

## Original Research Article

# Determinants of maternal healthcare services utilization in selected communities in Edo Central Senatorial District Nigeria

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## ABSTRACT

**Background:** Throughout history, society has always employed several means to promote maternal healthcare services to save pregnant women and their unborn babies from expected or unexpected dangers during pregnancy, birth and after birth. This study investigated the determinants of maternal health care services utilization in selected communities.

**Methods:** A descriptive cross-sectional survey design was adopted for this study using a questionnaire as a quantitative tool. The population of the study comprised women of reproductive age group (15-49) Edo Central Senatorial District, Edo State Nigeria. A multi-stage sampling technique was used to select 561 study participants from the target population. A total of 561 copies of the questionnaire were administered but 490 of them were retrieved and found to meet criteria for analysis. Data was analyzed using SPSS version 25 and computed for descriptive statistics- frequency with percentage counts, mean and standard deviations. Additionally, inferential statistics chi-square used to test the stated hypotheses.

**Results:** The finding showed that the women's mean age of 28±5.37. Residential location of the participants did not significantly influence their utilization of maternal healthcare services. Educational qualifications, were found to influence the utilization of maternal healthcare services than those of lower educational levels ( $p < 0.05$ ). In addition, 364 (74.2%) respondents agree that free or low cost of maternal health services would prompt and promote regular visits to clinic.

**Conclusions:** It is recommended that the government should provide freer or low-cost.

**Keywords:** Maternal healthcare services, Pregnancy, Reproductive age, Utilization

## INTRODUCTION

Throughout history, society has always employed several means to promote maternal healthcare services to save pregnant women and their unborn babies from expected or unexpected dangers during pregnancy, childbirth and after birth. Maternal healthcare refers to the essential care given to women to enhance positive pregnancy outcome.<sup>1</sup> Mannava et al., described maternal healthcare as care given to women that is primarily concentrated on their wellbeing during pregnancy, childbirth, and the postpartum period.<sup>2</sup>

Maternal health is the health of women during pregnancy, childbirth and the postpartum period. Maternal health care services are antenatal care (ANC), delivery care and postnatal care (PNC) services rendered to women and their newborn.<sup>3</sup> Maternal healthcare service is also described as the totality of activities related to the care and treatment of women in childbirth, during pregnancy and the period before and after delivery. It has been reported that the increasing attention given to maternal health globally has contributed immensely to the reduction of maternal mortality.<sup>4</sup> Although there has been a 47% decline in maternal deaths globally, the maternal mortality ratio is still unacceptably high.<sup>5</sup>

In high-income countries, child delivery is often a positive and fulfilling experience, but for many women in low and middle-income countries, delivery is often associated with suffering, morbidity and in some cases maternal death.<sup>6</sup> For example, with an estimated maternal mortality ratio of 500 per 100,000 live births, sub-Saharan Africa (comprising low and middle-income countries) accounts for 56% of all maternal deaths globally.<sup>7</sup> It has been reported that 287,000 annual global maternal deaths, 99% occur in low- and middle-income countries (LMICs). It was reported that lack of timely and quality maternal healthcare services contribute significantly to high maternal morbidity and mortality witnessed in low-and-middle-income countries (LMICs).<sup>8</sup>

In Nigeria, it has been reported that an estimated 2,300 children under the age of five and 145 women of childbearing age die every single day, making the country to account for the second-largest number of maternal and child deaths in the world.<sup>9</sup>

Central Intelligent Agency (2016) equally reported that the maternal mortality rate resulting from obstetrics episodes in Nigeria is estimated to be 814 deaths/100,000 live births, which is about four times higher than the global average of 216 deaths per 100,000 live births.<sup>10</sup> Nigeria accounts for 2.4% of global population yet carry 14% of the global burden of maternal mortality.<sup>11</sup>

