

Health System Leadership and Maternal Healthcare Service Utilisation: A Mixed-Methods Study of Rural-Urban Inequities in Anambra State, Nigeria

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ABSTRACT:

Background: Maternal mortality remains a major public health challenge in Nigeria, contributing approximately 14% of global maternal deaths. Enhancing access to maternal healthcare services is central to achieving Sustainable Development Goal (SDG) 3, and effective healthcare leadership can influence how services are organised, delivered, and accessed.

Objective: This study assessed the utilisation of maternal healthcare services (MHS) among rural and urban women in Anambra State, Nigeria, and examined the leadership styles within healthcare facilities.

Methods: A descriptive cross-sectional study using a mixed-methods approach was conducted among 640 women of reproductive age selected from rural and urban communities. Quantitative data were collected using a semi-structured, pre-tested, interviewer-administered questionnaire adapted from the Access to Health Services Questionnaire (AHSQ) and the Maternal Health Belief Questionnaire (MHBQ). Data were analysed using STATA/BE version 17. Qualitative data were collected through 10 key informant interviews (KIIs) conducted with purposively selected heads of

healthcare facilities, using an interview guide adapted from the Multifactor Leadership Questionnaire (MLQ). Qualitative data were analysed thematically using NVivo 14.

Results: Overall utilisation of the full continuum of maternal healthcare, defined as at least four antenatal visits, skilled birth attendance, and postnatal care within 42 days postpartum, was low, with only 33.1% of women meeting all criteria. Urban women demonstrated higher utilisation across antenatal care, skilled delivery, and postnatal care compared to rural women. Leadership across facilities was predominantly transformational in both settings, contributing to staff motivation and patient satisfaction, although structural limitations in rural facilities constrained service delivery.

Conclusion: Transformational healthcare leadership should be sustained and augmented to improve continuity of care and maternal health outcomes across the State.

Keywords: Maternal healthcare services; Rural-urban disparities; Leadership styles; Nigeria

INTRODUCTION

Maternal mortality remains a major public health challenge globally, particularly in low- and middle-income countries such as Nigeria. Despite improvements in maternal health interventions over recent decades, Nigeria continues to contribute substantially to global maternal deaths, largely due to inadequate utilisation of maternal healthcare services (MHS) such as antenatal care (ANC), skilled birth attendance (SBA), and postnatal care (PNC) [1,2]. Maternal healthcare utilisation (MHU) is essential for reducing preventable maternal morbidity and mortality and remains a key indicator of health system performance and equity [3,4].

Strengthening health systems has been identified as a critical strategy for improving maternal health outcomes [5]. Beyond infrastructure and workforce availability, healthcare leadership plays an important role in shaping service delivery, staff motivation, accountability, and patient experiences. Effective leadership influences how MHS are organised, delivered, and accessed, particularly in resource-constrained settings [6]. Transformational and participatory leadership styles have been associated with improved teamwork, supportive supervision, staff satisfaction, and quality of care, all of which may enhance utilisation of MHS [7,8]. Conversely, authoritarian and weak leadership approaches may contribute to poor communication, low staff morale, inadequate community engagement, and reduced quality of care [9,10].

In Nigeria, rural-urban disparities in MHU remain pronounced. Urban women are generally more likely to access antenatal care, skilled delivery services, and postnatal care than rural women due to better healthcare infrastructure, improved transportation, higher educational attainment, and greater economic opportunities [11,12]. In contrast, women in rural communities often face multiple barriers, including poverty, poor road networks, inadequate health facilities, shortage of skilled healthcare workers, cultural beliefs, and reliance on traditional birth attendants (TBAs) [13,14]. These disparities highlight persistent inequities in access to quality MHS.

Anambra State, located in southeastern Nigeria, has recorded relatively high utilisation of some MHS compared with other regions of the country. However, significant gaps remain between rural and urban communities, particularly in access to emergency obstetric care, referral systems, and continuity of MHS [14,15]. While previous studies in Nigeria have focused mainly on socio-demographic determinants, service availability, and healthcare financing, limited attention has been paid to the role of health system leadership in shaping MHU, particularly in the context of rural-urban inequities.

Healthcare leadership is increasingly recognised as a key component of health system strengthening. Effective leaders can improve resource allocation, workforce coordination, community participation, and implementation of maternal health policies [16]. Leadership that promotes accountability, supportive supervision, culturally sensitive care, and collaborative decision-making may improve women's trust in health facilities and encourage utilisation of MHS [6]. Furthermore, community-oriented leadership approaches can strengthen health education, outreach programmes, and referral systems, particularly in underserved rural areas [17].

Nigeria has implemented several initiatives to improve MHU, including the Basic Health Care Provision Fund (BHCPF), the Midwives Service Scheme (MSS), community-based health insurance programmes, and digital health innovations targeting maternal and child health [18,19]. Although these interventions have improved maternal healthcare delivery, disparities in service utilisation persist, raising concerns about the effectiveness, equity, and sustainability of existing health system structures and leadership approaches.

Despite growing recognition of the importance of leadership in healthcare systems, there remains a paucity of empirical research examining how leadership influences MHU in Nigeria, particularly across rural and urban settings. Understanding the relationship between health system leadership and MHU may provide important insights to strengthen MHS and reduce inequities in access to care.

Therefore, this mixed-methods study aims to examine the influence of health system leadership on maternal healthcare service utilisation and to explore rural-urban inequities in maternal healthcare access and use among women in Anambra State, Nigeria. The findings will provide evidence to inform maternal health policy, healthcare leadership practices, and interventions aimed at improving equitable access to quality maternal healthcare services.

METHODOLOGY

Study Area: The study was conducted in Anambra State, in Nigeria's South-East geopolitical zone. The State capital is Awka, which also serves as the State's administrative headquarters. Anambra State covers approximately 4,416 square kilometres and shares boundaries with Delta State to the west, Imo State and Rivers State to the south, Enugu State to the east, and Kogi State to the north (National Population Commission, 2006).

Healthcare delivery in Anambra State operates through a three-tier system comprising primary, secondary, and tertiary levels of care, supported by an expanding private and mission-based health sector. Primary Health Centres (PHCs) constitute the foundation of healthcare delivery at the community level and provide essential MHS, including ANC, PNC, delivery services, family planning, child immunisation, and health education. Secondary healthcare facilities, mainly general

hospitals, provide inpatient care, basic surgical services, blood transfusions, and referral services for complicated obstetric cases. Tertiary healthcare institutions, including teaching hospitals and federal medical centres, offer specialised maternal healthcare services such as comprehensive emergency obstetric and neonatal care (CEmONC), advanced surgical interventions, specialist obstetric and gynaecological services, and postgraduate medical training.

The maternal healthcare workforce in the state comprises medical officers, family physicians, obstetricians, gynaecologists, nurses, and midwives, supported by community health officers (CHOs) and community health extension workers (CHEWs), who provide essential maternal and child health services at the grassroots level.

Study Design: This was a comparative cross-sectional study using a mixed-method approach to explore the healthcare leadership style and the level of maternal healthcare utilisation in Anambra State, Nigeria.

Study Population: The study population consists of all women of childbearing age resident in Anambra State, between the ages of 15 and 49 years. Key informant interviews (KIIs) of facility heads (Doctors, Nurses, PHC coordinators) explored the leadership style in the systems using a KII guide.

