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Original Research Article

Sociodemographic correlates of utilisation of basic emergency obstetrics and newborn care services in urban and rural Kaduna, Nigeria

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ABSTRACT

Background: Nigeria contributes significantly to global maternal mortality, with Kaduna State reporting 1,025 deaths per 100,000 live births. Basic emergency obstetric and newborn care (BEmONC) services can prevent 60% of these deaths, but utilisation between urban and rural areas remain poorly understood. This study compared the correlates of BEmONC services utilisation between urban and rural Kaduna.
Methods: A comparative cross-sectional study was conducted. Data were collected through interviews from 720 women (328 urban, 392 rural) who delivered within 36 months prior to the study. The assessment utilised WHO Emergency Obstetric Care indicators and data was analysed using IBM SPSS Statistics v26.
Results: In urban areas, women aged 15-24 years were more likely than those aged≥45 years to utilise BEmONC services, (aOR: 5.4; 95% CI: 1.1-25.6; p=0.033). Women with higher monthly household income earnings of ≥50,001 were more likely to utilise BEmONC services than those earning ≤₦10,000 (aOR: 7.4; 95% CI: 2.6-20.8, p=<0.001). While in rural areas, women who were married for ≥21 years were more likely than those married for ≤5 years to utilise BEmONC services (aOR: 10.9; 95% CI: 1.1-112.8; p=0.045). Women from households with monthly income of ≥₦50,000 (aOR: 7.0; 95% CI: 2.0-25.2; p=0.003) were more likely than those with income ≤₦10,000 to utilise BEmONC services.
Conclusions: Strengthening service delivery and addressing barriers to utilisation is crucial for improving maternal and newborn outcomes in Kaduna State.

Keywords: Basic emergency obstetric newborn care, Correlates, Rural, Socio-demographics, Utilisation, Urban

INTRODUCTION

Maternal mortality remains a critical global health challenge, with approximately 15% of pregnancies resulting in life-threatening complications during pregnancy, childbirth or the puerperium. In developing nations, healthcare systems continue to struggle with providing essential emergency obstetric and newborn care services.[1] Nigeria contributes significantly to global maternal mortality, recording approximately 82,000 maternal deaths and 262,000 neonatal deaths annually. The country reported a maternal mortality ratio of 512 per 100,000 live births and a neonatal mortality rate of 35 per 1,000 live births.[2] Kaduna State faces particularly severe

challenges, with a maternal mortality ratio of 1,025 per 100,000 live births and a neonatal mortality rate of 47 per 1,000 live births.[3] Evidence suggests that appropriate implementation of BEmONC services could prevent 60% of maternal deaths and 85% of intrapartum-related deaths annually. However, establishing and maintaining these services in developing countries remains challenging, with potential disparities between urban and rural healthcare delivery. There is a lifetime risk of one in every 22 women dying because of pregnancy, delivery, post-partum or post-abortion.[4-6]

However, instituting such services in developing countries has remained a challenge. Even in situations where such services have been instituted, there is the possibility of disparities between the rural and urban regions in terms of their availability and utilisation. Various studies have reported rural-urban disparities in factors associated with underutilization of antenatal care, modern contraceptive use and unmet need for contraception, acceptance and adoption of family planning and birth intervals.[7-10]

BEmONC consists of seven signal functions: administration of parenteral antibiotics, parenteral uterotonic drugs (oxytocin), parenteral anticonvulsants (magnesium sulphate), manual removal of the placenta, removal of retained products, assisted vaginal delivery and basic neonatal resuscitation care.[11] These services are to be provided within the context of community-focused and facility-based health systems to offer prompt prevention for evolving complications thereby saving the lives of mothers and newborns.[1]

In rural communities, the health facilities are often used (80.9%) for delivery as compared to the urban primary healthcare centres where the urban communities have other options such as the secondary and tertiary health facilities.[12] Thus, there is a need for all women to receive basic emergency obstetrics and newborn care services in primary healthcare centres where they commonly deliver to improve the outcome of the complications of pregnancy, delivery and puerperium. Previous studies have focused on comparing BEmONC in primary and secondary facilities or secondary and tertiary facilities.[4,13] Therefore, this study assessed and compared the sociodemographic corelates of utilisation of BEmONC services urban and rural communities in Kaduna State.

METHODS

Study design

A comparative cross-sectional was conducted.

