FUDMA Journal of Sciences (FJS)
ISSN online: 2616-1370
ISSN print: 2645 - 2944
Vol. 9 No. 3, March, 2025, pp 164 - 168
DOI: https://doi.org/10.33003/fjs-2025-0903-3217

A SURVEY OF HEALTHCARE ACCESS AND UTILIZATION IN SELECTED RURAL AND URBAN SETTLEMENT OF PLATEAU STATE, NIGERIA

Fulus, Daniel Fom

Department of Statistics, Plateau State Polytechnic, Barkin Ladi

*Corresponding authors' email: dfulus@gmail.com

ABSTRACT

This study examines disparities in healthcare access and utilization between rural and urban communities in Plateau State, Nigeria. Using a cross-sectional survey design, data were collected from 384 respondents across six selected local government areas (LGAs). Fisher's Discriminant Analysis was employed to identify significant factors influencing healthcare access. The results demonstrate that rural residents face greater challenges, including long travel distances to health facilities, inadequate transportation, financial constraints, and low health insurance coverage. Maternal and child healthcare utilization is also lower in rural areas, contributing to higher under-five mortality rates. The study finds that educational status and proximity to health facilities are critical determinants of healthcare access. The use of Fisher's Discriminant Analysis proves appropriate, as it effectively differentiates between rural and urban healthcare accessibility based on key variables, achieving a classification accuracy of 67.7%. This validates its suitability in modelling healthcare disparities. The study highlights the need for strategic policy interventions, including expanding rural healthcare infrastructure, subsidizing healthcare costs, and increasing health awareness programs. Addressing these disparities is essential to achieving universal health coverage and improving public health outcomes in Plateau State.

Keywords: Healthcare access, Rural-urban disparity, Healthcare utilization, Health infrastructure, Maternal health, Fisher's Discriminant Analysis

INTRODUCTION

Access to quality healthcare remains a significant challenge in Nigeria, particularly in rural areas where disparities in healthcare services are pronounced. Rural populations face numerous barriers, including geographic inaccessibility, financial constraints, inadequate health infrastructure, and shortages of trained healthcare personnel. While urban residents benefit from relatively better healthcare facilities, rural dwellers struggle with limited access to essential health services, leading to poorer health outcomes (World Health Organization [WHO], 2023). In Plateau State, where over 70% of the population resides in rural areas, these disparities are even more evident (National Population Commission [NPC], 2021).

Healthcare accessibility is central to sustainable development, poverty reduction, and improved public health outcomes. The World Bank (2022) emphasizes that equitable access to healthcare can significantly reduce mortality rates and enhance economic productivity. However, in Nigeria, persistent healthcare inequities have undermined efforts to achieve Universal Health Coverage (UHC) and the Sustainable Development Goals (SDGs) (United Nations Development Programme [UNDP], 2022). Studies indicate that the country has consistently fallen short of key health targets due to underfunding, inefficient healthcare delivery systems, and weak policy implementation (Adepoju, 2023; Uzochukwu *et al*, 2022).

Previous research has established that rural areas have fewer health facilities, longer travel distances to medical centres, and lower health literacy levels, which affect service utilization (Akinyemi & Adedini, 2021). The Nigeria Demographic and Health Survey (NDHS, 2018) reports that only 35% of rural women live within 30 minutes of a health facility, compared to 57% in urban areas. Additionally, doctor-to-patient ratios in rural communities are five times lower than in urban areas (WHO, 2023). As a result, rural populations experience higher maternal and child mortality rates, lower vaccination coverage, and increased prevalence of preventable diseases (Yaya *et al*, 2021).

A growing body of literature suggests that financial barriers, including high out-of-pocket healthcare costs and low health insurance enrollment, further exacerbate rural-urban disparities. According to Onwujekwe *et al* (2022), out-of-pocket spending accounts for over 70% of total healthcare expenditures in Nigeria, disproportionately affecting rural households. This financial burden discourages healthcare utilization and contributes to poor health outcomes, particularly among women and children. Moreover, sociocultural factors, such as traditional beliefs and low health awareness, continue to limit rural residents' engagement with modern healthcare services (Sakeah *et al*, 2020).