Inclusion Criteria:

1. Women who are currently pregnant or have given birth within the last 12 months.
2. Women who have been residents of Anambra State for at least the past 12 months.
3. Women who have utilised any form of maternal healthcare services (antenatal care, delivery services, postnatal care) in the last 12 months.
4. Doctors, nurses, midwives, community health workers and traditional birth attendants who are heads of their facility and have been providing maternal healthcare services in Anambra State, for at least one year.

Exclusion Criteria:

1. Mothers who were critically ill and unable to respond to the interview
2. Facility heads and other stakeholders who have not worked in the LGAs for up to 12 months

Sample Size Determination: The minimum sample size to determine a difference in the utilisation of maternal healthcare services among rural and urban women was estimated with 80% power (chance of detecting the difference) and at a 95% confidence level using the formula for a comparative study of two population proportions with binary outcome, commonly called “Sample size formula for comparing two proportions” [20].

$$n = \frac{[Z_{1-\alpha}\sqrt{2P(1-P)} + Z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}]^2}{(P_2 - P_1)^2}$$

Where

n = minimum sample size for each group

Z_{α} = percentage point of the standard normal deviate corresponding to the two-sided significance level = 1.96 (for = 5% or 0.05)

$Z_{1-\beta}$ = one-sided percentage point of the standard normal deviate corresponding to 100% - power (1-) = 0.84 (for power = 80%).

P_1 = reported use of maternal healthcare services among women living in the urban area = 50.8 per cent (0.508) obtained from a study done in Anambra by Duru et al., 2014 [21]

P_2 = reported use of maternal healthcare services among women living in the rural area = 37.0 per cent (0.37) obtained from a study done in Anambra by Duru et al., 2014 [21]

Therefore $P = 0.44$

$n = 288$

Anticipating a non-response rate (f) of 10%, therefore, the adjusted sample size (n_s) to be selected was,

Given, $f = 10\% = 0.1$ then,

$$n_s = 288 / 0.9 = 320$$

Approximately, there were **320** respondents for each sub-population. Therefore, multiplying by a factor of 2, the total adjusted sample size for the study = **640** women.

Sampling Technique: In the quantitative arm of this study, a multistage sampling technique was used to recruit women of childbearing age from urban and rural dwellers in the population, and a stratified random sampling technique was used in the selection of the health facility to assess the availability of healthcare facilities. While the qualitative arm utilised key informant interviews using a KII guide.

A multistage sampling technique was used in this study: Participants were recruited from the total number of women of childbearing age in both urban and rural populations and were selected using a

multistage sampling process with four stages. At the first stage, a total of four local government areas were selected using a table of random numbers. In the second stage, two towns from each LGA were selected from the available LGAs selected using a table of random numbers. In the third stage, two villages from each town were selected using a table of random numbers. The complete household list was not available, and a random walk method was adopted, starting from a random point and selecting households at regular intervals. At the final stage, within each selected household, women aged 15-49 years who met the inclusion criteria were randomly selected using a simple random sampling technique by balloting folded papers with either “YES” or “NO” and, depending on their picks, respondents who picked “YES” were administered the questionnaire.

A stratified random sampling technique was used in the selection of the health facility: For the facility assessment, a stratified random sampling approach was used to select both public and private healthcare facilities that provide MHS in Anambra State. The sampling frame included all registered PHCs, General Hospitals, licensed private hospitals and clinics within the State, and four facilities were chosen: one public hospital, one PHC and two licensed private hospitals or clinics, randomly selected from both rural and urban LGAs. Selection was conducted using a table of random numbers to ensure equitable representation among facility types. Facility assessments were carried out using a standardised checklist adapted from WHO’s Service Availability and Readiness Assessment (SARA) framework [22,23].

Study Tools: The questionnaire guide used in this study was primarily adapted from previously published, validated instruments. A semi-structured interviewer-administered questionnaire was adapted from the AHSQ and MHBQ, and also guidance from other works already done on the subject. [24,25,26]. Leadership style was assessed qualitatively through key informant interviews with facility heads (which included Doctors, Nurses, and PHC coordinators). The interviews were guided by adapted constructs from the MLQ but allowed flexibility for participants to describe their leadership practices and challenges in context [12,27,28,29].

The KII guide: The KII guide comprised open-ended questions adapted from constructs of the MLQ and probes focused on: leadership styles and behaviours observed in maternal healthcare settings, the perceived influence of leadership on service delivery and workforce performance, barriers and facilitators to MHU, and recommended strategies for improvement. The guide was developed from adapted constructs of the MLQ, the authors’ experience, and the literature on service delivery. It was reviewed for content validity before use.

Variables and their definition/measurement

Outcome Variable: The outcome variable of this study was MHS utilisation. MHS utilisation was computed using 3 variables, i.e., ANC visits, SBA during the delivery of children (i.e., qualified doctor or nurse), and PNC during the postpartum period (within 42 days of childbirth). Women who had ≥ 4 ANC visits, utilised SBA during their childbirth and received PNC within 42 days of childbirth were considered utilised MHS. Otherwise, if any women failed to meet any one of the mentioned 3 criteria, they were considered not using MHS.

Data Collection

Quantitative Data

The procedure for the study was explained to each participant, and thereafter, written informed consent was obtained before their participation. Information was obtained using the pre-tested, semi-structured, interviewer-administered questionnaire. All participants were informed that their responses would remain confidential. The questionnaire was adapted from the AHSQ and MHBQ, with guidance from previous research. The questionnaire had six parts (labelled sections A, B, C, D, E and F); Section A assessed the socio-demographic and socioeconomic characteristics of the respondents. This section features questions that help elicit responses concerning the age, educational background, religion, tribe, and current marital status. Section B assessed the ANC history of the participants. This section featured questions that help elicit responses concerning ANC. For example, whether the delivery of the last child was in a healthcare facility, received postnatal care, or was subject to local community practices. Section C assessed the prevalence of health service uptake by the respondents. Section D assessed the male partner's involvement in the use of MHS. Section E assessed which of the health care facilities was utilised more, and assessed factors influencing health care utilisation, and Section F assessed the women's perceptions about MHU.

Qualitative procedure: Key informant interviews

To explore how leadership styles influence the utilisation of MHS in rural and urban areas of Anambra State, this study used KIIs with stakeholders who have direct knowledge of maternal health service delivery and management. Key informants were purposively selected using criterion sampling. Eligible participants were adults (18 years and above), residents of Anambra State, and current personnel with responsibilities in the state health system. The sample comprised ten stakeholders drawn from different institutions and roles, including facility heads/matrons, PHC coordinators, LGA maternal and child health (MCH) officers, and traditional birth attendants. Selection criteria

prioritised individuals in leadership or managerial positions within the healthcare sector because they hold insights and perspectives not normally accessible to external researchers.

The lead investigator visited the facilities and had personal contact with potential participants. The study objectives were explained to them, and they were invited to participate and either physically or by phone. All participants provided written informed consent. Permission to audio-record interviews for transcription and note-taking was requested and obtained from each participant.

Interviews were conducted by the lead investigator and one of the research assistants between 1st May 2025 and 1st August 2025 in English, and some by phone and lasted between 30 and 60 minutes (average $\approx$ 45 minutes). Each interview was audio-recorded, and reflective field notes captured contextual detail and initial impressions. Interviews continued until sufficient, rich data were obtained, and no new substantive theme emerged. Saturation was considered achieved when successive interviews yielded repetitive information and no new codes or themes were identified across participant categories. At this point, additional data collection was deemed unnecessary, as further interviews were unlikely to contribute substantively to the research questions. Audio recordings were transcribed verbatim and de-identified. Transcripts were checked against recordings and field notes to ensure accuracy and completeness. Transcripts and related materials were stored securely in password-protected files accessible only to the researcher.

