*[f]
No	303 (70.1)	34 (11.2)	269 (88.8)		
Yes	129 (29.9)	1 (0.8)	128 (99.2)		
Family headcount				2.05	0.153
1–6	234(54.2)	23 (9.8)	211 (90.2)		
7–30	198(45.8)	12 (6.1)	186 (93.9)		
Perceived food affordability				15.40	0.00009*
No	185 (42.8)	26 (14.0)	159 (86.0)		
Yes	247 (57.2)	9 (3.6)	238 (96.4)		
Received palliative during lockdown				1.71	0.191
No	277 (64.1)	26 (9.4)	251 (90.6)		
Yes	155 (35.9)	9 (5.8)	146 (94.2)		

*Significant; [a] no formal education and primary education; [b] secondary and tertiary education; [f] Fisher's exact test; Palliative: relief materials.

Comparison of medical characteristics of participants by residential location

Table 2 shows a significant association between residential location and whether an individual or a family member fell ill during the lockdown (χ^2=11.79, $P < 0.001$). Among those who lived in rural areas, a higher proportion of participants who reported illness in their family (77.8%) reported that treatment was obtained through self-medication, compared with those living in the urban areas (31.1%). This association was statistically significant (Fisher's exact test, $P = 0.033$). Other variables (chronic disease, health insurance, confirmed COVID-19 case in family, and perceived ease of obtaining hospital treatment during the lockdown) were not significantly associated with residential location ($P < 0.05$).

Table 2
Medical characteristics of participants by residential location

Characteristics	Total	Residential location		χ^2	*P*-value
	n (%)	Rural	Urban		
Have chronic disease				1.60	0.206
No	300 (69.4)	21(7.0)	279 (93.0)		
Yes	132 (30.6)	14 (10.6)	118 (89.4)		
*Which of these chronic conditions do you have? **					
Hypertension				1.87	0.172
No	336 (77.8)	24 (7.1)	312 (92.9)		
Yes	96 (22.2)	11 (11.5)	85 (88.5)		
Diabetes				0.01	0.913
No	385 (89.1)	31 (8.0)	354 (92.0)		
Yes	47 (10.9)	4 (8.5)	43 (91.5)		
Sickle cell disease				-	0.096[f]
No	418 (96.8)	32 (7.7)	386 (92.3)		
Yes	14 (3.2)	3 (21.4)	11(78.6)		
Asthma/Allergy				-	1.000[f]
No	428 (99.1)	35 (8.2)	393 (91.8)		
Yes	4 (0.9)	0 (0)	4 (100)		
Pelvic ulcer disease				-	1.000[f]
No	431 (99.8)	35 (8.1)	396 (91.9)		
Yes	1 (0.2)	0 (0)	1 (100)		

*Could have had more than one chronic disease; [f] Fisher's exact test; **Significant.

Characteristics	Total	Residential location		χ^2	*P*-value
	n (%)	Rural	Urban		
Did you have health insurance?				-	0.054[f]
No	339 (78.5)	32 (9.4)	307 (90.6)		
Yes	93 (21.5)	3 (3.2)	90 (96.8)		
Did you or a family member fall ill during lockdown?				11.79	0.0006**
No	201 (46.5)	26 (12.9)	175 (87.1)		
Yes	231 (53.5)	9 (3.9)	222 (96.1)		
Illness treatment options (n = 231)				-	0.033**[f]
Chemist/Pharmacy	32 (13.9)	0 (0)	32 (1100)		
Hospital	122 (52.8)	2 (1.6)	120 (98.4)		
Self medication	76 (32.9)	7 (9.2)	69 (90.8)		
Traditional healer	1 (0.4)	0 (0)	1 (100)		
How easy was it to get hospital treatment during lockdown?				0.04	0.850
Difficult	290 (67.1)	24(8.3)	266 (91.7)		
Easy/Unchanged	142 (32.9)	11(7.8)	131(92.2)		
Confirmed case of COVID-19 in the family				-	0.241[f]
No	410 (94.9)	35 (8.5)	375 (91.5)		
Yes	22 (5.1)	0 (0)	22 (100.0)		

*Could have had more than one chronic disease; [f] Fisher's exact test; **Significant.

Predictors of residential location among the participants

Following logistic regression, the independent predictors of residential location were employment status and perceived food affordability during the lockdown (Table 3). Participants who were gainfully employed during the lockdown were at least 15 times more likely to have lived in urban areas than those without employment (OR = 15.91, 95% CI = 2.03–124.77, *P* = 0.002). Conversely, unemployed participants were more likely to have lived in rural areas. Similarly, those who could afford food as usual were 4 times more likely to have lived in the urban areas than those who could not afford food as usual (OR = 4.22, 95% CI = 1.67–10.71, *P* = 0.002). The converse is that participants who could not afford food as they used to were more likely to have lived in rural areas.

