Factors Associated with Access to Maternal Health Services in Primary Health Care Centers in Karu Local Government Area of Nasarawa State, Nigeria

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Abstract- Background: ***Despite progress, access to maternal health services remains a challenge in sub-Saharan Africa, where only 56% of births occur in health facilities. Understanding local determinants of access is essential for improving maternal and child health outcomes.***

Objective: ***This study assessed factors influencing access to primary health care (PHC) services among pregnant women in Karu Local Government Area (LGA), Nasarawa State, Nigeria, and examined their relationship with child mortality.***

Methods: ***A descriptive cross-sectional study employing a mixed-method approach was conducted. Quantitative data were collected from 355 mothers using structured questionnaires, while qualitative insights were obtained through in-depth interviews. A multi-stage sampling technique selected respondents from three wards (Karshi II, Uke, and Karu). Data were analysed using SPSS with chi-square tests and binary logistic regression.***

Results: ***Overall, 75% of mothers reported access to PHC services, with Karu ward recording the highest utilisation (69.9%). Socio-demographic characteristics significantly associated with access included ward ($\chi 2$ =14.999, p=0.001), religion (LR =14.368, p=0.003), and husband's income ($\chi 2$=22.568, p=0.000). Waiting time emerged as the most significant barrier to access (χ^2 = 4.069, p = 0.044). Child mortality was significantly associated with ward ($\chi 2$=11.522, p=0.003), mother's occupation (LR=13.306, p=0.038), mother's age (LR=13.156, p=0.011), duration of PHC access ($\chi 2$=13.791, p=0.008), and husband's income ($\chi 2$=12.103, p=0.033). Notably, 85.8% of respondents with good PHC access reported reduced child mortality (p=0.006).***

Conclusion: ***Access to PHC services in Karu LGA is relatively high, and improved access is significantly associated with reduced child mortality. Targeted interventions addressing waiting times and socio-economic disparities could further enhance service utilisation and maternal-child health outcomes.***

Keywords: ***Access, Pregnant women, Antenatal, Primary healthcare, and Karu LGA.***

I. INTRODUCTION

The Alma-Ata Declaration of 1978 heralded the primary healthcare system globally, aiming to promote access to essential healthcare services and recognizing it as a fundamental human right (1). Despite that breakthrough, primary healthcare accessibility remains notably low amongst low and middle-income countries (2). It becomes crucial to explore factors influencing access to primary healthcare in resource-limited settings (1). Access to primary healthcare services, specifically, serves as a significant proxy measure for Universal Health Coverage (UHC), offering a means to assess healthcare system performance and uncover opportunities for advancing UHC (3), which is critical to reducing the world burden of morbidity and mortality (4,5).

In 2020, approximately 287,000 women lost their lives due to complications related to pregnancy and childbirth (6). While global maternal mortality rates showed notable decline from 2000 to 2015, progress stalled between 2016 and 2023, with little to no improvement in the rate of reduction (7).

Lack of access to healthcare before, during, and after delivery has led to a higher prevalence of infant mortality in both developing and underdeveloped countries (6).

Despite Primary Health Care (PHC) being intended for universal access to skilled pregnancy care to prevent maternal deaths, there is limited understanding of the factors influencing its utilisation for professional maternity care in rural areas of Nigeria (8).

The importance of the study aims in identifying and understanding the factors affecting access to primary health care services among pregnant and postnatal women. By exploring these factors and their impact

on child mortality, the research aims to contribute valuable insights to inform targeted interventions and policies, ultimately improving the region's maternal and child health outcomes. Findings from this study will also enhance existing literature on this phenomenon by identifying the dangers of lack of access to PHCs, the various factors that hinder their optimal usage and their effect on child mortality.

This study aims to assess factors associated with access to Maternal health services in primary health care centres and their effect on child mortality in Karu Local Government Area, Nasarawa State.