In response to these challenges, various healthcare models have been proposed to bridge the rural-urban healthcare divide. The Primary Health Care (PHC) model, introduced by the Nigerian government, aims to expand healthcare access at the grassroots level. However, despite efforts such as the National Health Insurance Scheme (NHIS) and the Midwives Service Scheme, coverage remains low, and service delivery is inconsistent (Okpani & Abimbola, 2022). Additionally, recent studies advocate for decentralized healthcare models, increased health workforce deployment in rural areas, and mobile health (mHealth) interventions to improve service delivery (Adepoju, 2023; Uzochukwu *et al*, 2022).

Despite these findings, there is a lack of recent empirical research quantifying the magnitude of rural-urban healthcare disparities in Plateau State. This study seeks to fill this gap by examining differences in healthcare accessibility, affordability, and utilization between rural and urban populations. By employing Fisher's Discriminant Analysis, the study aims to identify key determinants of healthcare access and provide evidence-based recommendations for policy interventions.

MATERIALS AND METHODS

Study Design

This will be a cross-sectional quantitative study using survey methodology. The study was conducted in 3 rural and 3 urban areas across six LGAs purposively selected across the Plateau North Senatorial Zone of Plateau State, Nigeria.

Study Population and Sample Size

The study population consists of adults aged 18 years and above living in selected rural and urban settlements from each of the six LGAs. A sample size of 384 participants (192 from rural and 192 from urban LGAs), was calculated using a 95% confidence level and a 5% margin of error. A multi-stage sampling technique was employed, beginning with the purposive selection of 3 rural and 3 urban LGAs from the Plateau North Senatorial Zone (Stage 1), followed by the simple random selection of 4 electoral wards from each LGA, totalling 24 wards (Stage 2). Subsequently, systematic random sampling was used to select 16 households from each ward, resulting in 384 households (Stage 3), and finally, one adult was randomly chosen from each household to participate in the study (Stage 4).

Data Collection and Analysis

Data was collected using a pre-tested structured questionnaire. Information was gathered on demographics, healthcare access indicators, healthcare utilization, and health outcomes.

To distinguish between the two cohorts of accessibility to health care, urban and rural settlement, Fisher's Discriminant Analysis Technique was employed. This statistical technique reveals whether there exists a significant difference between the two groups and identifies the key variable(s) contributing to this disparity (Alade et al, 2023). Additionally, descriptive statistics; including tables were utilized to supplement the insights gained from the collected data. The analysis was facilitated through the utilization of Statgraphics and StatAssist software tools.

RESULTS AND DISCUSSION

The frequency tables reveal that the sample has a good urban-rural mix in the responses obtained, with 57% from urban and 43% from rural areas. Educational attainment is moderately high, with over 80% having secondary or tertiary education. Most respondents are economically active as self-employed or salaried workers.

In terms of healthcare access, while a majority can reach facilities within 30 minutes, geographical barriers appear more pronounced for rural groups. Walking and public transportation are the most common modes of transport. Around 35% had foregone care in the past year due to financial constraints. Only 32% have any health insurance coverage. Regarding service utilization, vaccination rates for children are good but there appear to be gaps in maternal healthcare with low antenatal care coverage and continued home deliveries. Under-5 mortality is high at 30%.

The Discriminant Analysis

Table 1: Tests of Equality of Group Means

	Wilks' Lambda	F-ratio	Sig.
Gender	0.979	1.362	0.248
Age	1.000	0.005	0.945
Educational Status	0.887	8.046	0.006
Employment Status	0.995	0.348	0.558
Average monthly income	0.982	1.145	0.289
How long does it take you to reach the nearest health facility	0.765	19.396	0.000
What means of transportation do you usually use to reach the health facility?	0.952	3.155	0.081
In the past year, did you or your family member not go to a health facility when needed due to lack of money?	0.976	1.575	0.214
Are you enrolled in the National Health Insurance Scheme or any other health insurance plan?	0.974	1.680	0.200
In the past year, how many times did you visit a hospital/health facility when you or a family member was sick?	0.991	0.600	0.441
Have your children under 5 years received the BCG vaccines?	0.994	0.352	0.555
Have your children under 5 years received the Measles vaccines?	1.000	0.013	0.910
Have your children under 5 years received the Polio vaccines?	1.000	0.023	0.880
Have your children under 5 years received the DPT vaccines?	0.997	0.207	0.651
For women: Did you receive antenatal care during your last pregnancy?	0.952	3.199	0.078
For women: Where did you deliver your last child? Home/Health facility?	0.996	0.251	0.618
In the past year, did any of your children under 5 years die?	0.986	0.893	0.348
In general, how would you rate your family's health?	0.957	2.811	0.099