Table 3
Logistic regression analysis of factors associated with the residential location of participants

Variables	OR	95% CI	*P*-value
Sociodemographic characteristics			
Sex			
Male	1.43	0.55–3.75	0.461
Female		Reference	
Tribe			
Hausa / Fulani		Reference	
Others	0.79	0.33–1.89	0.598
Employed during lockdown			
No		Reference	
Yes	15.91	2.03–124.77	0.009*
Household head count			
1–6		Reference	
7–30	1.96	0.87–4.38	0.103
Food affordability			
No		Reference	
Yes	4.22	1.67–10.71	0.002*
Received palliative during the lockdown			
No		Reference	
Yes	0.85	0.32–2.24	0.744
Medical characteristics			
Have a chronic disease?			
No		Reference	
Yes	1.36	0.30–6.13	0.691
Have hypertension?			
No		Reference	
*Significant; OR: Odds ratio; CI: Confidential interval.			

Variables	OR	95% CI	*P*-value
Sociodemographic characteristics			
Yes	0.43	0.09–1.96	0.275
Have Sickle cell disease?			
No		Reference	
Yes	0.17	0.02–1.28	0.087
Did you have health insurance?			
No		Reference	
Yes	0.78	0.20–3.08	0.725
Did you or a family member fall ill during the lockdown?			
No		Reference	
Yes	2.02	0.77–5.33	0.154
*Significant; OR: Odds ratio; CI: Confidential interval.			

Discussion

This analysis demonstrated urban-rural differences among the study participants, with variables such as sex, employment status, perceived food affordability, and having a family member who fell ill during the lockdown associated with residential location. Being employed and perceived ability to afford food as usual were the predictors of residing in urban areas.

Sex has similarly been observed to be associated with residential location in a study in the Delta and Edo states of South-South Nigeria during the COVID-19 pandemic [32]. Women were more likely than men to live in rural areas during the lockdown. This was attributed to women being more inclined to petty trading and household activities, including caregiving responsibilities for children out of school, and the elderly. In contrast, our study showed that the proportion of women living in rural areas was lower than that living in urban areas (9.9% vs 90.1%). This could be due to differences between the study populations (patients vs nonpatients), socio-cultural contexts (northern vs southern Nigeria), study designs (quantitative vs qualitative), and settings (hospital- vs community-based).

Remarkably, among families with a member who fell ill during the lockdown, more lived in urban areas (96.1%) than in rural areas (3.9%). This pattern was similarly reported by the WHO and other studies, which found that illnesses were more commonly reported among urban residents [33, 34]. This is attributed to higher population density, increased transmission risk and better access to healthcare services in urban areas. This disparity highlights the need to strengthen access to healthcare in rural areas during future public health emergencies.

Interestingly, employment status was a predictor of residential location in this study. Those who were gainfully employed were more likely to live in the urban areas than those who were not. This finding was similarly observed in a study in south-south Nigeria, where participants who were unemployed (for formal employment) or employed (for informal employment such as farming, petty trading, or daily wage work) had higher odds of living in rural areas [32]. This highlights the need for better social assistance, such as distributing palliatives (food items, money, etc.) to rural residents, rather than concentrating solely on urban residents during similar public health emergencies, such as the COVID-19 pandemic.

Perceived food affordability was another predictor of residential location in this study. Food insecurity and hunger have been associated with both living in urban and rural areas during the lockdown [35]. In this study, perceived food affordability was strongly associated with living in urban Kano. Conversely, more rural residents were unable to afford food as usual as shown in some studies [36]. This finding also highlights the need to support residents during public health emergencies such as the COVID-19 pandemic.

This study had some limitations. We could not eliminate recall bias since the study was conducted after the lockdown. In addition, the participants were patients or their caregivers, and their responses may differ from those of the general population. However, the study site is a major health facility serving a large and diverse patient population in Kano State, and its findings could offer valuable baseline data for future community-based research.

Conclusion

This study demonstrated a strong association between living in an urban area, being employed, and being able to afford food during the COVID-19 lockdown. These findings suggest that participants living in rural areas were more likely to be unemployed and unable to purchase food as usual and were therefore important targets for social assistance (palliatives) during the COVID-19 lockdown and similar future public health emergencies.

Declarations

Ethical approval : Ethical approval for the study was obtained from Aminu Kano Teaching Hospital Research Ethics Committee (NREC/28/01/2020/AKTH/EC/3128). Written informed consent was obtained from each participant before administering the questionnaire. The study protocol conformed to all other principles of the Declaration of Helsinki.

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Conflict of interest of Authors: The authors have declared that no competing interests exist.

Data availability: Data is available on reasonable request from the corresponding authors

***Authors' contribution*:** *Michael GC:* Conception, design, data collection, analysis, interpretation and manuscript drafting, revision and approval; *Suleiman AK: D*esign, data interpretation and manuscript drafting, revision and approval; *Olawumi AL: D*ata interpretation, manuscript drafting and revision and approval; *Abdulkadir Z*: Data interpretation, manuscript drafting and revision and approval; *Grema BA:* Data interpretation, manuscript drafting and revision and approval; *Badamasi AL*: Data interpretation, manuscript drafting and revision and approval.

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