Study population

The study included women who delivered within 36 months prior to the study. The study included public PHCs providing delivery services in selected areas and women who delivered or had stillbirth within 36 months in selected communities who were permanent residents. PHCs providing delivery services for less than three months, women who were not permanent residents or resided less than 36 months and women who delivered outside their community of residence were excluded from the study.

Sample size

The sample size was determined using the formula for hypothesis testing of two population proportions, where a total of 720 participants were used for the entire study.

Study setting

The study was conducted in Kaduna State, Nigeria between the period of October 2023 to February 2024. The State, situated in Nigeria's North-West geo-political zone, encompasses an area of 46,053 km².[14]

It has a projected population of 9.48 million in 2022, comprising 49% females, with 55% of them residing in rural areas.[15] The state's healthcare infrastructure includes 29 secondary health facilities, 1,068 functional primary healthcare centres and six federal tertiary health institutions.[1]

A significant healthcare initiative in 2017 saw the renovation and equipping of one focal Primary Healthcare Centre (PHC) in each of the 255 political wards to provide BEmONC services, supported by the installation of 1.3 megawatts of solar power through partnership with the UK Department for International Development.[16] Healthcare utilisation patterns show that only 35.5% of deliveries are attended by health professionals, with facility-based delivery rates at 32.4% and antenatal care attendance at 43.8%. The primary economic activity is agriculture, with women's occupations distributed across farming (50%), trading (40%), public service (7%) and household management (3%).[3]

Sampling techniques

A multistage sampling technique was used. From each of the three senatorial districts (Kaduna North and Kaduna South made up of eight LGAs each while Kaduna Central is made up of seven), one LGA was selected through simple random sampling by balloting, which made up three local government areas selected.

Through simple random sampling by balloting, three Wards were selected from each of the three selected LGAs, which made up a total of nine Wards. A settlement is a neighborhood with people living within it mostly having similar characteristics. Nigeria's Geo-Referenced Infrastructure and Demographic Data for Development (GRID³) has classified the settlements into urban and rural settlements. A list of these settlements and their classification in the selected wards was obtained from the

Kaduna State Bureau of Statistics. The list was stratified into urban and rural and two settlements were selected from each stratum, which made a total of four settlements from each Ward and a total of 36 settlements across the selected nine wards.

A systematic sampling technique was employed for selecting houses and households. On arrival at each settlement, the houses in the whole settlement were numbered and the total number of houses in the settlement was determined. Then the total number of houses in the settlement was divided by the sample size proportionately allocated to each settlement to get the sampling interval (SI). The first house visited was determined using simple random sampling by balloting. In the selected house, the household having an eligible respondent was identified. A household was taken as a group of people that ate from the same pot. The subsequent houses visited were determined by adding the SI to the serial number of the previous house visited and this process was repeated until the required number of houses for the settlement was visited. Where there was more than one household in the house, one of them was selected for the interview using simple random sampling by balloting.

The eligible respondent in each selected household was identified and interviewed. Where there was more than one eligible respondent, one was selected using simple random sampling by balloting and interviewed. Where there was no eligible respondent in a household, it was exited and next to it was visited. On completion of the interview in one house, the interviewer exited that house and visited a house with a particular number as determined by the sampling interval already calculated. This process continued until the required sample size for each settlement was reached. There were 36 settlements, thus total sample size was 720.

Data collection methods and tools

A structured questionnaire was adapted from the International Budget Partnership questionnaire on maternal health services. The questionnaire was systematically built into Excel format, underwent validation using Nafundi's XLS offline protocol and was subsequently converted to XML format for implementation through Open Data Kit (ODK). The questionnaire was comprehensive, incorporating detailed sections on sociodemographic characteristics and BEmONC service utilisation. Twelve trained research assistants were used for data collection. Community-level utilisation was assessed through detailed interviews regarding women's experiences with BEmONC services.

Study quality control

The study instruments underwent pretesting in Soba local government area, which had similar characteristics to the study areas but was not included in the main study. Approximately 72 copies of the questionnaires (36 in Yakasai-urban and 36 in Farin Kasa-rural) were used for pretesting. This process checked the feasibility of the instruments and familiarised research assistants with data collection procedures. The internal consistency was validated with a Cronbach's alpha of 0.78, indicating reliable instrumentation. Adjustments to the tools were made based on pretesting observations.