Table 1 shows the Tests of Equality of Group Means and it was observed that educational status and time to reach the health facility have significant p-values, indicating their means differ significantly between rural and urban. Educational attainment is likely higher in urban areas. The time to reach facilities is longer in rural areas. This provides quantitative evidence for two of the key barriers faced by rural populations hypothesized in the study - lack of proximity to health facilities and lower education levels.

Table 2: Test of Function

Wilks' Lambda	Chi-square	Degree of freedom	Sig.
0.577	29.741	18	0.040

Table 2 shows a Wilks' lambda value of 0.577 which indicates the moderate discriminatory ability of the model. Since the value is closer to 0 than 1, it suggests the model can differentiate between rural and urban groups fairly well based on the predictors. This is important for the study because it indicates there are significant differences in healthcare access between rural and urban areas that the model can detect.

The classification results showed a 67.7% cross-validated accuracy which indicates that the model has a good predictive ability to classify individuals into rural or urban solely based on their healthcare access parameters. This further validates that healthcare access significantly differs between rural and urban populations.

Table 3: Standardized Canonical Discriminant Function Coefficients

Variable	Function
Gender	0.177
Age	0.137
Educational Status	-0.472
Employment Status	-0.195
Average monthly income	0.094
How long does it take you to reach the nearest health facility	0.837
What means of transportation do you usually use to reach the health facility?	-0.604
In the past year, did you or your family member not go to a health facility when needed due to lack of money?	0.136
Are you enrolled in the National Health Insurance Scheme or any other health insurance plan?	0.258
In the past year, how many times did you visit a hospital/health facility when you or a family member was sick?	0.296
Have your children under 5 years received the BCG vaccines?	-0.423
Have your children under 5 years received the Measles vaccines?	0.023
Have your children under 5 years received the Polio vaccines?	0.609
Have your children under 5 years received the DPT vaccines?	-0.603
For women: Did you receive antenatal care during your last pregnancy?	0.305
For women: Where did you deliver your last child? Home/Health facility?	0.484
In the past year, did any of your children under 5 years die?	-0.324
In general, how would you rate your family's health?	-0.127

Table 3 shows that the time to reach the facility (0.837) and transportation used (-0.604) have the highest correlations with the discriminant function. This further reinforces that geographic access is a major differentiator between rural and urban healthcare access. Transportation barriers also emerge.

Table 4: Functions at Group Centroids

Location	Function
Urban	-0.689
Rural	1.033

Table 4 shows the Group Centroids and it indicates that the Rural group has a large positive function mean while the urban has a large negative mean. This indicates the function maximally separates the two groups based on the predictor variables. This demonstrates that healthcare access is poorer in rural areas compared to urban areas.