Pre-Testing of Questionnaire: Questionnaires were pretested in towns outside the study area to assess their quality and feasibility. Questionnaire items were modified to enhance understanding and answerability.

Data Analysis:

Quantitative Data:

Data from the questionnaires was checked for completeness, cleaned, entered into Microsoft Excel thereafter it was coded and uploaded immediately to the Kobo Collect database. Kobo (often called KoboToolbox) (developed by the Harvard Humanitarian Initiative (HHI) and supported by organisations such as the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and the International Rescue Committee (IRC). Data analysis was done using the STATA/BE version 17.0 (StataCorp, Texas, USA) statistical software. Data consistency and missing data were validated. The socio-demographic characteristics of subjects were presented in frequency tables and percentages. Categorical variables were expressed as percentages, while continuous variables were summarised as mean and standard deviation. The associated factors influencing the

utilisation of MHS among women in Anambra State, Nigeria, were determined using Fisher's exact test for 2 by 2 comparisons and the Chi-square test for comparisons involving variables with more than two categories. The primary outcome variable was MHS utilisation, treated as a binary variable (utilised vs. not utilised). The distribution of MHS utilisation across explanatory variables was examined using cross-tabulations, and significant associations were identified through Pearson's Chi-square test of independence.

Qualitative Data:

Qualitative data from KIIs on leadership styles in maternal healthcare service delivery were coded and transcribed verbatim, and transcripts were cross-checked against audio recordings for accuracy. The final transcripts used for analysis were based on the audio-taped materials. Data was analysed thematically with the assistance of NVIVO 14 software programme according to the framework analysis (Silverman, 2010). The transcripts of the KIIs were reviewed and read (familiarisation), during which a coding scheme was developed. The transcripts were coded by creating 'nodes' in the NVIVO programme, with each node examined separately. The researcher developed coding schemes and identified themes. The themes identified were compared with an emphasis on consistency and redundancy. Any disagreements in coding were clarified by consensus. Direct quotes arising from the discussion are presented to support identified themes. The quotes were checked for the accuracy of the translations and interpretation of the quotes presented.

Integration of Quantitative and Qualitative Data

Findings from the quantitative survey and qualitative interviews were triangulated to provide a comprehensive understanding of maternal healthcare service utilisation in rural and urban areas of Anambra State. While the quantitative analysis identified patterns of MHS utilisation, the qualitative insights explained leadership-related factors shaping women's access to and use of maternal healthcare services.

Ethical Approval:

Approving Authority: An Institutional approval was obtained from the Health Research Ethics Committee of Nnamdi Azikiwe University Teaching Hospital Health Research Ethics Committee (NAUTHHREC). Ethical approval number: NAUTH/CS/66/VOL17/VER.3/38/2024/100. Approval was also obtained from the various LGAs.

Voluntariness: Consent was obtained from all Participants. Participation was voluntary, and participants had the liberty to withdraw whenever they so wished.

Confidentiality: The study data were made confidential and solely for this study and not for any other publications. Data from the study was only accessible to the investigator alone, and information was only released to participants on a one-on-one basis, based on a need-to-know basis.

The ethical principles of autonomy, beneficence, non-maleficence, and justice were ensured. Fourthly, permission was obtained from the Family Medicine department before the commencement of the study. Lastly, permission was obtained from the communities and community leaders. The information sheet of the questionnaire was read and explained to the participants, and reactions were entertained and addressed.

RESULTS

The study was conducted from January 2025 to August 2025. The intended allocation was 320 rural and 320 urban respondents; the achieved sample was 304 rural and 336 urban women due to non-response and replacement during fieldwork.

Quantitative Findings

Socio-demographic and Socio-economic Characteristics of the Study Participants

Table 1a and Table 1b show the socio-demographic and socio-economic characteristics of the study participants. The mean age of respondents was comparable between rural (31.15 ± 8.32 years) and urban women (31.89 ± 7.53 years) ($p = 0.237$), with most participants aged 21-30 years. Educational attainment differed significantly ($p = 0.038$), as urban women had higher levels of tertiary education, while lower educational attainment was more common among rural women. Most respondents in both settings were married, with no significant difference in marital status ($p = 0.116$), although the type of marriage varied significantly ($p = 0.040$). Employment status of women and their husbands, household income, marriage duration, and parity showed no significant rural–urban differences. However, the age of the last child differed significantly ($p = 0.042$), with urban women more likely to have younger children. Pregnancy complications were significantly more common among rural women (30.92%) than urban women (17.86%) ($p < 0.001$). This is shown in Table 1a and Table 1b below.

Table 1a: Socio-demographic characteristics of the rural and urban women in Anambra State

Variable	Location		Total	Test Statistic	p-value
	Rural	Urban			
Age (years)					
≤20	16 (5.26)	15 (4.46)	31 (4.84)	X ² = 8.85	0.065
21 – 30	171 (56.25)	160 (47.62)	331 (51.72)		
31 – 40	78 (25.66)	119 (35.42)	197 (30.78)		
41 – 50	33 (10.86)	39 (11.61)	72 (11.25)		
>50	6 (1.97)	3 (0.89)	9 (1.41)		
Mean ± STD	31.15±8.32	31.89±7.53	31.54±7.91	t-statistic= 1.18	0.237
Level of Education					
No formal Education	2 (0.66)	0	2 (0.31)	X ² = 8.43	0.038*
Primary	45 (14.80)	39 (11.61)	84 (13.13)		
Secondary	193 (63.49)	198 (58.93)	391 (61.09)		
Tertiary	64 (21.05)	99 (29.46)	163 (25.47)		
Marital Status					
Co-habiting	2 (0.66)	2 (0.66)	4 (0.63)	X ² = 7.40	0.116
Divorced	4 (1.32)	13 (3.87)	17 (2.66)		
Married	276 (90.79)	308 (91.67)	584 (91.25)		
Single	12 (3.95)	8 (2.38)	20 (3.13)		
Widowed	10 (3.29)	5 (1.49)	15 (2.34)		
Type of marriage					
Monogamous	246 (80.92)	249 (74.11)	495 (77.34)	X ² = 4.23	0.040*
Polygamous	58 (19.08)	87 (25.89)	145 (22.66)		
Employment status					
Employed	65 (21.38)	81 (24.11)	146 (22.81)	X ² = 2.59	0.459
Self employed	218 (71.71)	240 (71.43)	458 (71.56)		
Student	12 (3.95)	7 (2.08)	19 (2.97)		

Unemployed	9 (2.96)	8 (2.38)	17 (2.66)
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** signifies statistically significant p-values at the 0.05 sig level*

Table 1b: Socio-demographic characteristics of the rural and urban women in Anambra State