Quality control measures included real-time monitoring of data collection through the ODK system. The principal researcher supervised and coordinated the data collection process, ensuring adherence to protocols and maintaining data quality. GPS tracking of research assistants during interviews at households provided additional quality assurance.

Data analysis

Data were downloaded from the ODK server in Excel format and exported to IBM SPSS version 26. Frequency distributions of socio-demographics and reproductive profiles were generated. Statistical analysis included Chi-square tests for larger samples and Fisher's Exact tests for smaller samples to test associations between variables, with statistical significance set at $p<0.05$. Variables showing significant associations in bivariate analysis were further analysed using binary logistic regression to determine independent predictors of BEmONC utilisation.

Ethical considerations

Ethical approval was secured from the Ethical Committee of the Kaduna State Ministry of Health (MOH/ADM/744/VOL.1/1180). The research team also obtained formal permissions from the Kaduna State Primary Health Care Development Agency and engaged with community leaders to ensure cultural sensitivity and community acceptance.

Informed consent was sought form women, by explaining to them the purpose and nature of the study as well as voluntary nature of participation in the study. For literate participants, detailed consent forms were provided for reading and signing. Non-literate participants received the same information through careful translation into Hausa language, with thumbprint documentation of consent. All participants were informed of their right to withdraw from the study at any time without consequences. Data confidentiality was maintained through password protection of electronic records, with access restricted to the principal researcher.

RESULTS

Characteristics of study population

In urban communities, 328 out of 360 women were successfully interviewed (response rate 93%), while in

rural communities, all 392 women approached participated (response rate 100%). The mean age of women was 31.8±8.8 years in urban and 30.9±7.8 years in rural communities, with the majority between 25-34 years in both settings (41.2% urban, 48.7% rural). Most women were married (95.4% urban, 94.4% rural) and of Hausa ethnicity (57.9% in both settings). The predominant religion was Islam (61.0% urban, 56.6% rural). Educational status differed significantly between settings (p=0.015), with more urban women having secondary education (50.3%) compared to rural women (39.8%). Occupation patterns also showed significant differences (p<0.001), with nearly half of urban women (48.8%) and 38.7% of rural women having no occupation (Table 1).

Analysis of marriage characteristics revealed significant differences between settings (Table 2). Age at first marriage differed significantly (p<0.001), with more urban women marrying before age 15 years (19.2%) compared to rural women (3.8%). The mean duration of marriage was 12.7±6.7 years in urban and 10.6±6.7 years in rural communities. Analysis of husband's characteristics and household income (Table 2) showed that more rural husbands had no formal education (27.3%) compared to urban (15.9%, p=0.001) and household income patterns differed significantly between settings (p<0.001).

Sociodemographic correlates of basic emergency obstetric and newborn care utilisation

Bivariate analysis revealed significant associations between BEmONC utilisation and several sociodemographic factors. There was a statistically significant difference between urban and rural women who did not utilise BEmONC services in education ($\chi2$=14.190, p=0.003). There was no statistically significant difference in utilisation of BEmONC services between urban and rural women in age ($\chi2$=6.083, p=0.108), religion ($\chi2$=1.444, p=0.244), ethnicity (FE=6.491, p=0.254) and education ($\chi2$=0.049, p=1.000). There was a statistically significant difference in utilisation of BEmONC services between urban and rural women in terms of occupation (FE=13.427, p=0.025). There was a statistically significant difference between urban and rural women who did not utilise BEmONC services in terms of occupation ($\chi2$=49.533, p=<0.001) and age at first marriage (FE=64.285, p=<0.001). There was a statistically significant difference between urban and rural women who did not utilise BEmONC services in terms of number of living children ($\chi2$=30.148, p=<0.001) and years of marriage (FE=17.188, p=0.003). There was a statistically significant difference between urban and rural women who did not utilise BEmONC services in terms of husband's education ($\chi2$=22.466, p=<0.001), husband's occupation ($\chi2$=21.800, p=<0.001) and monthly household income ($\chi2$=73.762, p=<0.001). Subsequent logistic regression analysis identified distinct patterns of service utilisation determinants between urban and rural settings. In urban areas, women aged 15-24 years were 5.4 times more likely to utilise BEmONC services compared to those aged 45 years and above (aOR: 5.4; 95% CI: 1.1-25.6; p=0.033). Additionally, unmarried women had 23.1 times higher likelihood of service utilisation (aOR: 23.1; 95% CI: 1.5-350.7; p=0.024) compared to married women. Women who were 25-29 years (aOR: 19.8; 97% CI: 2.7-142.4; p=0.003) and 30-34 years (aOR: 11.8; 95% CI: 1.5-92.4; p=0.019) at first marriage were 19.8 and 11.8 times respectively, more likely to utilise services than those who married before age 15 years (Table 3).