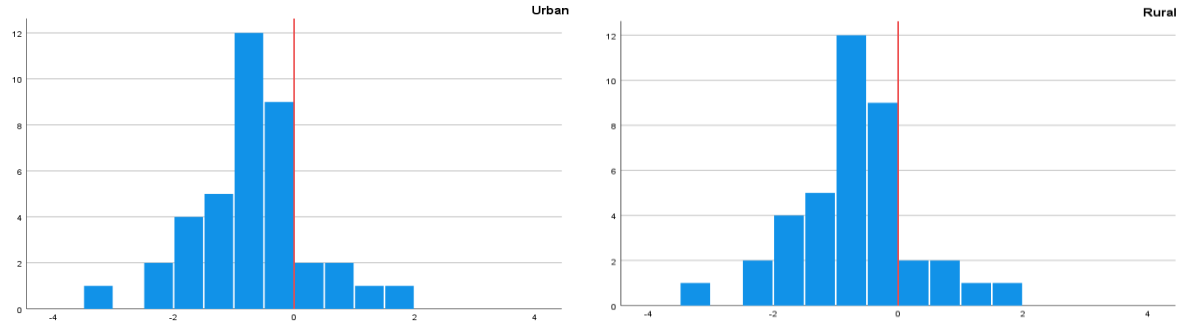

Figure 1: The canonical functions

Figure 1 visually reinforces the statistical findings that healthcare access is substantially poorer in rural areas compared to urban areas. The separation of the two groups confirms that geographic access, transportation, financial constraints, and health awareness are key differentiators. The canonical functions validate the need for targeted policy interventions, such as expanding rural health infrastructure, reducing travel barriers, and increasing health insurance coverage, to bridge these disparities.

Table 5: Classification Function Coefficients

Factor	Location	
	Urban	**Rural**
Gender	45.528	46.407
Age	3.900	3.932
Educational Status	18.800	17.789
Employment Status	-15.009	-15.365
Average monthly income	0.001	.001
How long does it take you to reach the nearest health facility	-6.662	-3.994
What means of transportation do you usually use to reach the health facility?	-2.615	-3.550
In the past year, did you or your family member not go to a health facility when needed due to lack of money?	30.551	31.034
Are you enrolled in the National Health Insurance Scheme or any other health insurance plan?	78.679	79.625
In the past year, how many times did you visit a hospital/health facility when you or a family member was sick?	8.840	9.490
Have your children under 5 years received the BCG vaccines?	22.825	21.118
Have your children under 5 years received the Measles vaccines?	-15.584	-15.496
Have your children under 5 years received the Polio vaccines?	40.175	43.321
Have your children under 5 years received the DPT vaccines?	-23.398	-25.730
For women: Did you receive antenatal care during your last pregnancy?	18.382	19.709
For women: Where did you deliver your last child? Home/Health facility?	25.885	27.534
In the past year, did any of your children under 5 years die?	-7.712	-8.868
In general, how would you rate your family's health? Excellent/Good/Fair/Poor	17.160	16.845
(Constant)	-282.214	-288.071

Table 5 shows the coefficients for the logistic regression model that can classify cases into rural or urban groups based on their healthcare access characteristics. The coefficients are used in a discriminant score formula to predict group membership for each case. A positive coefficient indicates the variable is more associated with rural locations, while a negative coefficient indicates an association with urban areas. Larger absolute coefficient values reflect stronger associations.

The coefficients showed that the time taken to reach health facilities has a negative coefficient in the urban model and a positive in the rural model. This suggests longer time to reach facilities is more strongly associated with rural areas, aligning with geographical access barriers faced by these groups. The use of transportation methods like cars has negative coefficients in both models but is larger in the rural model, reflecting that car ownership and transportation access are associated more with urban populations.

Experiencing a lack of money preventing facility visits shows positive coefficients, slightly higher in the rural model, indicating financial constraints are a greater barrier in rural areas. Health insurance enrollment has a large positive coefficient in both models, implying it is universally low across groups. The frequency of facility visits has a small positive coefficient in both models. For childhood vaccinations, uptake generally has negative coefficients in the rural model, suggesting vaccination coverage is lower among rural children.

The discriminant analysis shows that the study agrees with the hypothesis that healthcare access is poorer among rural versus urban populations. Time taken to reach facilities and transportation used are key differentiators between both groups. Financial barriers to access are also greater for rural residents. Vaccination coverage among rural children is lower. The model has good predictive accuracy in classifying rural and urban groups based on healthcare access factors.

CONCLUSION

This study has identified significant disparities in healthcare access and utilization between rural and urban populations in Plateau State, Nigeria. The findings reveal that rural residents experience greater challenges, including longer travel times to health facilities, fewer transportation options, higher financial constraints, and lower health insurance coverage. These barriers contribute to reduced utilization of essential healthcare services, particularly maternal and child health services, leading to poorer health outcomes such as higher under-five mortality rates in rural areas.

Fisher's Discriminant Analysis was instrumental in identifying key factors that significantly differentiate rural and urban settlements in terms of healthcare access. The study found that educational status, proximity to health facilities, and mode of transportation were the strongest determinants of healthcare accessibility. Rural populations had lower educational attainment, which correlated with limited health awareness and lower service utilization. Additionally, rural residents faced longer travel times to health facilities due to sparse distribution, and their reliance on less efficient means of transportation further hindered access to timely medical care.