Variable	Location		Total	Test Statistic	p-value
	Rural	Urban			
Husband's occupation					
Artisan	17 (5.59)	17 (5.06)	34 (5.31)	$X^2 = 8.29$	0.141
Businessman	242 (79.61)	257 (76.49)	499 (77.97)		
Civil servant	35 (11.51)	56 (16.67)	91 (14.22)		
Farmer	-	1 (0.30)	1 (0.16)		
Self employed	-	1 (0.30)	1 (0.16)		
Unemployed	10 (3.29)	4 (1.19)	14 (2.19)		
Husband's highest level of education?					
No formal Education	1 (0.33)	3 (0.89)	4 (0.63)	$X^2 = 1.48$	0.686
Primary	18 (5.92)	15 (4.46)	33 (5.16)		
Secondary	183 (60.20)	204 (60.71)	387 (60.47)		
Tertiary	102 (33.55)	114 (33.93)	216 (33.75)		
Salary range in naira/month					
<50,000	37 (12.17)	39 (11.61)	76 (11.88)	$X^2 = 7.17$	0.067
50,000-100,000	134 (44.08)	116 (34.52)	250 (39.06)		
100,000-500,000	90 (29.61)	125 (37.20)	215 (33.59)		
>500,000	43 (14.14)	56 (16.67)	99 (15.47)		
Duration of marriage (years)					
<1	45 (14.80)	39 (11.61)	84 (13.13)	$X^2 = 1.52$	0.468
1 – 5	128 (42.11)	143 (42.56)	271 (42.34)		
>5	131 (43.09)	154 (45.83)	285 (44.53)		
No of children					
1-2 children	127 (42.05)	135 (40.66)	262 (41.32)	$X^2 = 1.05$	0.593
3-4 children	120 (39.74)	144 (43.37)	264 (41.64)		
5 or more	55 (18.21)	53 (15.96)	108 (17.03)		

**Age of last child
(years)**

<1	19 (6.29)	31 (9.34)	50 (7.89)	$X^2=13.05$	0.042*
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* signifies statistically significant p-values at the 0.05 sig level

Table 2 shows high utilisation of MHS among both rural and urban women in Anambra State, with no significant differences observed across most indicators. Nearly all respondents received ANC, and the majority attended the recommended ANC visits, mainly at hospitals, with most initiating care between 3-6 months of pregnancy. Healthcare facility delivery and postnatal care utilisation were also high and comparable between the groups. Family planning uptake after childbirth remained low in both settings. However, a significant rural-urban difference was observed in maternal health education, with a higher proportion of rural women reporting receipt of maternal health education from healthcare providers compared to urban women (87.83% vs. 80.06%, $p = 0.008$), as shown below.

Table 2: Utilisation of maternal healthcare services by rural and urban women in Anambra State

Variable	Location		Total	Test Statistic	p-value
	Rural	Urban			
Received antenatal care					
No	3 (0.99)	5 (1.49)	8 (1.25)	X ² =0.32,	0.569
Yes	301(99.01)	331 (98.51)	632(98.75)		
Attended ANC					
No	60 (19.74)	75 (22.32)	135(21.09)	X ² =0.64,	0.424
Yes	244(80.26)	261 (77.68)	505(78.91)		
Place received ANC					
None	-	2 (0.60)	2 (0.31)	X ² =1.92,	0.589
Health Centre	99 (32.57)	105 (31.25)	204(31.87)		
Hospital	172(56.58)	193 (57.44)	365(57.03)		
Maternity Home	33 (10.86)	36 (10.71)	69 (10.78)		
Age of pregnancy when enrolled					
Less than 3 months	82 (26.97)	106 (31.55)	188(29.38)	X ² =2.86,	0.413

3 to 6 months	187 (61.51)	187 (55.65)	374 (58.44)		
Above 6 months	30 (9.87)	34 (10.12)	64 (10.00)		
Don't remember	5 (1.64)	9 (2.68)	14 (2.19)		
Frequency of ANC visits					
None	7 (2.30)	10 (2.98)	17 (2.66)		
1-3 visits	162(53.29)	161 (47.92)	323(50.47)	1.97	0.579
4-6 visits	101(33.22)	122 (36.31)	223(34.84)		
More than 6 visits	34 (11.18)	43 (12.80)	77 (12.03)		
Healthcare facility Delivery					
No	43 (14.14)	55 (16.37)	98 (15.31)	0.61	0.435
Yes	261(85.86)	281 (83.63)	542(84.69)		
If no, place of delivery (n=98)					
Home	15 (34.88)	18 (32.73)	33 (33.67)	0.05	0.823
Traditional Birth Attendant	28 (65.12)	37 (67.27)	65 (66.33)		
Utilised postnatal care					
No	47 (15.46)	51 (15.18)	98 (15.31)	0.01	0.921
Yes	257(84.54)	285 (84.82)	542(84.69)		
Received family planning					
No	239 (78.62)	279 (83.04)	518 (80.94)	2.02	0.155
Yes	65 (21.38)	57 (16.96)	122 (19.06)		
Received maternal health education from HCP					
No	37 (12.17)	67 (19.94)	104(16.25)	7.08	0.008*
Yes	267(87.83)	269 (80.06)	536(83.75)		

* signifies statistically significant p-values at the 0.05 sig level

HCP – Healthcare providers

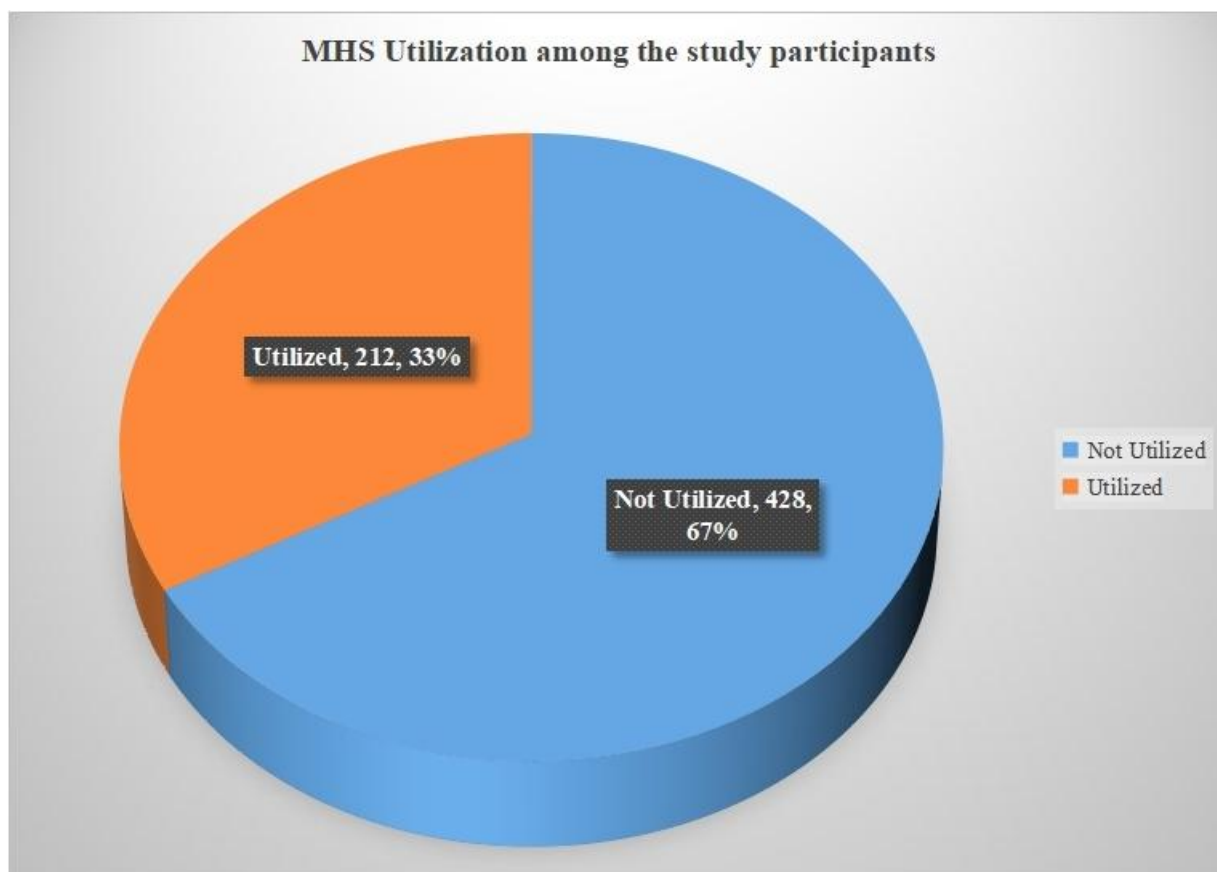


Figure 1: Pie chart representation of the overall utilisation rate of maternal healthcare services by rural and urban women in Anambra State