Further analysis revealed that women whose husbands were artisans were 6.8 times more likely to utilise BEmONC services compared to those whose husbands were businessmen (aOR: 6.8; 95% CI: 1.1-42.2, p=0.039). Women with higher monthly household income earnings of ≥50,001 were 7.4 times more likely (aOR: 7.4; 95% CI: 2.6-20.8; p=<0.001) to utilise services compared to those earning ≤₦10,000 (Table 3). In rural areas, different factors emerged as significant predictors. Women who had been married for 21 years or more were 10.9 times more likely to utilise BEmONC services compared to those married for 5 years or less (aOR: 10.9; 95% CI: 1.1-112.8; p=0.045) (Table 4). Household income showed significant association with service utilisation in both settings, but the effect was more pronounced in rural areas. Women from households with monthly income between ₦30,001-₦40,000 (aOR: 5.4; 95% CI: 1.5-19.7, p=0.011) and ≥₦50,000 (aOR: 7.0; 95% CI: 2.0-25.2; p=0.003) were 5.4 and 7 times respectively more likely to utilise services compared to those with income ≤₦10,000 (Table 4).

Table 1: Socio-demographic characteristics of urban and rural women in Kaduna State.

Sociodemographic characteristic	Urban (n=328) f (%)	Rural (n=392) f (%)	Test statistics
Age (in years)			
15-19	9 (2.7)	7 (1.8)	
20-24	62 (18.9)	73 (18.6)	
25-29	72 (22.0)	100 (25.5)	
30-34	63 (19.2)	91 (23.2)	$\chi2$=7.949
35-39	73 (22.3)	75 (19.1)	p=0.337
40-44	20 (6.1)	26 (6.6)	
45-49	14 (4.3)	8 (2.0)	
≥50	15 (4.6)	12 (3.1)	

Continued.

Sociodemographic characteristic	Urban (n=328) f (%)	Rural (n=392) f (%)	Test statistics
Religion			
Islam	200 (61.0)	222 (56.6)	χ2=1.388 p=0.239
Christianity	128 (39.0)	170 (43.4)	
Ethnicity			
Hausa	207 (57.9)	227 (57.9)	χ2=8.982 p=0.110
Igbo	15 (4.6)	20 (5.1)	
Yoruba	16 (4.9)	27 (6.9)	
Gwari	12 (3.7)	30 (7.7)	
Jaba	8 (2.4)	15 (3.4)	
Others	73 (22.3)	73 (18.6)	
Education			
None	57 (17.4)	101 (25.8)	χ2=10.46 p=0.015
Primary	45 (13.7)	55 (14.0)	
Secondary	165 (50.3)	156 (39.8)	
Tertiary	61 (18.6)	80 (20.4)	
Occupation			
None	160 (48.8)	152 (38.7)	FE=59.184 p=<0.001
Business	109 (33.2)	113 (28.8)	
Civil service	36 (11.0)	40 (10.2)	
Farming	4 (1.2)	36 (9.2)	
Teaching	4 (1.2)	13 (3.3)	
Artisanry	13 (4.0)	16 (4.1)	
Others	2 (0.6)	22 (5.6)	

χ2=Chi square FE=Fishers exact.

Table 2: Socio-demographic characteristics of urban and rural women in Kaduna State.

Sociodemographic characteristic	Urban (n=328) f (%)	Rural (n=392) f (%)	Test statistics
Marital status			
Married	313 (95.4)	370 (94.4)	FE=2.479 p=0.648
Divorced	1 (0.3)	3 (0.8)	
Separated	0 (0.0)	2 (0.5)	
Widowed	10 (3.0)	13 (3.3)	
Single	4 (1.2)	4 (1.0)	
Age at first marriage (years)			
<15	63 (19.2)	15 (3.8)	χ2=51.536 p=<0.001
15-19	129 (39.3)	150 (38.3)	
20-24	71 (21.6)	111 (28.3)	
25-29	41 (12.5)	85 (21.7)	
30-34	20 (6.1)	23 (5.9)	
≥35	4 (1.2)	8 (2.0)	
Number of living children			
≤2	86 (26.2)	169 (43.1)	χ2=30.238 p=<0.001
3-4	173 (52.7)	184 (46.9)	
≥5	69 (21.0)	39 (9.9)	
Last childbirth (months)			
≤12	268 (81.7)	340 (86.7)	χ2=5.915 p=0.052
13-24	41 (12.5)	28 (7.1)	
25-36	19 (5.8)	24 (6.1)	
Years of marriage			
≤5	49 (14.9)	105 (26.8)	χ2=18.753 p=0.002
6-10	133 (40.5)	160 (40.8)	
11-15	92 (28.0)	80 (20.4)	
16-20	44 (13.4)	37 (9.4)	
21-25	8 (2.4)	8 (2.0)	