The specific objectives are as follows:

1. To determine the factors affecting access to primary health care services among women attending antenatal and post-natal clinics in Karu LGA.
2. To identify the factors associated with child mortality among women attending antenatal and post-natal PHCs in Karu LGA.
3. To ascertain the association between access to primary health care services and child mortality rates among women attending antenatal and post-natal clinics.

The following hypotheses were tested in this study:

Hypothesis 1
Ho: There is no association between Socio-demographic characteristics and access to primary health care services among women attending antenatal/postnatal clinics at $P > 0.05$

Hypothesis 2
Ho: There is no association between access to primary healthcare services and the factors that hinders access to PHC services among women attending antenatal/postnatal clinics at $P > 0.05$.

Hypothesis 3
Ho: There is no association between Socio-demographic characteristics and the occurrence of child mortality among women attending antenatal/postnatal clinics at $P > 0.05$

Hypothesis 4
Ho: There is no association between access to primary healthcare services and child mortality in Karu Local Government Area at $P > 0.05$

II. METHODS

Study design:
We conducted a descriptive cross-sectional study using a mixed-method approach in Karu Local Government Area (LGA), Nasarawa State, Nigeria. For the quantitative method, data were collected using a questionnaire to answer the research questions and test the hypotheses. For the qualitative, an exploratory approach was used to elucidate more insights into the research objectives.

Setting:
The Karu Local Government Area is positioned within Nasarawa State and covers an allocated Planning Area spanning roughly 800 square kilometres. It is comprised of 11 wards. This study was conducted in twelve (12) selected primary health care facilities in three wards (Karshi II, Uke, and Karu) at Karu Local Government Area, Nasarawa State. The study was carried out between April and September 2024 in 12 selected Primary Health Care (PHC) facilities across three wards (Karshi II, Uke, and Karu).

Study Population:
The target population for this study consisted of women of childbearing age (15-49 years) living in Karu Local Government Area.

Inclusion criteria:
Women who were pregnant or had at least one child, resided in Karu LGA, seeking maternal and child health services in the selected PHCs and consented to participate.
Exclusion criteria:
Women who did not give consent or those not seeking maternal and child health services in the selected facilities.

Sample Size Determination:
The minimum sample size of 355 respondents was determined using the Cochran and Leslie-Fischer formula (9).
The statistical formula for calculating sample size is given below;

$$n = Z^2 pq/d^2$$

Where n = the sample size
p = the proportion of access to PHC services by pregnant women in Nasarawa state (67.3%)
Z = Confidence level of 95% = 1.96
q = 1 - P; (1 - 0.673) = 0.327

d = Margin of error or measure of precision = 0.05
In this study, p is the proportion of respondents who accessed health care centres during their antenatal visits was given as 67.3% (10). This figure represents the rate of access to PHC services in Nasarawa State.

Inputting the above parameters in the formula;

$$n = \frac{1.96^2 \times 0.136 (1 - 0.673)}{0.05^2} = \frac{3.8416 \times 0.673 \times 0.327}{0.0025} = \frac{0.8454}{0.0025} = 338$$

n = 338.
The minimum sample size was adjusted by 5% to account for recording errors.
n = 355 respondents.

Sampling Techniques:
The study sample was selected through a multi-stage sampling procedure.

Stage 1: First, there are 11 wards in the Karu LGA, three wards were randomly selected using the simple random method of balloting (Karshi II, Uke and Karu wards).

Stage 2: Out of 45 PHCs across three wards (Karshi II – 16, Uke – 9, Karu – 20),four (4) PHCs were selected randomly using a random number generator method from the three selected wards, making a total of 12 public PHCs.

Stage 3: Using systematic random sampling, 355 pregnant and nursing mothers were recruited in proportion to the number of ANC/PNC attendees per facility. Every *nth* attendee from the registers was approached until the sample size was reached (Karshi II – 71, Uke – 37, Karu – 247).
For the qualitative arm, purposive sampling was used to recruit 12 Officers-in-Charge (OICs) of PHCs for in-depth interviews.

