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North-South Differential and Determinants of Maternal Health Services Utilization among Urban Poor Women in Nigeria

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Abstract: This study investigated maternal health service utilization among urban poor women in Nigeria, with a focus on North-South differentials. Using 2018 Nigeria Demographic and Health Survey data on 373 women aged 15-49 years, the study found substantial disparities in ideal maternal healthcare use between the North (3%) and South (19%). In the North, husband's education and health facility visits were significantly associated with maternal health service (MHS) utilization, while in the South, women's level of education, occupation, and exposure to family planning information on television were significant factors. There was a significant relationship between predisposing, enabling, and needs factors on MHS use in the South versus the North. Overall, the study highlights how regional demographic and socioeconomic characteristics greatly influence MHS utilization in Nigeria. The findings emphasize the need for tailored interventions to address North-South disparities and improve maternal health outcomes among urban poor women.

Keywords: Maternal health services; Inequality; Poverty; Urban poverty; Nigeria

1. Introduction

The introduction should briefly place the study in a broad context and highlight why it is important. It should define the purpose of the work and its significance. The current state of the research field should be carefully reviewed, and key publications cited. Please highlight controversial and diverging hypotheses when necessary. Finally, briefly mention the main aim of the work and highlight the principal conclusions. As far as possible, please keep the introduction comprehensible to scientists outside your particular field of research. References should be numbered in order of appearance and indicated by a numeral or numerals in square brackets—e.g., [1] or [2,3], or [4–6]. See the end of the document for further details on references.

The use of maternal health care services (MHS) is a proven approach to reducing the risk of maternal mortality, particularly in regions where women's general health status is poor. Between 2005 and 2015, over 600,000 women died during pregnancy or within 42 days of its end, and nearly 900,000 maternal near-miss cases occurred [1]. Sub-Saharan Africa alone accounted for approximately two-thirds of global maternal deaths [1]. In 2017, the maternal mortality ratio (MMR) in developing countries was 462 per 100,000 live births, compared to 11 per 100,000 live births in developed countries [1].

The Millennium Development Goal 5 (MDG 5) aimed to reduce the MMR by 75% from 1990 to 2015. Although maternal mortality decreased by 44% [2], Nigeria failed to achieve the MDG 5 target. Subsequently, Sustainable Development Goal 3 was established to ensure good health and well-being. The primary objective of MHS is to minimize maternal mortality through components such as prenatal/antenatal care, delivery services, assistance during delivery, and postnatal care.

Despite constituting only 2.81% of the global population and 15.2% of the sub-Saharan African population [3], Nigeria ranks third in countries with extremely high maternal mortality rates. In 2020, Nigeria's MMR was 1,047 deaths per 100,000 live births, a 14% increase from 2017 [4]. The high number of maternal deaths in less developed and developing countries reflects inequalities in access to quality health services and highlights the gap between the rich and the poor. In 2017, the lifetime risk of death due to pregnancy was significantly higher among women in low-income

countries (1 in 45) compared to high-income countries (1 in 5,400) [1]. Poor health-seeking behavior, long distances to health facilities, delays in receiving appropriate care, and inadequate infrastructure contribute to these disparities [4]. The inequity in maternal healthcare services between high-income and low-income countries is mirrored in the gap between the urban rich and urban poor populations.

While literature consistently shows a wide rural-urban gap in access to maternal health services, disparities also exist among women within urban areas. These differences are primarily attributed to variations in access based on maternal education and unequal opportunities in healthcare services [5; 6]. Poor women in remote areas are least likely to receive adequate health care [7]. Even with the "urban advantage," rich and poor people live in vastly different epidemiological environments within the same city. Rapid population growth and urbanization have led to an increase in the proportion of urban dwellers in slums, squatters, and shanty towns. The environmental conditions, living arrangements, and economic purchasing power of the urban poor are incomparable to those of their rich counterparts [8]. While good health facilities are within reach of the urban rich, the poor are often confined to substandard facilities. Studies have shown that the urban poor rarely fare better than their rural counterparts in terms of health, as they have limited access to healthcare due to socioeconomic differences [9].

With 54% of Nigeria's population now residing in urban areas [3], a proportion expected to grow in the coming years, the health of women in urban areas, especially those in the lowest economic bracket, should be a major focus of global public health policy. Using the Nigeria Demographic and Health Survey 2018, this study aims to identify the North-South differentials and associated determinants of maternal healthcare services among urban poor women in Nigeria.