Figure 1, as shown above, demonstrates MHS utilisation as defined, based on three key indicators: (i) attendance of at least four antenatal care (ANC) visits, (ii) delivery assisted by a skilled birth attendant (SBA), such as a qualified doctor or nurse, and (iii) receipt of postnatal care (PNC) within 42 days of childbirth.

Women who met all three criteria were classified as having utilised MHS, while those who failed to meet one or more of the criteria were considered not to have utilised MHS. Overall, 212 respondents (33.1%) utilised maternal healthcare services, while 428 (66.9%) did not meet the full utilisation criteria.

Table 3 below shows that educational level significantly influenced utilisation, with women having a tertiary education demonstrating higher uptake of maternal healthcare services compared with those with lower educational attainment ($p = 0.003$). Marital status was also significantly associated with utilisation ($p = 0.039$), as married women were more likely to access maternal health services than single or divorced women. Household income positively influenced utilisation, with women from higher-income households reporting greater service use than those from lower-income households (p

= 0.001). Duration of marriage was similarly associated ($p = 0.021$), with women married for 1–5 years showing the highest utilisation rates. Child-related factors, including age of the last child ($p = 0.016$) and history of pregnancy complications ($p = 0.030$), were also significantly related to service uptake. However, age, type of marriage, employment status, number of children, and husbands' educational level showed no significant association with maternal healthcare utilisation. Overall, higher educational attainment, stable marital status, greater household income, recent childbirth, and absence of pregnancy complications emerged as important determinants of maternal healthcare utilisation. These are demonstrated in Table 3a and Table 3b below.

Table 3a: Chi-square Analysis showing the relationship between socio-demographic characteristics of the study participants and utilisation of maternal healthcare services

Variable	Maternal Healthcare Utilisation (%)		Test Statistic	p-value
	No (n=428)	Yes (n=212)		
Age (years)			$\chi^2 =$	
≤20	19 (4.44)	12 (5.66)	5.44	0.245
21 – 30	217 (50.70)	114 (53.77)		
31 – 40	142 (33.18)	55 (25.94)		
41 – 50	50 (11.68)	31 (14.62)		
Mean ± STD	31.53±7.38	31.67±8.81	t-value=0.22	0.822
Level of Education			$\chi^2 =$	
No formal Education	1 (0.23)	1 (0.47)	13.71	0.003*
Primary	55 (12.85)	29 (13.68)		
Secondary	281 (65.65)	110 (51.89)		
Tertiary	91 (21.26)	72 (33.96)		
Marital Status			$\chi^2 =$	
Co-habiting	3 (0.70)	1 (0.47)	10.09	0.039*
Divorced	14 (3.27)	3 (1.42)		
Married	381 (89.02)	203 (95.75)		
Single	19 (4.44)	1 (0.47)		
Widowed	11 (2.57)	4 (1.89)		

Type of marriage			X² =	
Monogamous	338 (78.97)	157 (74.06)	1.95	0.162
Polygamous	90 (21.03)	55 (25.94)		
Employment status			X² =	
Employed	93 (21.73)	53 (25.00)	3.81	0.282
Self employed	309 (72.20)	149 (70.28)		
Student	16 (3.74)	3 (1.42)		
Unemployed	10 (2.34)	7 (3.30)		
Occupation of Spouse			Fisher's	
Artisan	30 (7.01)	4 (1.89)		0.060
Businessman	329 (76.87)	170 (80.19)		
Civil servant	58 (13.55)	33 (15.57)		
Farmer	1 (0.23)	-		
Self employed	1 (0.23)	-		
Unemployed	9 (2.10)	5 (2.36)		

Table 3b: Chi-square Analysis showing the relationship between socio-demographic characteristics of the study participants and utilisation of maternal healthcare services

Variable	Maternal Healthcare		Test	p-value
	Utilisation (%)		Statistic	
	No (n=428)	Yes (n=212)		
Highest level of education of Spouse				
No formal Education	3 (0.70)	1 (0.47)	1.09	0.777
Primary	24 (5.61)	9 (4.25)		
Secondary	261 (60.98)	126 (59.43)		
Tertiary	140 (32.71)	76 (35.85)		
Salary range in naira			X ² =	
<50,000	57 (13.32)	19 (8.96)	16.36	0.001*

50,000-100,000	178 (41.59)	72 (33.96)
100,000-500,000	143 (33.41)	72 (33.96)
>500,000	50 (11.68)	49 (23.11)

How long have you been married (years)

<1	66 (15.42)	18 (8.49)	7.77	0.021*
1 – 5	169 (39.49)	102 (48.11)		
>5	193 (45.09)	92 (43.40)		

Do you have children?

X² =

No	6 (1.40)	-	3.00	0.083
Yes	422 (98.60)	212 (100.00)		

If yes, how many

X² =

1-2 children	179 (42.42)	83 (39.15)	0.97	0.615
3-4 children	170 (40.28)	94 (44.34)		
5 or more	73 (17.30)	35 (16.51)		

Age of last child (years)

X² =

<1	37 (8.77)	13 (6.13)	15.63	0.016*
1 – 5	254 (60.19)	142 (66.98)		
6 – 10	93 (22.04)	25 (11.79)		
11 – 15	22 (5.21)	19 (8.96)		
16 – 20	11 (2.61)	8 (3.77)		
21 – 25	3 (0.71)	2 (0.94)		
>25	2 (0.47)	3 (1.42)		

Did you have any complications during your last pregnancy?

No	314 (73.36)	172 (81.13)	4.68	0.030*
Yes	114 (26.64)	40 (18.87)		

Qualitative Findings

The thematic analysis of the qualitative results of the interview transcripts, which focus on leadership styles and community engagement, in the utilisation of maternal healthcare services in Anambra State. The thematic analysis was conducted using NVivo software. The results are presented according to the codes obtained from the data.