Despite the frightening figures, the context and causes of maternal mortality and morbidity are known to be mostly from pregnancy-related complications, most of which are attributed to haemorrhage, puerperal sepsis, obstructed

labour, hypertensive disorders, complications of abortion, uterine rupture and unsafe abortions.<sup>12</sup>

Efforts have been made to improve on strategies to ameliorate these pregnancy-related complications especially by provision of access to maternal healthcare services.<sup>13</sup>

Although maternal mortality was reported to have declined by 41% between 1990 and 2010 Nigeria still ranks high in the list of countries with high maternal mortality rates. The high maternal mortality rate has been attributed to inadequate utilization of maternal health care services. Deliveries in a health facility staffed with professional healthcare providers is associated with lower maternal and newborn mortality and morbidity rates compared with deliveries devoid of professional healthcare providers.<sup>14</sup>

However, in Nigeria the National Primary Health Care Development Agency (NPHCDA, 2016) reported that, 61% of pregnant women receiving care by a skilled provider in Nigeria, only 38% of births are attended to by professional birth attendants. Also, report from Nigeria Demographic and Health Survey (NDHS, 2018) stated that only 38% of Nigerian women delivered in a health facility with professional health care attendants which corroborated the NPHCDA of 2016.

From the foregoing, it is convenient to opine that Nigeria's high rate of maternal mortality is verily related to poor utilization of maternal healthcare services. Therefore, to stem the ugly tide of the high maternal mortality rate, the factors that fuel or contribute poor utilization of maternal healthcare services need to be understood.<sup>15</sup>

Studies have outlined several factors as influencing the utilization of maternal health services in developing countries including Nigeria. These factors range from availability, accessibility and quality of services to the social characteristics of the users and their communities. The present study therefore seeks to ascertain the determinants of maternal health care services utilization in Edo State, vis-à-vis, place of residence, education, cost and women's autonomy.<sup>16</sup>

Pregnant mothers living in rural areas are most likely to reside far from health centres, which are mostly located in urban areas than their urban counterparts. Another also added that maternal mortality is higher in rural areas because large geographic distances limit access to maternal healthcare services to health facilities and scarce resources. The poor income earners may probably find it more difficult to afford transportation and the 'initial deposit cost' compulsorily charged in most health centres in line with the cost recovery initiative.<sup>17</sup>

Educational attainment and women's autonomy (i.e. a woman's right to make decisions that impact her life and

well-being without having to seek consent) have been reported to influence utilization of maternal healthcare services significantly. Educational attainment has been identified as a marker of economic resources which empowers women to take control of their health and facilitate easy access to and utilization of quality maternal health care. Studies also indicated that women with improved status and autonomy and those who reported making joint decisions with their partners were more likely to deliver in a health facility with professional healthcare providers. Spousal support and empowerment helps women to take concerted action, timely, in accessing maternal healthcare services considered qualitative, necessary or essential.<sup>18</sup>

Allowing these factors to continue to fuel poor utilization of maternal healthcare services which in turn contributes significantly to the high maternal mortality rate in Nigeria does not hold a good prospect for the struggle against maternal morbidity and mortality and therefore must be critically addressed. In other words, some determinants are responsible for the pattern of utilization of maternal healthcare services observed in Nigeria, which have been repeatedly described as “poor”. Therefore, it is convenient to infer that sustainable development goal (SDG) 3, which borders on good health and well-being will remain a mirage in Nigeria as far as maternal health is concerned if the factors that fuel poor maternal healthcare service utilization are not tackled.<sup>19</sup> Determinants of maternal healthcare service utilization in several geographical locations in Nigeria have been evaluated by several studies which showed that place of residence, education, cost of healthcare services and women autonomy in respect to decision making have significant influence on healthcare service utilization.<sup>20</sup> However, the specific situation as it relates to Edo State still manifests gross paucity of literature on the subject matter. As Edo State is not isolated from all the negative indices of maternal mortality and morbidity bedevilling Nigeria, it is proper to unravel the exact situation determinants that affect utilization of maternal healthcare services in the State. It is against this background that the current study was carried out to ascertain the determinants of maternal health care services utilization in Edo State.