2. Materials and Methods

For the analyses reported in this manuscript, we used nationally representative data from the 2018 DHS, which is the sixth survey of its kind implemented by the National Population Commission (NPC). Participants in the DHS were selected using a stratified, two-stage cluster design, with enumeration areas (EAs) as the sampling units for the first stage. The second stage was a complete listing of households carried out in each of the 1,400 selected EAs. The data were accessed online through the DHS website (www.dhsprogram.com). The dataset provided information on the women's background characteristics, antenatal, delivery, and postnatal care, husband's background characteristics, and adult and maternal mortality in Nigeria. A total of 373 weighted values of urban poor women of reproductive age (15-49 years) who delivered twelve months before the NDHS 2018 survey were selected. The choice of events belonging to one year before the survey is to avoid memory lapses of the respondents.

The outcome variable for the study is maternal health service utilization. This study used some of the components of maternal healthcare services, such as the number of antenatal care visits (using the WHO-recommended 8 visits), place of delivery, and provider of assistance at delivery, to generate an indicator outcome variable called utilization of maternal healthcare service package. Following a technique used by [10], the above variables were categorized into three categories namely: ideal or desirable (women who attended at least 8 antenatal care visits, assisted by skilled personnel during delivery and delivered in a health facility), moderate (women who had between 4 and 7 antenatal care visits, supervised during delivery and delivered in an health facility; or had at least 8 ANC visits but did not receive any of the other components; or women who had less than 4 ANC visits but received other components of care were also included in this category; or at least 8 ANC visits, assisted by skilled personnel or supervised during delivery and did not deliver in an health facility; or women who had between 4 and 7 antenatal visits, assisted by skilled personnel or supervised during delivery and did not deliver in an health facility), and undesirable (women who received less than 4 antenatal care visits, did not deliver in any health facility and was not assisted during delivery; or less than 4 antenatal care visits, did not deliver in any health facility and assisted during delivery; or women who had between 4 and 7 antenatal visits, no health facility delivery and was not assisted during delivery) utilization of maternal health service.

The Andersen and Newman framework of health services utilization [11] was chosen for this study because of its ability to specify needs at multiple levels using predisposing, enabling, and need variables. The choice of variables for this framework is based on the reviewing of existing literature [12; 13]. We assessed the predictive value of 11 explanatory variables divided into three categories:

1. Predisposing Factors
- The current age of respondents
- Level of education
- Religion
- Family type (monogamous or polygamous)

- Total number of children ever born
- Husband/partner's level of education

2. Enabling factors
- Work status of the respondent
- Exposure to family planning information in the media
- Distance to health facilities

3. Need Factors
- Pregnancy status
- Visit a health facility in the last 12 months

Stata 18 was used to perform all statistical analyses. Frequency tables and a Venn diagram were employed to describe sample characteristics, including predisposing, enabling, and need factors, as well as maternal health service utilization. Bivariate analysis utilized chi-square statistics to examine the associations among research variables. At the multivariate level, multinomial logistic regression was conducted to further investigate the relationship between explanatory variables and maternal health service utilization.
Since the dependent variable (maternal health service utilization) has three unordered categories (desirable, moderate, and undesirable utilization), a model that accommodates three or more response outcomes is appropriate [14]. To analyze the determinants of maternal health service utilization, the response probabilities for the multinomial logistic regression model can be specified as follows:

$$\log\left(\frac{P(MHSU=j)}{P(MHSU=0)}\right) = \beta_{0i} + \beta_{1i}X_1 + \beta_{2i}X_2 + \ldots + \beta_{ki}X_k$$

Where:
- j=1(Moderate) or 2 (Desirable)
- 0 (Undesirable) is the reference category
- $X_1, X_2, \ldots, X_k$ are the independent variables
- β_{0i} is the intercept for outcome i
- $\beta_{1i}, \beta_{2i}, \ldots, \beta_{ki}$ are the regression coefficients for outcome i.

The model will produce two sets of coefficients: for the log-odds of Moderate utilization vs. Undesirable utilization and for the log-odds of Desirable utilization vs. Undesirable utilization. For each independent variable: a positive coefficient indicates that as the variable increases, the likelihood of being in that category (Moderate or Desirable) compared to the reference category (Undesirable) increases. A negative coefficient indicates that as the variable increases, the likelihood of being in that category compared to the reference category decreases.