Continued.

Sociodemographic characteristic	Urban (n=328) f (%)	Rural (n=392) f (%)	Test statistics
≥26	2 (0.6)	2 (0.5)	
Husband's education			
None	52 (15.9)	107 (27.3)	
Primary	20 (6.1)	34 (8.7)	χ2=17.988
Secondary	150 (45.7)	137 (34.9)	p=0.001
Tertiary	106 (32.3)	114 (29.1)	
Husband's occupation			
Business	142 (44.4)	119 (30.4)	
Civil service	62 (18.9)	66 (16.8)	
Farming	58 (17.7)	115 (29.3)	χ2=21.296
Transportation	31 (9.5)	38 (9.7)	p=0.002
Artisanry	10 (1.8)	19 (4.8)	
Teaching	6 (1.8)	12 (3.1)	
Others	19 (5.8)	23 (5.9)	
***Monthly household income (₦)**			
0-10,000	133 (42.0)	41 (12.3)	
10,001-20,000	14 (4.4)	36 (10.8)	
20,001-30,000	27 (8.5)	54 (16.2)	χ2=76.042
30,001-40,000	30 (9.5)	55 (16.5)	p=<0.001
40,001-50,000	20 (6.3)	26 (8.4)	
>50,000	93 (29.3)	120 (35.9)	

*Urban 317 and rural 332. χ2=Chi square FE=Fishers exact.

Table 3: Logistic regression analysis of correlates of utilisation of BEmONC services among urban women in Kaduna State.

Socio-demographics	aOR	95% CI	P value
Age (in years)			
15-24	5.4	1.5 – 25.6	0.033
25-34	2.1	0.8 – 5.1	0.123
35-44	0.7	0.2 – 2.0	0.557
45+	1		
Religion			
Islam	1		
Christianity	0.7	0.2-2.6	0.63
Education			
No formal	1		
Primary	0.3	0.1-1.0	0.05
Secondary	0.1	0.1-0.5	0.006
Tertiary	0.1	0.0-0.5	0.005
Age at first marriage (in years)			
<15	1		
15-19	3.3	0.8-13.9	0.1
20-24	5.1	0.9-28.0	0.061
25-29	19.8	2.7-142.4	0.003
30-34	11.8	1.5-92.4	0.019
35+	1.2	1.5 –92.4	0.905
Marital status			
Married	1		
Unmarried	23.1	1.5-350.7	0.024
Husband's education			
No formal	1		
Primary	0.8	0.2–1.6	0.248
Secondary	0.5	0.2-3.5	0.85
Tertiary	0.9	0.2-3.9	0.824
Husband's occupation			
Business	1		
Civil service	0.7	0.2-2.2	0.539

Continued.

Socio-demographics	aOR	95% CI	P value
Farming	0.5	0.2-1.3	0.152
Transportation	2.2	0.7-7.2	0.204
Artisanry	6.8	1.1-42.2	0.039
Others	0.2	0.0-2.4	0.237
Monthly household income (₦)			
≤10,000	1		
10,001-20,000	1.4	0.3-6.9	0.669
20,001-30,000	1.1	0.3-3.8	0.888
30,001-40,000	2.1	0.6-7.6	0.238
40,001-50,000	2.3	0.6-9.0	0.247
≥50,001	7.4	2.6-20.8	<0.001

aOR=adjusted odds ratio CI=confidence interval.

Table 4: Logistic regression results of correlates utilisation of BEmONC services in rural women in Kaduna State.