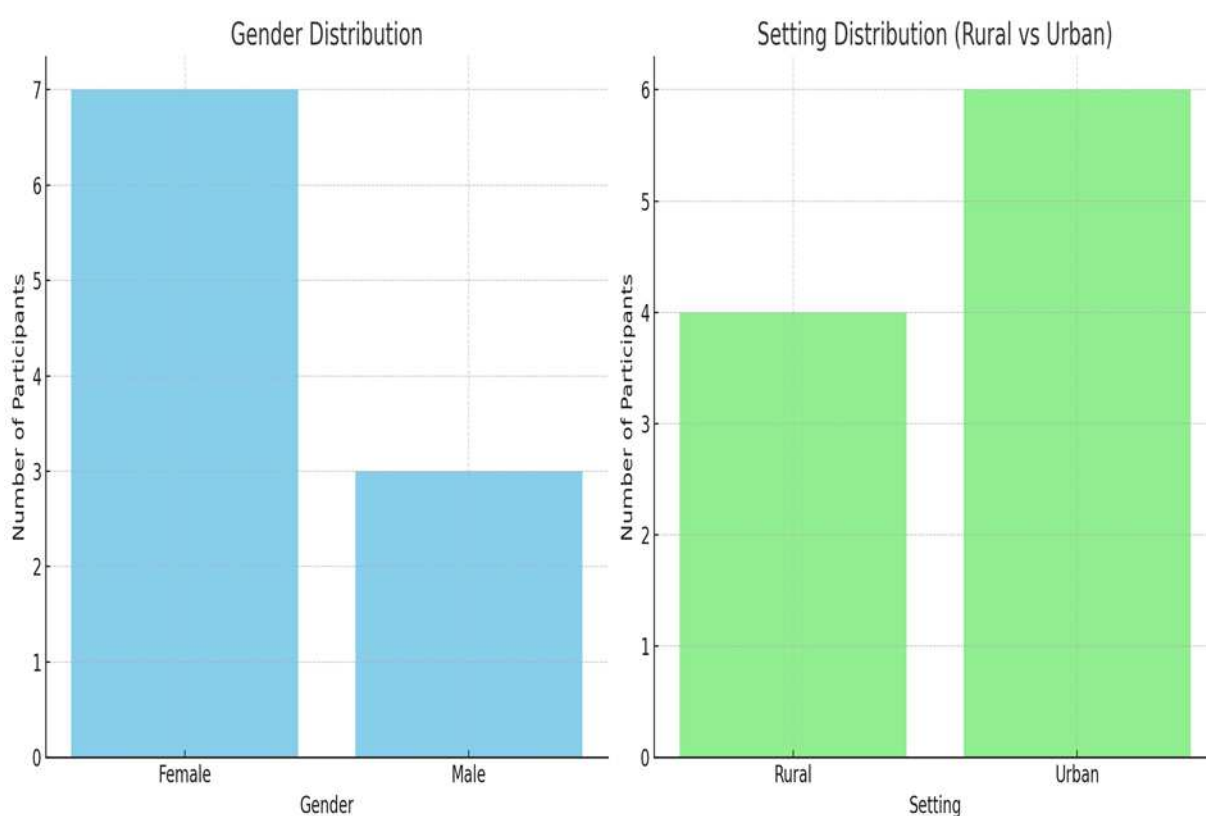


Figure 2: Demographic Profile.

Figure 2, above, shows the demographic overview of interview participants. The interview participants are 10, with 7 females and 3 males. It also varies in settings, rural and urban.

Thematic Overview of the Findings

Table 4 below shows the thematic overview of the findings. This section examines four central themes derived from the interview transcripts. To begin with, it examines the leadership styles in maternal healthcare settings in rural and urban areas of Anambra State, highlighting leadership approaches and decision-making processes. It then considers the community engagement, focusing on how feedback mechanisms, outreach programs, and community needs were assessed. Thereafter, it explores the quality of care in maternal healthcare, focusing on incentives for healthcare staff. Also, it considers barriers in maternal healthcare, focusing on economic and cultural barriers. Finally, it also explores crisis management, shedding light on how participants describe communication during crisis. The results were presented according to the codes obtained from the data, as shown in Table 4 below.

Table 4: Themes and Codes

Themes	Codes
Leadership Styles in Maternal Healthcare	Democratic Leadership
	Autocratic Leadership
	Transformational Leadership
	Consultation with Staff
Community Engagement in Maternal Healthcare	Patient Feedback Mechanisms
	Outreach Programs
	Community Needs Assessment
Quality of Care in Maternal Healthcare	Quality Assurance
	Incentives for Healthcare staff

Crisis Management	Crisis Communication
	Leadership Response in Crisis

Themes/Sub-themes:

Leadership Styles in Maternal Healthcare

Democratic Leadership: Some respondents revealed that their facilities adopted a democratic leadership style that permitted workers to contribute their feedback in decision-making processes, which hastens a collaborative work process. Respondent 1 said, *“In our hospital, leadership is democratic. We have regular meetings where employees can voice their suggestions and opinions. According to Participant 9, “They listen to us, but the decisions are often made fastly and implemented without full or general consultation”.* Also, Respondent 10 revealed, *“We do have a democratic approach; however, leadership should involve employees more during decision-making”.*

Autocratic Leadership: In some hospitals, leadership was explained as more autocratic, in which decisions were made by top management without workers’ consultation, thereby resulting in restricted employee involvement in decisions on maternal healthcare. According to Respondent 4, *“In some situations, the leadership enforces decisions without consulting us, particularly in emergencies.* Also, Participant 8 stated, *“Most times, the decisions are made by the leadership, and workers are not consistently consulted. During emergencies, decisions are quickly made without involving any employee”.*

Transformational Leadership: In a few cases, leadership was seen as transformational, where leaders motivated and inspired staff during challenges, which facilitated a powerful team spirit. Respondent 7 said, *“Our leaders can be supportive and encourage us to provide the best care, particularly in difficult times.* More so, Participant 10 revealed, *The leadership inspires us, particularly in challenging periods. They ensure we offer the best care, even under any pressure”.*

Patient Feedback Measures: Patients’ feedback was gathered via questionnaires plus follow-up calls, with management utilising the information to enhance service delivery. According to Respondent 2, *“We share questionnaires with patients in their visits, and the leadership utilises the feedback to make some improvements”.* Participant 7 also noted, *“We received feedback via follow-*

up calls; however, the level at which leadership implements the feedback is not very clear". In contrast, Respondent 9 expressed that feedback is sometimes considered, though it is mostly when the issue is pressing.

Outreach Programmes: Furthermore, outreach programmes were used in remote places to educate women on the benefits of maternal healthcare, which aims to lessen geographical and cultural challenges to hospital access. According to Respondent 5, *"In remote places, we conduct outreach programmes to train women on antenatal care plus safe delivery practices"*. Also, Respondent 8 stressed the benefits of indulging the community via their facility's outreach, while concentrating on training women regarding maternal health.

Quality Assurance: The leadership's role in quality assurance was highlighted, with some respondents reporting that leaders were committed to enhancing service delivery via constant monitoring plus feedback. Participant 3 revealed, *Our leadership makes sure that quality checks are constantly done, and patients' feedback is included in improving service delivery*. This statement was echoed by Respondent 7, who expressed that the attention of leadership to quality care was vital in sustaining high standards of maternal care.

Healthcare Employee Incentives: Respondent 9 noted that incentives for workers are often offered via recognition, though there have been no direct monetary rewards.

Crisis Communication: Crisis communication was essential in maternal healthcare, particularly in emergencies like cesarean sections or complications in childbirth. Efficient leadership was reported as crucial in ensuring adequate communication in these crises. Respondents 10, 7, and 6 talked about the benefits of communication in maternal health crises. Respondent 7 said, *During crises, such as emergency deliveries, the leadership ensures that everybody is prepared and informed, which ensures that the situation is efficiently handled*.