Data collection:
Data were collected using a structured, self-administered questionnaire adapted from a study (11). It had four sections: consent, socio-demographics, factors affecting PHC access, and factors linked to child mortality. Two trained research assistants fluent in English and Hausa administered the questionnaire.

For the qualitative method, in-depth interviews (IDIs) adapted from a study (11) were conducted with 12 Officers-in-Charge (OICs) across selected facilities. Using purposive sampling, the interviews explored factors hindering access to PHC services in Karu LGA, and all sessions were recorded.

Validity of the Research Instrument:
The questionnaire was adapted from previously validated tools (11) following a literature review to ensure relevance to the study context. Content validity was strengthened through review by subject matter experts in reproductive health and family planning, whose feedback guided refinement of the instrument.

Data Analysis:
Quantitative data were checked, entered into Microsoft Excel, and analyzed using SPSS version 20. Descriptive statistics were presented as frequencies and percentages. Chi-square and binary logistic regression analyses were performed, with statistical significance set at $p \leq 0.05$.

Qualitative data were transcribed and analyzed thematically using Otter and QDA Miner software. Responses were coded, grouped into themes, and supported with illustrative quotes.

Ethical Considerations:
Ethical approval was obtained from the Health Research and Ethics Committee of Bingham University Teaching Hospital. Permission was also obtained from the Karu LGA Primary Health Care Board and heads of selected PHCs. Informed written consent was obtained from all participants after explaining the study objectives, procedures, risks, and benefits. Confidentiality and anonymity were assured, and participation was voluntary with the option to withdraw at any stage.

III. RESULTS

Socio-demographic Characteristics of Respondents
Out of the 355 respondents who attempted the questionnaire, 346 (98%) filled it out correctly.
Most respondents were from Karu ward (69.9%), married (97.1%), and aged 25–34 years (59.8%).

Over half engaged in business (52.3%), with secondary (50.3%) and tertiary (33.3%) education being most common. The majority were Christians (76.6%). PHC use ranged from <6 months (30.1%) to >3 years (28.9%). Nearly half earned below ₦10,000 (45.4%), while 47.1% did not know their husbands' income.

Factors affecting access to primary health care services among respondents:

Key barriers to access included distance (22.7%) and lack of transport (21.5%), though 22.5% reported none. A majority (75.4%) faced no challenges in ANC/PNC access. Service quality was rated good (52.9%) or excellent (40.5%). Most respondents found costs moderate (61.8%) and noted no extra expenses (74%). Figure 1, as shown below, gave more insight into the focus group discussion on the factors affecting access to PHC services.