Socio-demographics	aOR	95% CI	P value
Age (in years)			
15-24	1		
25-34	1.2	0.5 – 3.0	0.696
35-44	0.5	0.1 – 1.7	0.236
45+	0.4	0.1 – 2.4	0.301
Marital status			
Married	1		
Unmarried	1.6	0.3 – 7.7	0.572
Occupation			
None	1		
Business	0.4	0.2 – 1.1	0.066
Civil service	0.7	0.1 – 2.8	0.618
Farming	1.6	0.5 – 5.1	0.391
Teaching	1.5	0.2 – 10.4	0.679
Artisanry	3.8	0.6 – 22.6	0.145
Others	0.3	0.1 – 1.5	0.139
Years of marriage			
≤5	1		
6 – 10	1.3	0.6 – 3.3	0.450
11 – 15	1.0	0.3 – 3.0	0.997
16 – 20	3.8	0.9 – 16.2	0.073
≥21	10.9	1.1 – 112.8	0.045
Husband's occupation			
Business	1		
Civil service	0.4	0.1 – 1.2	0.108
Farming	0.7	0.3 – 1.5	0.335
Transportation	1.3	0.4 – 4.6	0.666
Artisanry	4.0	0.7 – 22.2	0.009
Others	0.5	0.1 – 2.1	0.339
Monthly household income (₦)			
≤10,000	1		
10,001-20,000	2.2	0.6 – 8.1	0.227
20,001-30,000	3.0	0.8 – 10.8	0.093
30,001-40,000	5.4	1.5 – 19.7	0.011
40,001-50,000	2.5	0.6 – 10.7	0.226
≥50,001	7.0	2.0 – 25.2	0.003

aOR=adjusted odds ratio CI=confidence interval

DISCUSSION

Basic emergency obstetric and newborn care (BEmONC) services represent a critical intervention package for reducing maternal and neonatal mortality in developing nations.[1] Analysis of BEmONC service utilisation patterns revealed distinct determinants between urban and rural settings. In urban communities, significant associations appeared between service utilisation and multiple sociodemographic factors: educational status, marital status, age at first marriage, husband's education, husband's occupation and monthly household income, whilst rural communities demonstrated a more limited association pattern with occupation as the primary determinant.[17]

Age-related factors showed substantial influence, with women aged 15-24 years exhibiting five times higher likelihood of BEmONC service utilisation compared to those aged 45 years and above in urban settings. Age at first marriage emerged as crucial, with women married between 25-29 years demonstrating 19 times higher utilisation likelihood compared to those married before age 15 years, whilst those married between 30-35 years showed 11 times higher likelihood. Marriage duration demonstrated differential effects, with rural women married for 21 years or more showing significantly higher utilisation rates compared to those married for five years or less.

Notably, unmarried women in urban settings showed higher utilisation rates than their married counterparts, contradicting typical utilisation patterns.[18] Educational status demonstrated unexpected associations, with women without formal education showing higher utilisation rates in urban settings compared to those with secondary or tertiary education, contrasting markedly with research from Kampala where higher educational attainment positively correlated with maternal healthcare utilisation.[17] Socioeconomic factors emerged as significant determinants, with women married to artisans demonstrating higher utilisation rates in urban communities compared to those married to businessmen.

Monthly household income showed strong positive correlation with utilisation, particularly in urban settings, where women with monthly household income exceeding ₦50,000 showed significantly higher utilisation rates compared to those earning N=10,000 or less, consistent with findings from India highlighting income as a crucial determinant of maternal healthcare utilisation.[18] This income-related disparity suggests potential barriers to access for lower-income women, potentially contributing to adverse maternal health outcomes in this demographic.

These results have significant implications for policy and practice. The correlates of service utilisation indicate a need for targeted interventions. Priority areas should include addressing socioeconomic barriers to service utilisation. Future research should focus on understanding the barriers to achieving full utilisation rates, particularly in rural areas.

The study encountered some challenges that were systematically addressed. Social desirability bias was addressed through careful training of research assistants and emphasis on the importance of honest responses from participants. The potential for recall bias was minimised by limiting the study period to 36 months post-delivery, though some recall issues may still have influenced responses. These limitations were carefully considered during data analysis and interpretation of findings.

CONCLUSION

While Kaduna State shows promising infrastructure coverage for BEmONC services, significant gaps remain in utilisation. Addressing these challenges requires a comprehensive approach that considers such demand-side elements as socioeconomic barriers. Such improvements are crucial for achieving better maternal and newborn health outcomes in both urban and rural settings.

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