3. Results

3.1. Profile of Respondents

The age composition is relatively similar across North and South, with the 25-34 age group being the most prominent (45% North, 48% South). Young adults (15-24) represent about 30% in the North and 27% in the South, while those 35 or older comprise approximately 24-25% in both regions. Stark educational disparities exist between North and South. In the North, 81.5% have no education, compared to only 8.7% in the South. About 50% in the South have secondary or higher education, while just 6.5% in the North have reached this level. Husbands' education levels, like those of women, vary substantially. In the North, 64% have no education, while in the South, only 13.3% are uneducated. 48% of the Southern husbands have secondary or higher education, compared to 19.9% in the North. The North is predominantly Muslim (94%), while the South is overwhelmingly Christian/Catholic (84.8%). Traditional religions are minimally represented in both regions. The South has a higher proportion of monogamous families (80%) compared to the North (52.6%). The North has a higher proportion of grand multiparous women (about 50% with 5 or more children) compared to the South (33.8%).
The South shows higher female workforce participation (86.5%) compared to the North (57%). Family planning information exposure is limited in the North (25.6%) but more prevalent in the South (46.5%). A larger percentage in the South (42.3%) considers distance to health facilities a big problem, compared to 25% in the North. Unplanned

pregnancies are more common in the South (26%) than in the North. Southern women demonstrate higher healthcare facility visits in the last 12 months (75%) compared to Northern women (55%).

The figures**Error! Reference source not found.** and**Error! Reference source not found.** revealed significant regional disparities in the utilization of maternal healthcare services. In Northern Nigeria, the most concerning finding is that 78% of women have poor access to the three maternal healthcare services (that is they have below the recommended 8 antenatal visits, not assisted by skilled personnel, and did not deliver in a health facility), compared to 33% in the South. Overall, the South - single service use ranges from 6-9% compared to 2-3% in the North, while combined service utilization shows 24% of Southern women accessing both skilled assistance and facility delivery versus 9% in the North. Most notably, comprehensive maternal healthcare utilization (all three services) is significantly higher in the South at 19% compared to just 3% in the North.

3.1.1. Bivariate results

The relationship between the predisposing, enabling, and need factors and the maternal health service utilization is presented in Table 2. In the North, key challenges are evident with higher undesirable outcomes, particularly among those with no education (65.5%), Muslims (64.2%), and those who don't visit health facilities (73.1%). The strongest statistical associations in the North are with husband's education ($\chi2 = 22.1^{***}$) and health facility visits ($\chi2 = 9.5^{**}$).

The South shows generally more favorable outcomes, with education playing a crucial role - undesirable outcomes decrease significantly from 33.7% (no education) to 9.4% (secondary/higher education). Healthcare facility visits in the South are associated with higher moderate outcomes (67.7%), and media exposure shows better ideal outcomes (23.1%). Notable statistical associations in the South are with education level ($\chi2 = 9.2^{**}$) and religion ($\chi2 = 9.0$).

3.1.2. Multivariate results

Error! Reference source not found. presents the result of the multinomial logistic regression. In the Northern region, the number of children a woman has significantly influences her maternal health service utilization. Women who have had two to four children are notably less likely to use both moderate and ideal maternal health services compared to first-time mothers, showing a 72% reduction in moderate service use and a striking 98% reduction in ideal service use. This pattern becomes even more pronounced for women with five or more children, suggesting that as family size increases in the North, women become progressively less likely to access higher levels of maternal care.

Education emerges as a crucial factor, but its impact varies by region. In the South, women with secondary or higher education are substantially more likely to use moderate maternal health services, with the likelihood increasing by more than 15 times compared to women with no education. This trend suggests an even stronger association with ideal service utilization. The North shows a different pattern, where the husband's education level appears more influential than the woman's own education. Men with secondary or higher education in the North are associated with their wives being 2.73 times more likely to use moderate maternal health services. The working status of women shows some positive association with service utilization, particularly in the North, for ideal MHS usage, though the evidence is marginally significant. Religious factors appear to play a role, with a notable pattern among Muslim women in the South.