Leadership Response in Crisis: Lastly, leadership response in crises was described as decisive and fast, which often involves coordination with several teams to effectively manage the situation. Participants 6 and 10 almost had the same opinion. According to Participant 6, *"During emergencies, leadership makes fast decisions to ensure that teams and resources are immediately mobilised."*

Discussion

The study includes questionnaire respondents and interview participants from both urban and rural areas in Anambra State, offering a balanced demographic that represents a range of experiences in maternal healthcare. The age distribution of questionnaire participants showed that a significant

percentage of females were aged 21 to 30 years, with 56.25% of rural females and 47.62% of urban females falling within this range. This aligns with Shanto et al, who stated that younger females are more likely to seek maternal healthcare services because of higher fertility rates in this age group [3]. The average age for urban women (31.89 ± 7.53 years) and rural women (31.15 ± 8.32 years) showed little difference, indicating that MHU is not heavily influenced by age alone. Additionally, educational attainment was higher among urban respondents, with 29.46% holding a tertiary education compared to only 21.05% in rural areas. This reflects greater access to education in urban regions, which influences healthcare-seeking behaviour, as educated females are more likely to utilise healthcare services [30]. Furthermore, the participants' marital status revealed that 91.25% of females were married, with polygamous marriages being more common in urban areas. The employment status of participants was similar in both urban and rural settings, with self-employment being the most common occupation. Economic factors played a crucial role in decision-making regarding maternal healthcare, as the monthly income showed no significant differences between urban and rural areas, though financial challenges were identified as a key barrier to accessing healthcare services.

These findings align with broader evidence that socio-demographic and economic factors remain critical determinants of MHS use in Nigeria. Okonofua et al. demonstrated that women's education, marital status, partner's employment, and religious affiliation all significantly influence utilisation of primary healthcare facilities for antenatal and delivery services [31]. Their study also revealed that women with primary or secondary education were more likely to deliver in PHCs compared to those with tertiary education, suggesting that more educated women may preferentially seek care from private or higher-level facilities due to perceived better quality. The authors further identified an intriguing association between women's autonomy and facility use, where women with greater autonomy were less likely to utilise PHCs, possibly reflecting higher expectations for quality and a preference for alternative options. Taken together, the similarities between the present findings and the observations by Okonofua et al. underscore the persistent structural and perceptual barriers that shape maternal healthcare utilisation in rural Nigeria. Issues related to financial limitations, perceived and actual quality of care, and geographical access continue to affect women's decisions about when and where to seek maternal services. These insights highlight the urgent need for targeted interventions aimed at improving the quality, affordability, and accessibility of maternal health services, particularly in rural areas of Anambra State. Strengthening PHC facilities and addressing socioeconomic inequities will be essential steps toward improving maternal health outcomes and reducing preventable morbidity and mortality among women in these communities.

In another vein, the interview participants' demographic profile reveals a diverse representation across position, setting, gender, facility type, and length of experience. The respondents were drawn from various urban and rural settings across the State, ensuring a balanced view of maternal healthcare efforts in both contexts. The gender distribution was skewed towards females, with seven females and three males. This aligns with the trend of greater female involvement in maternal healthcare, especially in midwifery and nursing. It is also consistent with existing research, such as Shanto et al., which shows that maternal healthcare roles are occupied by women, particularly in settings involving direct patient care. Regarding setting, the rural-urban split was noticeable, with four respondents from rural areas and six from urban hospital settings. This distribution mirrors the healthcare services' urbanisation in Anambra State, where urban areas tend to have greater healthcare resources, professionals, and facilities. This rural-urban division in healthcare accessibility has been discussed in the literature, such as Shanto et al., which stresses that urban areas are more likely to have well-established healthcare facilities, thereby affecting service utilisation and delivery. The type of facility where the respondents worked also varied, including federal medical centres, general hospitals, traditional health facilities, and community health facilities, with more nurses operating in rural settings. This pattern reflects variability in the provision of healthcare, with urban facilities generally more specialised, while rural areas depend more on traditional healthcare systems and general services that are sometimes less equipped. In terms of years of experience, the range spanned from one to 25 years, with experienced healthcare staff present in both rural and urban settings.

The use of MHS among urban and rural women in the State shows similar uptake, with a few statistically significant differences. The research shows high ANC attendance in both urban and rural areas, with 99.01% of rural women and 98.51% of urban women reported receiving ANC in their last pregnancy. This result aligns with wider research indicating the growing uptake of ANC services in the country, though regional differences exist [24,25,32,33]. For example, Sayyadi et al. carried out a comparative cross-sectional study in urban and rural primary health facilities in Kano State, Northwest Nigeria [33]. Using a similar mixed-methods design, their findings showed that the majority of women in both areas attended only 1-3 antenatal care visits (63.5% in urban areas and 70.3% in rural areas), and comparable proportions reported delivery by skilled birth attendants (58.4% urban; 50.2% rural). However, this study differed from previous studies done in Anambra by Adogu et al. and Ibeh et al [34,35]. Adogu et al. was a comparative cross-sectional study in Anambra State to assess maternal health service utilisation. The study found that rural women had significantly higher fertility rates and fewer antenatal visits compared to urban women. The timing of ANC initiation was similar, with many women in both settings enrolling from three to six months of pregnancy, which highlights the benefits of timely care in pregnancy to avoid maternal and child

complications. However, ANC attendance showed a slight discrepancy, with 80.26% of rural women and 77.68% of urban women comply with ANC attendance. This result mirrors a marginal rural-urban difference, with urban women most likely to attend ANC. This resonates with research noting that urban women gain from better healthcare and access to healthcare personnel [30].

The overall utilisation rate of MHS in this study was low, with only 33.1% of women meeting the full criteria of ≥ 4 ANC visits, skilled birth attendance, and receipt of postnatal care within 42 days after delivery. This suggests that a significant proportion of women do not complete the full continuum of maternal care, despite partial engagement with individual services. The pattern aligns with the findings of earlier Nigerian studies, which similarly report high uptake of at least one component of maternal healthcare but much lower completion of all recommended stages [36,37]. The findings of this study align partly with the broader evidence on MHU reported in the 2024 systematic review and meta-analysis of LMICs, which documented pooled utilisation levels of 85.0% for ANC1, 50.8% for ANC4, 65.6% for skilled birth attendance, 66.9% for institutional delivery, and 48.9% for postnatal care [3]. In contrast, the present study recorded considerably higher utilisation of key maternal health services in both rural and urban communities of Anambra State. Almost all women in both settings received at least one ANC visit ($>98\%$), exceeding the pooled LMIC estimate of 85%. Similarly, facility-based delivery was relatively high (85.9% in rural and 83.6% in urban areas), surpassing the LMIC average for institutional delivery (66.9%) and skilled birth attendance (65.6%). Postnatal care utilisation in this study (84-85%) was also markedly higher than the pooled estimate of 48.9% from the meta-analysis.

Despite these favourable service-specific utilisation rates, the proportion of women who met the full continuum of maternal healthcare was notably low at 33.1%. This contrasts with the meta-analytic finding of 50.8% for ANC4 alone, suggesting that although initial contact with healthcare services is high, continuity and completion of recommended care remain suboptimal in the study area. Another point of divergence relates to regional patterns. The meta-analysis reported higher utilisation in South and Southeast Asia than in Sub-Saharan Africa for most indicators, reflecting persistent regional disparities. However, the present study demonstrates that within Nigeria, particularly in Anambra State, both rural and urban communities exhibit utilisation levels comparable to or higher than LMIC averages, indicating relative progress at the subnational level.