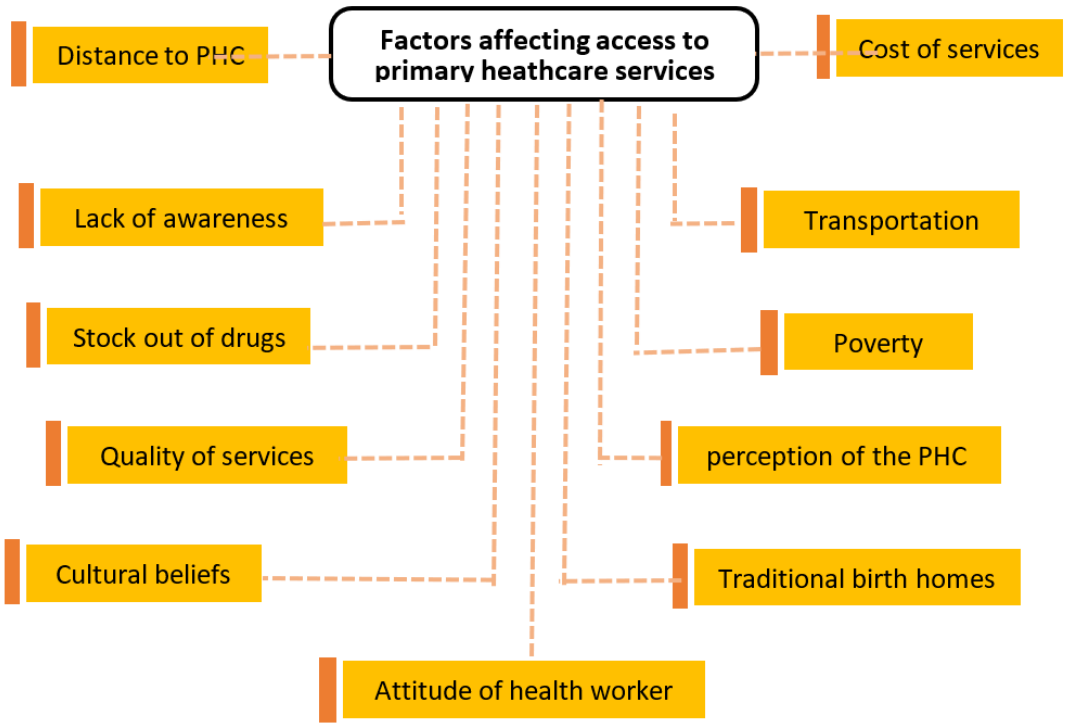

Figure 1: factors militating against access to primary healthcare services.
Source: (Field survey, 2024)

Factors associated with child mortality among respondents:

Most respondents (79.8%) reported no child illness, and 84.1% no child deaths in the past five years, though 37% had lost one child previously. Reported causes of child death included sickness (20.1%), lack of money (15.7%), and unknown causes (13.4%). Over two-thirds (67.6%) delivered their last child at PHCs, with smaller proportions using homes (17.1%) or private hospitals (14.2%). Most interviewees reported no recent mortality trends, attributing this to improved immunisation uptake. However, a few PHCs recorded child deaths, with service providers linking them to various contributing factors, as shown in Figure 2.

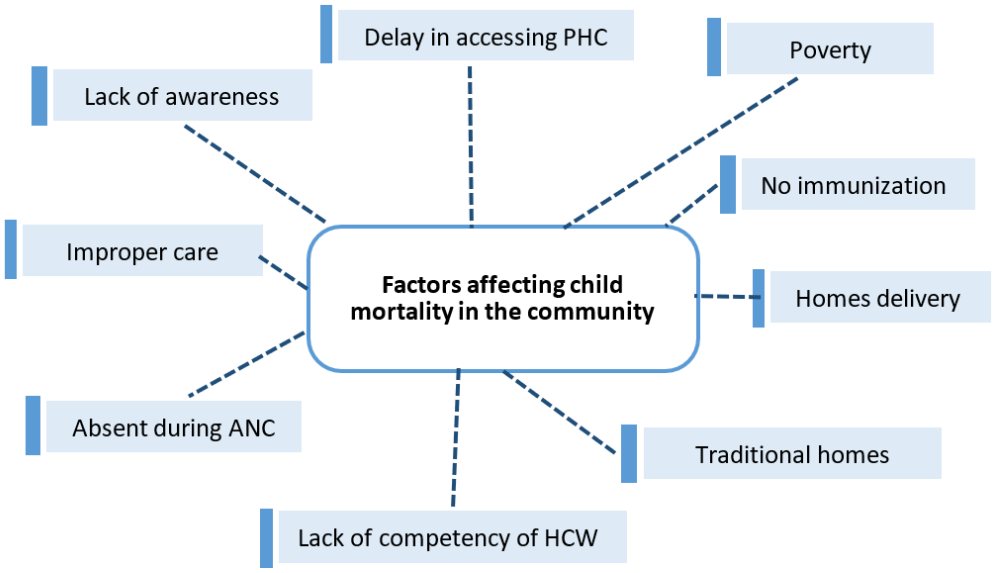

Figure 2: factors affecting child mortality in the mapped communities.
Source: (Field survey, 2024)

Test of Research Hypotheses

The study tested its hypotheses at a 5% significance level ($p < 0.05$) using Chi-square to assess associations and binary logistic regression.