The findings in **Error! Reference source not found.** Further show that the relationship between pregnancy planning and service utilization presents an interesting contradiction in the South, where planned pregnancies are associated with an 87% reduction in the likelihood of using moderate maternal health services. Healthcare access patterns also show regional variation. In the North, women who have visited a health facility in the previous 12 months are 31% more likely to use moderate maternal health services, indicating that familiarity with the healthcare system may encourage continued engagement. Interestingly, the perceived distance to health facilities does not show a statistically significant impact in either region, suggesting that other factors may be more crucial in determining service utilization.

3.2. Tables and Figures

Table 1: Predisposing, enabling and needs characteristics of study participants

Variables	North (percentage)	South (percentage)
Predisposing Variables		
Age		
15 – 24	30.2	27.4
25 – 34	44.9	48.0
35 or more	24.9	24.6
Level of Education		
No education	81.5	8.7
Primary	11.9	42.7
Secondary/higher	6.5	48.7
Religion		
Christian/Catholic	5.6	84.8
Islam	94.0	13.5
Traditional	0.4	1.7
Family Type		
Monogamous	52.6	79.8
Polygamous	47.4	20.2
Parity		
Primiparity (one)	9.6	23.2
Multiparity (2-4)	40.6	42.9
Grand multiparity (5+)	49.8	33.8
Husband's Level of Education		
No education	63.7	13.3
Primary	16.4	38.7
Secondary/higher	19.9	48.0
Enabling Factors		
Work Status		
Not working	43.0	13.5
Working	57.0	86.5
Exposure to family planning information on Media		
Not exposed	74.4	53.5
Exposed	25.6	46.5
Distance to Health Facility		
Big problem	25.09	42.27
Not a big problem	74.91	57.73
Needs Factors		
Pregnancy Status		
Planned	94.15	74.11

Unplanned	5.85	25.89
Visit to Health Facility in the last 12 months		
No	44.56	25.21
Yes	55.44	74.79

Source: Author's Work, 2024 (Computed from 2018 NDHS)
Note: *** significant at the 1% level; ** significant at the 5% level: * significant at the 10% level.