The study highlights the need for targeted policy interventions to bridge these disparities. Expanding rural healthcare infrastructure, improving road networks, and increasing financial accessibility through subsidized healthcare services and expanded health insurance coverage are essential steps toward equitable healthcare. Furthermore, community-based health education programs can enhance awareness and encourage service utilization. Addressing these rural-urban healthcare inequities is crucial for achieving Universal Health Coverage (UHC) and meeting Sustainable Development Goals (SDGs) related to health and well-being. Strengthening healthcare policies and implementing evidence-based interventions will help ensure equitable and improved healthcare delivery across Plateau State.

RECOMMENDATIONS

i. Expand health infrastructure like primary health centres and referral hospitals in rural and remote areas to bring services closer to rural settlements. Deploy and incentivize health workers, especially midwives, to rural postings.
ii. Subsidize user fees and expand health insurance coverage to make healthcare affordable for the rural poor. Enrol more low-income groups into the national insurance scheme.
iii. Conduct health literacy campaigns, particularly targeting rural women to raise awareness and demand for maternal, child and preventive health services. Engage local leaders and community health volunteers.
iv. Expand the geographic scope of future studies to include other regions of Plateau State and Nigeria to provide a more comprehensive understanding of rural-urban disparities.

ACKNOWLEDGEMENT

The research work was made possible through a grant from Tertiary Education Trust Fund (TETFUND), Nigeria. The contents are solely the possibilities of the author and do not represent the official views of the funding organization. My appreciation goes to the sponsors, TETFUND and also the management of Plateau State Polytechnic, Barkin Ladi for their support.

REFERENCES

Adepoju, P. (2023). Strengthening primary healthcare systems in Nigeria: Policy and funding considerations. *Global Health Research and Policy, 8*(1), 21-34.

Akinyemi, J. O., & Adedini, S. A. (2021). Urban-rural disparities in healthcare access and utilization in Nigeria: A multilevel analysis. *BMC Health Services Research, 21*(1), 654.

Alade, S. P., Suan, L. I., & Abu, C. (2023). Urban-rural disparities in food security: An analysis of household survey data in Plateau State, Nigeria. *FUDMA Journal of Sciences, 7*(5), 18-23. https://doi.org/10.33003/fjs-2023-0705-1991

National Population Commission [NPC]. (2021). *Nigeria Population and Health Report 2021*. Abuja: NPC.

Nigeria Demographic and Health Survey [NDHS]. (2018). *Nigeria DHS Final Report 2018.* Abuja: NPC and ICF International.

Okpani, A. I., & Abimbola, S. (2022). Revisiting Nigeria's National Health Insurance Scheme: Achievements and challenges. *BMC Health Policy and Planning, 37*(3), 211-226.

Onwujekwe, O., Uzochukwu, B., & Hanson, K. (2022). The burden of out-of-pocket healthcare spending in Nigeria: An equity perspective. *Health Economics Review, 12*(1), 10-22.

Sakeah, E., McCloskey, L., Yeboah-Antwi, K., Mills, S., & Doctor, H. V. (2020). Differences in healthcare-seeking behaviour between rural and urban women in resource-poor settings. *BMC Health Services Research, 20*, 211.

United Nations Development Programme [UNDP]. (2022). *Nigeria Human Development Report 2022: Progress towards SDGs.* New York: UNDP.

Uzochukwu, B., Onwujekwe, O., & Ezumah, N. (2022). Healthcare financing reforms in Nigeria: Strategies for achieving Universal Health Coverage. *Nigerian Journal of Public Health, 44*(2), 103-117.

World Bank. (2022). *Global Healthcare Equity Report 2022: Strengthening health systems in developing countries.* Washington, DC: World Bank.

World Health Organization [WHO]. (2023). *Global Health Statistics 2023: Health workforce distribution and service access.* Geneva: WHO.

Yaya, S., Uthman, O. A., Amouzou, A., & Bishwajit, G. (2021). Rural-urban disparities in maternal and child healthcare utilization in Nigeria: A national survey analysis. *PLOS ONE, 16*(7), e0254003.