Association between respondents' characteristics and access to PHC

The analysis showed a significant association between women's access to PHC services and their ward of residence (p = 0.001), religion (p = 0.003), and husband's income (p < 0.001). Other socio-demographic characteristics had no significant effect (Table 1).

Table 1: Association between respondents' characteristics and access to PHC

Characteristics		No access		Access		
		Freq	(%)	Freq	(%)	Statistics
Ward	Karshi II	5	5.9	65	24.9	$\chi2 = 14.999$
	Uke	8	9.4	26	10	P = 0.001*
	Karu	72	84.7	170	65.1	
	Married	82	96.5	254	97.3	$\chi2 = 1.423$
Marital status	Single	2	2.4	3	1.1	P = 0.700
	Separated/Divorced	0	0.0	2	0.8	
	Widowed	1	1.2	2	0.8	
	Farming	12	14.1	28	10.7	$\chi2 = 6.540$
	Trading	10	11.8	19	7.3	P = 0.366
	Business	45	52.9	136	52.1	
Occupation	Artisan	2	2.4	14	5.4	
	Civil servant	4	4.7	18	6.9	
	Unemployed/House wife	12	14.1	38	14.6	
	Others	0	0.0	8	3.1	
	No school	3	3.5	20	7.7	$\chi2 = 2.337$
	Primary	9	10.6	22	8.4	P = 0.674
Level of Education	Secondary	45	52.9	129	49.4	
	Tertiary	27	31.8	88	33.7	
	Christianity	73	85.9	192	73.6	LR = 14.368
Religion	Muslim	10	11.8	67	25.7	P = 0.003*
	Traditional	2	2.4	0	0.0	

	Others	0	0.0	2	0.8	
	15-24	19	22.4	56	21.5	LR = 6.129
	25-34	46	54.1	161	61.7	P = 0.190
Age	35-44	17	20	39	14.9	
	45-54	0	0.0	3	1.1	
	55-65	3	3.5	2	0.8	
	< 6 months	26	30.6	78	29.9	$\chi2$= 3.838
How long	1 year	15	17.6	50	19.2	P = 0.428
have you been	2 years	15	17.6	29	11.1	
using this	3 years	5	5.9	28	10.7	
PHC	> 3 years	24	28.2	76	29.1	
	< N10,000	34	40	123	47.1	$\chi2$= 4.609
	N10,000-N30,000	26	30.6	79	30.3	P = 0.330
Wife's income	N31,000-N50,000	10	11.8	29	11.1	
	N51,000-N80,000	11	12.9	16	6.1	
	N81,000 and above	4	4.7	14	5.4	
	< N10,000	9	10.6	6	2.3	$\chi2$= 22.568
	N10,000-N30,000	14	16.5	30	11.5	P = 0.000*
Husband's	N31,000-N50,000	12	15.3	30	11.5	
income	N51,000-N80,000	10	11.8	20	7.7	
	N81,000 and above	15	17.6	36	13.8	
	I don't know	24	28.2	139	53.3	

* Indicate significant at p<0.05; LR - Likelihood Ratio

Association between access to PHC services and the factors militating against access

As shown in Table 2, among the factors assessed, only waiting time showed a significant association with access to PHC services (p = 0.044). Other potential barriers were not statistically significant.

Table 2: Association between access to PHC services and the factors militating against access

Characteristics		No Access		Access		Statistics
		Freq	(%)	Freq	(%)	
Distance	No	56	56.7	175	67	$\chi2$ = 0.039
	Yes	29	28.3	86	33	P = 0.843
Transportation	No	52	61.2	185	70.9	$\chi2$ = 2.799
	Yes	33	38.8	76	29.1	P = 0.094
Cost of services	No	70	82.4	222	85.1	$\chi2$ = 0.356
	Yes	15	17.6	39	14.9	P = 0.551
Cultural belief	No	75	88.2	241	92.3	$\chi2$ = 1.362
	Yes	10	11.8	20	7.7	P = 0.243
Lack of awareness	No	77	90.6	241	92.3	$\chi2$ = 0.264
	Yes	8	9.4	20	7.7	P = 0.608
Quality of services	No	72	84.7	226	86.6	$\chi2$ = 0.191
	Yes	13	15.3	35	13.4	P = 0.662
Attitude of Health	No	73	85.9	233	89.3	$\chi2$= 0.721
worker	Yes	12	14.1	28	10.7	P = 0.396
Waiting time	No	75	88.2	247	94.6	$\chi2$= 4.069
	Yes	10	11.8	14	5.4	P = 0.044*