Figure 1 Maternal Health Utilization in Northern Nigeria

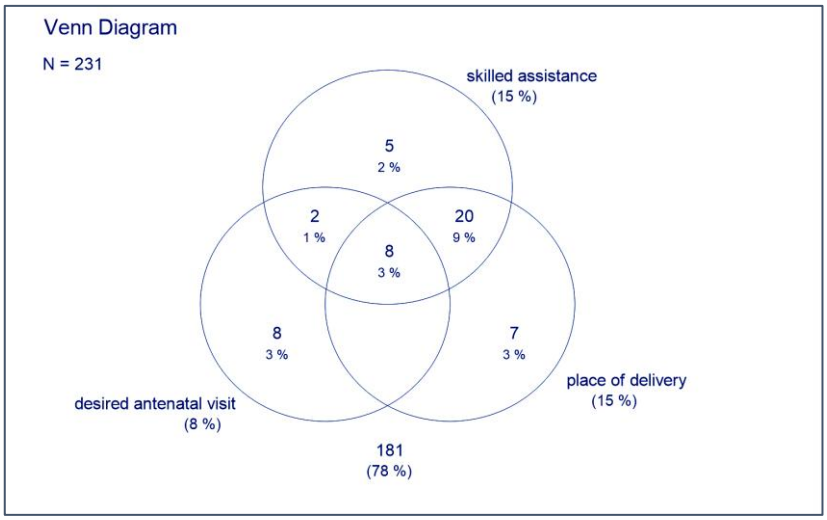

Figure 2 Maternal Health Utilization in Southern Nigeria

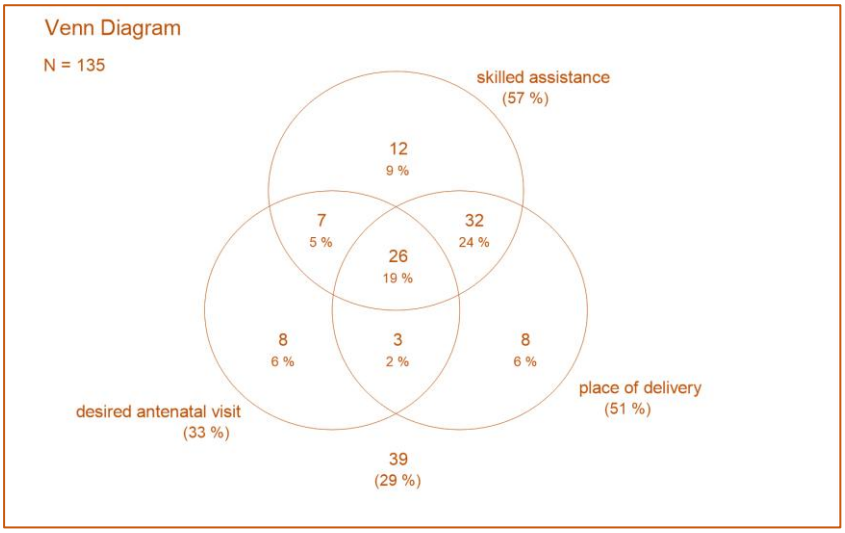

Table 2 Percentage distribution of respondents by selected background variables, and utilization of maternal health services in Nigeria

Variables	**North**			**South**		
	Undesirable	**Moderate**	**Ideal**	**Undesirable**	**Moderate**	**Ideal**
Age	$\chi2 = 0.5$			$\chi2 = 2.5$		
15 – 24	62.1	34.6	3.3	14.3	64.3	21.4
25 – 34	63.4	34.0	2.6	23.9	56.8	19.3
35 or more	59.9	38.1	1.9	17.5	69.2	13.3
Education level	$\chi2 = 5.4$			$\chi2 = 9.2^{**}$		
No education	65.5	32.2	2.3	33.7	57.6	8.6
Primary	43.8	52.1	4.1	28.5	55.7	15.8
Secondary/higher	55.5	42.5	3.9	9.4	68.1	22.4
Religion	$\chi2 = 6.9$			$\chi2 = 9.0$		
Christian/catholic	31.9	62.7	5.4	23.2	60.8	16.0
Islam	64.2	33.4	2.5	0.0	64.4	35.6
Traditional	0.0	100.0	0.0	0.0	100.0	0.0
Family type	$\chi2 = 5.1$			$\chi2 = 1.5$		
Monogamous	55.2	40.7	4.1	20.1	59.3	20.7
Polygamous	69.1	29.5	1.4	13.7	54.0	32.2
Parity	$\chi2 = 7.8$			$\chi2 = 1.5$		
Primiparity (one)	47.1	42.4	10.5	15.8	59.7	24.5
Multiparity (2-4)	65.4	33.9	0.7	19.1	63.3	17.6
Grand multiparity (5+)	62.3	34.9	2.7	23.2	61.7	15.2
Husband's education	$\chi2 = 22.1^{***}$			$\chi2 = 6.9$		
No education	71.0	27.8	1.2	6.2	76.0	17.8
Primary	44.4	44.7	10.9	29.3	45.7	25.0
Secondary/higher	46.7	52.2	1.1	13.9	63.3	22.8
Work status	$\chi2 = 3.0$			$\chi2 = 3.5$		
Not working	67.8	30.9	1.3	22.4	44.7	32.9
Working	57.9	38.5	3.7	19.3	64.6	16.1
Exposure to family planning information on Media	$\chi2 = 0.9$			$\chi2 = 1.8$		
Not exposed	63.8	33.4	2.8	19.7	66.0	14.3
Exposed	57.1	40.5	2.4	19.7	57.2	23.1
Distance to Health Facility	$\chi2 = 3.71$			$\chi2 = 2.0$		
Big problem	72.7	25.0	2.3	24.7	60.6	14.7
Not a big problem	58.6	38.7	2.7	16.0	62.9	21.1
Pregnancy status	$\chi2 = 0.4$			$\chi2 = 2.0$		

Planned	61.9	35.3	2.8	21.6	58.4	20.0
Unplanned	66.5	33.5	0.0	14.1	71.9	14.0
Visit to Health Facility in the last 12 months	$\chi2 = 9.5$**			$\chi2 = 7.5$*		
No	73.1	25.1	1.8	22.4	44.8	32.8
Yes	53.3	43.3	3.3	18.8	67.7	13.5

Source: Authors' Work, 2024 (Computed from 2018 NDHS)
Note: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Table 3 Multinomial regression model predicting the Relative Risk Ratios of an urban poor woman utilizing Maternal Health Services