However, health care utilization has been the platform to tackle any health related event. Studies have shown that there is an inverse relationship between maternal health care service utilization and maternal mortality rate. Nigeria not being an exception to this trend, has a worse data in respect to this as it currently has a four-fold of the global acceptable MMR.<sup>10</sup>

There is paucity of data on the prevailing MHSU in Edo State. Study done in Esan South East and Etsako East LGAs of Edo State showed that only 62% of the 1408 of randomly selected recently delivered women had antenatal care and only 47% were delivered by professional health care provider. Reasons for utilization

and non-utilization were attributed to long distance of PHC centres, high cost of service and poor quality service delivery. These factors might be responsible for the poor MHSU and the consequent high maternal and child mortality rate in Nigeria and like-wise Edo State. Hence, the purpose of this study is to assess determinants of maternal healthcare services utilization in Edo State central senatorial district.<sup>15</sup>

The result of this study will be useful to health policy makers, health workers, especially professional birth attendants, (e.g. physicians and nurses), pregnant women and their relatives, organisations that are interested in curbing the high maternal and child mortality in Nigeria (particularly in Edo State) and academics, when the results are shared with them.<sup>21</sup>

However, the objective of this study was to investigate the determinants of maternal health care services utilization in selected communities in Edo Central senatorial zone.

## METHODS

### Research design

The descriptive cross-sectional survey design described by Fubrook et al, was utilized for this study.<sup>22</sup>

### Area of the study

The study was conducted in Edo State Central Senatorial district in some communities across the senatorial zone of Edo central were selected to reflect diversity of Edo people. Designation of community as urban was hinged on the community having at least 2,500 population or greater with at least a hospital (Orobosa Medical Center, Irowa Medical Center and Audua Specialist Hospital) of more than 50 beds handling chronic and long inpatient stay cases and located within or less than 25 kilometres from a city of 20,000 population or greater.

### Study population

Women in the reproductive age group (15-49 years) located in Auchi, Aviele, New Benin, Uzebu, Ubiaja, and Emu communities in Edo State, Nigeria.

### Sample size determination

A sample size of 500 women who had births in the year preceding the survey was determined statistically using power analysis formula for sample sizes for two independent proportions,

$$n = \frac{2(Z_{\alpha} + Z_{\beta})^2 \times P(1 - P) \times d}{d^2}$$

where;  $n_i$ = minimum sample size for each group;  $Z_{\alpha}$  = percentage point of standard normal deviate (2 sided) set

at 95% confidence level = 1.96;  $Z_{\beta}$  = power of the test set at 80% (20% beta error) = 0.84; P = rate of utilization of delivery services from a previous Nigerian study = 57.1%.<sup>23</sup> D = design effect = 1.5;  $d^2$  = expected difference = 0.15.

$$n = \frac{2(1.96 + 0.84)^2 \times 0.57(1 - 0.57) \times 1.5}{0.152}$$

n = 255.

Therefore, from the above  $n_1$  (sample size drawn from urban area) and  $n_2$  (sample size drawn from rural area) are thus approximately 255 women of reproductive age group

From the calculation, sample size of  $n_1$  (urban) = 255 plus  $n_2$  (rural) = 255 (i.e.  $N=n_1+n_2 = 255 + 255=510$ ) would be the total sample size. Therefore, with anticipation of a 10% attrition rate,  $510 + 51 = 561$  was the final sample size.

### **Sampling technique**

A multi-stage sampling technique was employed for this study as follows: cluster sampling was used to categorize Edo central senatorial district into local government, namely: Esan Central, Esan North-East, Esan South-East, Esan West, Igueben. In the second stage simple random sampling was used to select one LGA from the senatorial zone which was Esan Central. In the fourth stage, a systematic sampling technique was also used in which the first household was selected from the community using simple random sampling and subsequent household were selected after skipping two houses. In the final stage, from the households, one eligible participant was selected by simple random sampling using a table of random numbers.