The absence of significant rural-urban differences across ANC attendance, ANC timing, place of delivery, postnatal care, and family planning uptake further contrasts with the broader LMIC evidence of substantial socioeconomic and geographic inequalities. This suggests that in Anambra State, maternal health interventions may be achieving more equitable service distribution across rural and urban settings. Nonetheless, the significant variation observed in maternal health education provision

highlights an important gap, as fewer urban women received health education compared with their rural counterparts. Given the established link between maternal health knowledge and optimal healthcare utilisation, this discrepancy may partly contribute to the low completion of the full maternal healthcare continuum observed in the study.

Concerning the area for delivery, a big percentage of females from the two settings delivered in healthcare facilities; 83.63% in urban and 85.86% in rural areas. Though the difference was not statistically significant, it is notable that home deliveries plus deliveries with traditional birth attendants remained popular, particularly in rural places. This is consistent with a study by Nyande et al that identified cultural preferences as a challenge to healthcare use in rural societies [38]. Also, maternal health training and education provision were commonly reported in 87.83% of rural females compared to urban areas (80.06%). This result implies that, despite greater facility-based solution usage in urban places, rural regions might gain from more health education efforts. This can be because of the higher dependence on healthcare personnel in remote settings for educational awareness, as suggested by Hosseini et al [39]. In sum, the prevalence of maternal healthcare utilisations is high in both urban and rural settings in Anambra State, with some noticeable regional and cultural variations in service use and education.

The prevalence of leadership styles in maternal healthcare settings in the State shows vital insights into the organisational dynamics and their effects on service delivery. Based on both the interview and questionnaire findings, transformational leadership is the dominant style in both urban and rural areas, with 52.38% of urban respondents and 51.32% of rural respondents identifying it as the major leadership style. This approach was seen as efficient, which hastens a collaborative workplace that improves staff performance and patient care. As revealed by an interview participant, a healthcare professional in an urban facility, “Our leaders can be supportive and encourage us to provide the best care, particularly in difficult times.” This resonates with the research on transformational leadership that focuses on support and inspiration to facilitate team cohesion and enhance healthcare results [40]. The present study found that transformational leadership was the predominant leadership style reported in both urban (52.38%) and rural (51.32%) maternal healthcare facilities. This aligns strongly with existing evidence that transformational leadership is increasingly recognised as the most effective leadership approach in modern healthcare environments. According to Ystaas et al transformational leadership enhances the nursing work environment by fostering structural empowerment, encouraging organisational commitment, and improving job satisfaction. These mediating factors play a critical role in shaping staff morale, teamwork, and overall performance, elements that are essential for delivering high-quality maternal healthcare.

In this study, both interview and questionnaire findings demonstrated that transformational leaders were perceived as supportive, communicative, and capable of motivating staff toward achieving shared goals. Such attributes are particularly important in maternal care, where timely decision-making, collaborative practice, and responsiveness to emergencies significantly influence maternal and neonatal outcomes. The ability of transformational leaders to inspire and engage staff is therefore consistent with the broader literature showing that this leadership style contributes to better patient outcomes and more positive care experiences.

However, Ystaas et al also highlighted that although transformational leadership is widely valued, managers in many healthcare organisations do not fully achieve excellence in this leadership style. They emphasised the need for continuous leadership training to strengthen competencies related to fostering a positive safety culture, reducing blame, and improving error reporting. This observation is relevant to the present study, as some respondents noted gaps in leadership capacity despite identifying the dominant leadership style as transformational. These gaps were particularly linked to resource constraints, workload pressures, and limited opportunities for leadership development, challenges more pronounced in rural facilities.

Overall, the congruence between the findings of this study and the conclusions of Ystaas et al suggests that while transformational leadership is present and valued in maternal healthcare settings in Anambra State, efforts must be made to enhance the depth and consistency of its practice. Strengthening leadership training, improving structural support, and promoting an enabling work environment could further amplify the positive influence of transformational leadership on maternal healthcare delivery. Democratic leadership was the second most expressed leadership approach, with 22.92% of urban and 24.67% of rural participants identifying it as the major style. This approach was praised for making a collaborative workplace that enabled healthcare personnel to add their suggestions and enhance patient care. However, in some settings, the participants reported autocratic leadership, in which decisions were made by senior management without involving lower-level workers, especially in emergencies, as noted by another interview participant. “In some situations, the leadership enforces decisions without consulting us, particularly in emergencies.” This implies that, though transformational and democratic leadership were common, the autocratic leadership during emergencies may restrict employee autonomy and flexibility in decision-making. These results resonate with Restivo et al (2022), who stated that efficient leadership positively affects healthcare service delivery, especially when the leadership approach is inclusive and engaging.[41]

Strengths and Limitations

The instruments employed in this study were adapted from previously published, validated tools. All instruments were adapted to the local contexts of rural and urban communities in Anambra State. The mixed-method approach minimised missing responses and ensured comprehensive data collection. The study has some limitations that should be considered when interpreting the findings. Recall bias and social desirability bias may have influenced participants' responses, particularly regarding past healthcare utilisation and involvement in maternal healthcare. In addition, the cross-sectional design did not permit assessment of changes in maternal healthcare utilisation over time.

Conclusion

This study assessed maternal healthcare service utilisation among rural and urban women in Anambra State. Overall utilisation across the continuum of care was low, with only 33.1% of women completing the recommended maternal healthcare pathway of adequate antenatal care, skilled birth attendance, and postnatal care, although awareness and engagement with individual MHS were high. Transformational leadership styles predominated within health facilities. Strengthening continuity of care from antenatal to postnatal stages remains essential for improving maternal health outcomes across the state.

Abbreviations

- SDG= Sustainable Development Goal
- MHS = Maternal Healthcare Services
- AHSQ = Access to Health Services Questionnaire
- MHBQ = Maternal Health Belief Questionnaire
- KIIs = Key Informant Interviews
- MLQ = Multifactor Leadership Questionnaire
- ANC = Antenatal Care
- SBA = Skilled Birth Attendance
- PNC = Postnatal Care
- MHU = Maternal Healthcare Utilisation
- BHCPF = Basic Health Care Provision Fund
- MSS = Midwives Service Scheme
- PHC = Primary Health Centre
- CHOs = Community Health Officers
- CHEWs = Community Health Extension Workers
- CEmONC = Comprehensive Emergency Obstetric and Neonatal Care
- WHO = World Health Organisation

Declarations;

Ethics approval and consent to participate

The study was carried out in compliance with the principles of the Declaration of Helsinki. Ethical approval was granted by the Nnamdi Azikiwe University Teaching Hospital Health Research Ethics Committee (NAUTHHREC), Nigeria (approval number: NAUTH/CS/66/VOL.17/VER.3/38/2024/100). Before the administration of the questionnaires, the purpose of the study was clearly explained to all prospective participants. Participants were fully informed about the study, and written informed consent was obtained from those who agreed to take part.

Consent for publication: Not applicable.

Availability of data and materials: The data used to support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of interest: The authors hereby declare that they have no financial or personal relationship(s) with anybody/organisation whatsoever that may have inappropriately influenced them in writing this article.

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Authors' contributions:

ESI: Conceived and carried out the research, participated in protocol writing, data analysis, manuscript writing and review.

ECS: Implementation, protocol writing and revision of the manuscript.

AAN: Participated in protocol writing and review of the manuscript.

YRA: Participated in protocol writing and review of the manuscript.

EUC: Involved in the writing of the protocol as well as the review of the manuscript.

NK: Participated in manuscript writing and review.

AF: participated in manuscript writing and review.

The authors read and approved the final manuscript and agreed to be accountable for all aspects of the work.

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