Variables	**NORTH**				**SOUTH**			
	Moderate MHS		**Ideal MHS**		**Moderate MHS**		**Ideal MHS**	
	RRR	**95% CI**	**RRR**	**95% CI**	**RRR**	**95% CI**	**RRR**	**95% CI**
Age								
15 – 24	RC		RC		RC		RC	
25 – 34	1.25	0.48 – 3.20	2.69	0.09 – 83.3	1.19	0.22 – 6.50	4.21	0.56 – 31.75
35 or more	1.33	0.38 – 4.71	2.52	0.04 –160.9	2.15	0.25 – 18.9	4.10	0.32 – 53.03
Education level								
No education	RC		RC		RC		RC	
Primary	1.34	0.51 – 3.49	1.76	0.16 – 19.4	2.86	0.17 – 48.9	9.79	0.23 – 419.12
Secondary/higher	0.47	0.12 – 1.94	2.93	0.13 – 65.9	15.63*	0.73 – 333.9	49.17	0.99 – 2431.45
Religion								
Christian/catholic	RC		RC		RC		RC	
Islam	0.48	0.11 – 2.07	0.44	0.03 – 7.41	0	0	0	0
Family type								
Monogamous	RC		RC		RC		RC	
Polygamous	0.96	0.50 – 1.81	0.20	0.02 – 2.38	0.27	0.05 – 1.54	0.96	0.15 – 5.97
Parity								
Primiparity (one)	RC		RC		RC		RC	
Multiparity (2-4)	0.28**	0.09 – 0.84	0.02**	0.001 – 0.52	26.34**	2.24 – 309.9	1.51	0.18 – 12.77
Grand multiparity (5+)	0.22**	0.05 – 0.91	0.03*	0.001 – 1.64	8.80	0.62 – 125.3	0.34	0.03 – 4.18
Husband's education								
No education	RC		RC		RC		RC	
Primary	1.41	0.58 – 3.45	5.99*	0.78 – 46.02	0.04*	0.002 – 0.99	0.29	0.01 – 12.13
Secondary/higher	2.73**	1.14 – 6.53	2.04	0.11 – 38.28	0.07	0.002 – 1.87	0.21	0.004 – 10.14
Work status								
Not working	RC		RC		RC		RC	
Working	1.71	0.86 – 3.41	14.96*	0.81 – 277	1.29	0.20 – 8.41	1.01	0.14 – 6.99

Exposure to family planning information on Media								
Not exposed	RC		RC		RC		RC	
Exposed	1.30	0.62 – 2.73	0.50	0.04 - 5.78	0.90	0.24 – 3.42	1.01	0.23 – 4.49
Distance to Health Facility								
Not a big problem	RC		RC		RC		RC	
Big problem	0.65	0.30 – 1.42	1.41	0.14 – 13.7	0.45	0.13 – 1.55	0.50	0.12 – 1.99
Pregnancy status								
Unplanned	RC		RC		RC		RC	
Planned	1.05	0.30 – 3.74	800678.1	0	0.13**	0.02 – 0.90	0.22	0.03 – 1.73
Visit to Health Facility in the last 12 months								
No	RC		RC		RC		RC	
Yes	1.31**	1.11 – 3.91	3.23	0.46 – 22.6	1.04	0.21 – 5.21	0.27	0.05 – 1.38
Model Constant	1.31	0.16 – 10.5	0.00	0	2.67	0.04 – 196.04	0.84	0.01 – 121.49

Source: Authors' Work, 2024 (Computed from 2018 NDHS)

Note: *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

RC = Reference category

Base model = Undesirable category

4. Discussion

We used a nationally representative sample to compare the level of maternal health service utilization among urban poor residents in North and South Nigeria. Our study revealed that only 3% of the Northern women and 19% of the Southern women have the desirable maternal health service utilization package (8 or more antenatal care visits, health facility delivery, and assisted by skilled personnel during delivery). This finding is significant as it demonstrates the poor maternal health service utilization among marginalized, urban poor women. This aligns with prior research among female adolescents in Nigerian urban slums, which revealed that slum residents face limited access to healthcare due to their low socioeconomic and environmental conditions [22]. A similar study using the Demographic and Health Survey data from 23 sub-Saharan African countries revealed that although the urban poor have better access to maternal health services than the rural residents, the care of the urban poor is worse than that of the urban non-poor [23]. It was also revealed that 65 per cent of the respondents in the North have an undesirable maternal health service utilization when compared to one-fifth of the respondents in the South.