### **Inclusion criteria and exclusion criteria**

Women whose children were between the ages of 0-3 years and were receiving maternal health care services within urban or rural area were included while those whose children were above three years excluded. This was to limit recall bias as well as ensure that those who participated in the study recently had the need to use maternal health services.

### **Instrument for data collection**

Data collection was carried out by means of a researcher constructed questionnaire titled: maternal healthcare service utilization questionnaire (MHSUQ). The items in the instrument were structured in line with the research questions and also based on the ideas and information obtained from the reviewed literatures. The instrument consisted of twenty-three (23) items arranged in two sections, namely: A and B. Section A is based on socio-economic and demographic variables and embodies three

(3) items [with two (2) items relating to participants place of residence and one (1) item relating to educational attainment]. Section B, on the other hand, contains twenty (20) statement items on determinants of MHSU.

The questionnaire was completed during a person-to-person interaction with the researcher or trained research assistants. Research assistants were trained on the procedure for data collection

### **Validation of the instrument**

The instrument for the study was subjected to face and content validation. The language used is clear, simple, understandable and unambiguous. It was ensured that the tools' items are adequate, suitable and in line with stated objectives. Based on these, a final copy of the instrument was pilot tested for reliability test and thereafter produced and utilized for data collection.

### **Reliability of instrument**

Twenty copies of the questionnaire were piloted in two selected places (one rural and one urban area both from Esan West LGA) with similar characteristics as the study area in Edo State. Cronbach's alpha was used to check for internal validity. A reliability coefficient (r) of 0.8 was obtained and the instrument was seen as reliable for the study.

### **Ethical consideration**

This current research work was done after a permission to go ahead was granted from the ethical committee of the Edo State Hospital Management Board with the registration number: A732/T/1.

Consent was obtained from respondents by attaching a written informed consent to the questionnaire. They were assured that participation was voluntary and their responses would be confidential and that they were free to withdraw at any time of the survey without prejudice.

### **Procedure for data collection**

Data was collected with instrument during a person-to-person interaction between the researcher or research assistants and the women concerned in the selected areas. Respondents were sourced from places where there are high probabilities of finding the target population within communities such as hospitals, markets, churches, women community unions, etc. The fieldwork lasted for a period of 8 weeks with 2 to 3 days spent at each selected location per week.

### **Training of research assistants**

Six research assistants were trained and utilized for this study. Questions in the instrument were discussed one after the other and areas of ambiguity were clarified.

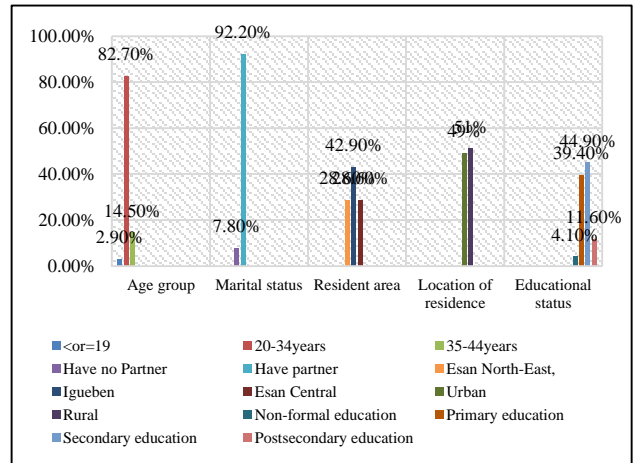
**Data analysis**

Copies of the MHSUQ were examined for completeness of copies. Data collected from the questionnaires were tallied and put into frequencies. Consequently, frequency counts and simple percentages were used in computing and describing the research questions. In describing research questions 7 to 26 which are concerned with determinants of MHSU, each question was answered as True, false or I don't know. True was given a score of 1, while false and I don't know were scored zero. I don't know was also scored because the questions were structured in such a way that indifference was similar to being false. Each section was subsequently added up and those who score above 50% were categorized as being positive for the section in question. Test of association was conducted using Chi-square and Fishers exact test.