* Indicate significance at p<0.05

Association between access to primary healthcare services and child mortality.
Table 3 shows that Access to PHC services was significantly associated with reduced child mortality (p = 0.006), with 85.8% of mothers who had good access reporting lower child deaths. Thus, the alternate hypothesis was accepted.

Table 3: Association between access to primary healthcare services and child mortality

Characteristics		Access to PHC				Statistics
		No Access		Access		
		Freq	(%)	Freq	(%)	
Child mortality	No	62	72.9	224	85.8	$\chi 2 = 7.424$
	Yes	23	27.1	37	14.2	P = 0.006*

* Indicate significant at p<0.05

IV. DISCUSSION

This study examined factors influencing access to primary healthcare (PHC) services and their association with child mortality in Karu LGA. Findings revealed that location, religion, and husband's income significantly influenced PHC access, consistent with (12,13), who highlighted the role of religion and household income in healthcare utilisation. However, education, marital status, and age were not significant, contrasting with (14,15), who reported positive associations between education and maternal health service use.

Among barriers to access, only waiting time was statistically significant, aligning with (16,17,18), who identified waiting time as a major predictor of service utilization. Unlike (19), this study found cost to be less of a barrier, possibly due to spousal financial support among married women in Karu.

For child mortality, location, occupation, age, duration of PHC use, and husband's income were significant predictors. These results support earlier studies showing geographic disparities (20), employment and economic status (21), and ANC attendance (22) as critical determinants. The higher mortality among women aged 25–34 aligns with (23), though education showed no effect, diverging from (24,25).

Finally, good access to PHCs was strongly associated with reduced child mortality (p = 0.006), in line with (26). However, interviews highlighted that deaths still occur due to delayed care-seeking and lack of ANC attendance. This underscores the need for community awareness interventions to complement facility access.

Limitations of the Study:
This study pinpoints some limitations that may impact the study. Firstly, the study was conducted in a specific geographic area (Karu LGA of Nasarawa State) and may not be a true reflection of other regions in the state. Secondly, findings rely on self-reported data from mothers accessing maternal health services, which may be subject to recall bias or social desirability bias.

V. CONCLUSION AND RECOMMENDATION

This study demonstrates that access to primary healthcare (PHC) services in Karu LGA, Nasarawa State, is relatively high, reflecting positive trends in maternal and child health service utilization. Access was significantly influenced by location, religion, and husband's income, indicating that geographic distribution of facilities, community engagement through religious structures, and household economic capacity remain critical determinants. Although barriers such as distance, transportation, cost, and health worker attitudes were identified, waiting time emerged as the only statistically significant constraint. Child mortality was closely associated with socio-economic and service-use factors, including location, occupation, age, duration of PHC use, and household income. Importantly, improved access to PHC was strongly linked with

reduced child mortality, underscoring the pivotal role of PHCs in advancing maternal and child health outcomes in low-resource settings.

Recommendations

Strengthening PHCs in Karu LGA requires a multi-level approach. Policymakers should prioritize renovation of facilities, ensure a steady supply of affordable essential drugs, address manpower shortages, and establish regular monitoring mechanisms. Health facilities need to maintain infrastructure, improve drug inventory management, and collaborate with local authorities for accountability. Health workers should actively engage communities to raise awareness of available services and advocate for improved staffing and working conditions to enhance service delivery.

By addressing systemic bottlenecks while reinforcing socio-economic and cultural enablers, PHCs in Karu LGA can expand equitable access, reduce preventable mortality, and significantly improve the health and well-being of mothers and children.

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