The Northern region demonstrates a concerning pattern in maternal health service utilization compared to the Southern region. About 78% of women do not access any of the three essential maternal health services in the North compared to 29% in the South, highlighting a critical gap in service coverage. This result agrees with the studies where it was reported that the maternal mortality ratio is worse in northern Nigeria and the utilization of maternal health services is lower in the North compared to the Southern part of the country [18; 19; 20]. This could be attributed to the cultural beliefs and traditions, such as the privacy of the women's body (purdah), as husbands prevent their wives from visiting the health facilities due to the predominance of male doctors over female doctors. Also, the insurgency and insecurity in the North with targeted attacks on government and private institutions, including health centers and hospitals, could be a reason for the low utilization of maternal health services in the area [21]. The component variables of the maternal health service package are important as one use can facilitate the others [24]. For instance, the higher ideal/desirable maternal health service utilization, especially in the South (19% versus 3% in the North) as revealed in our findings,

suggests more effective integration. Further findings demonstrate significantly higher rates of dual-service utilization for the combination of skilled personnel assistance during delivery and health facility delivery (29% in the South versus 9% in the North). The strong correlation between skilled assistance and facility delivery in the South demonstrates how these services effectively complement each other.

The analysis revealed a significant disparity in the level of maternal healthcare service utilization based on women's educational attainment in the Southern region ($p<0.05$). This finding aligns with the stark educational disparity observed between Northern and Southern Nigeria as documented in previous studies on regional inequalities. In the North, a staggering 81.5% of women have no formal education, compared to 8.7% in the South. This educational gap has profound implications for maternal healthcare access and utilization. The data shows that Southern women with secondary or higher education demonstrate higher rates of ideal/desirable service utilization (22.4%) compared to those with only primary education (15.8%) or no education (8.6%). Further findings revealed that Southern women with secondary/higher education are 15 times more likely to use moderate maternal health services. This finding aligns with existing evidence that education enhances women's social status and bargaining power within households [15, 16]. Educated women tend to have greater awareness about available health services, improved confidence in navigating the healthcare system, and stronger decision-making authority over their own care. Education also fosters the development of positive attitudes towards preventive healthcare and reproductive health practices [22; 25]. This evidence supports the notion that investing in women's education can yield significant dividends in terms of enhancing maternal health outcomes [22].

The analysis revealed that in the Northern region, the husband/partner's education emerged as a more influential factor compared to the woman's own education. The data showed a significant statistical association between the husband's educational attainment and the level of utilization of maternal healthcare services ($p<0.05$). Specifically, wives of men with secondary or higher education were 2.73 times more likely to utilize moderate maternal health services compared to women whose husbands had no education. This finding aligns with existing research on the role of men in women's health services utilization in northern Nigeria. The work highlights the deeply entrenched patriarchal social structures in the region, where cultural traditions and religious norms intertwine to place men as the primary decision-makers in the household healthcare matters [26]. A woman's access to maternal health services in the North is often contingent upon her husband's awareness, approval, and support. Men's education, therefore, emerges as a crucial determinant, as it can shape their understanding of the importance of maternal healthcare and their willingness to facilitate their wives' access to these vital services.

Further findings showed that although exposure to family planning information on television and occupation showed no impact on maternal healthcare use in the North, being exposed to family planning information on television and engaging in skilled, technical/professional work were positively associated with ideal maternal healthcare utilization in the South. This is not surprising given that mass media plays an important role in reaching both the educated and less educated mothers [17; 27]. Having a recent health facility visit was positively ($p<0.05$) associated with ideal utilization, significantly so in the North.

5. Conclusions

This study revealed a significant north-south disparity in maternal healthcare utilization across the country, with the Northern region substantially lagging behind the Southern region in key indicators like antenatal care, facility deliveries, and access to skilled birth attendants. To address this disparity, the findings underscore the need for urgent, region-specific interventions. In the Northern region, priority should be given to male engagement programs, involving religious leaders, educational initiatives for both genders, and ensuring cultural competency in healthcare delivery. In the Southern region, the focus should be on quality improvement in existing services and economic empowerment programs. The results also emphasize the importance of women's empowerment through education and targeted health messaging in improving maternal health outcomes, with particular attention to underprivileged urban populations. By implementing these tailored, evidence-based interventions, policymakers and public health authorities can work towards aligning maternal health indicators across the regions and ensuring equitable access to quality maternal healthcare services nationwide.

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