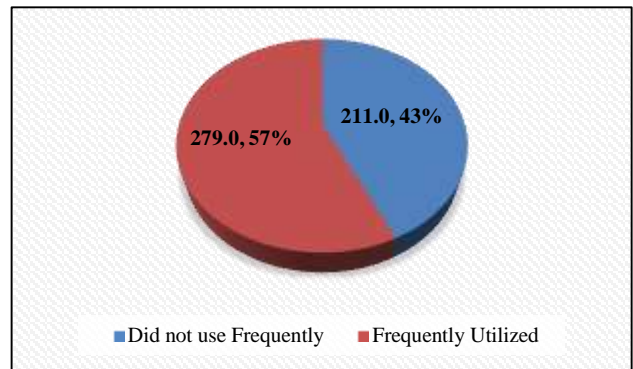
**RESULTS**

A total of 556 women were recruited for the study. However, 490 questionnaires were properly completed and considered valid for data analysis. Thus, the response rate was 88%. The women's ages were between 15 and 44 years; with the mean age of 28±5.37 years. Four hundred and fifty two (92.2%) had partners/spouses, while the remaining had no partners/spouses. Table 1 depicts that 210 (42.9%) of the respondents lived in Edo South senatorial District, while the Esan Central and Edo North Senatorial Districts share equal number of respondents of 140 (28.6%). Similarly, 240 (49.0%) of the women were urban based, whereas 250 (51.0%) of them were based in rural locations. A total of 220 (44.9%) of the respondents were secondary school leavers, while 193 (39.4%) of them were primary school

certificate holders and 57 (11.6%) had post-secondary school education.



**Figure 1: Demographic characteristics of respondents.**



**Figure 2: Utilization of healthcare services.**

**Table 1: Influence of respondents' place of residence on maternal healthcare service utilization.**

Residential location	Maternal healthcare service utilization		Chi Sq.	df	P
	Did not use frequently (n= 211)	Frequently utilized (n=279)			
Urban	93 (44.1%)	147 (52.7%)	3.566	1	0.68
Rural	118 (55.9%)	132 (47.3%)			

**Table 2: Respondents' educational attainment.**

Educational level attained	Utilization of services		Chi-sq.	Df	P
	No (%) (n=211)	Yes (%) (n=279)			
Non-formal education	16 (7.6%)	4 (1.4%)	17.873	3	0.001
Primary education	82 (38.9%)	111 (39.8%)			
Secondary education	98 (46.4%)	122 (43.7%)			
Post-secondary education	15 (7.1%)	42 (15.1%)			

Table 1 depicts the influence of respondent's place of residence on maternal health service utilization. One hundred and forty seven (52.7%) of participants who live in urban area were frequently utilizing maternal

healthcare services than those in rural area, 132 (47.3%). Though, not there was no significant difference (p>0.05) in the level of utilization in both rural and urban settlements.

**Table 3: Affordability of maternal health services.**

Variables	Frequency (n=490)	Percent
<b>Cost affects my visit to the hospital, to have four or more antenatal visits and ultrasound services when pregnant</b>		
True	92	18.8
False	388	79.2
Don't know	10	2.0
<b>Because of high cost, I did not deliver with the assistance of health professional</b>		
True	39	8.0
False	451	92.0
Don't know	0	0.0
<b>I did not start antenatal visits in the first trimester because of cost</b>		
True	197	40.2
False	290	69.2
Don't know	3	0.6
<b>High cost of transport limited my clinic visits</b>		
True	112	22.9
False	375	76.5
Don't know	3	0.6
<b>Free or low cost of maternal health services will foster my prompt and regular clinic visits, including antenatal and postnatal check-ups</b>		
True	347	70.8
False	127	25.9
Don't know	16	3.3

The influence of the women’s educational qualification on levels of maternal health care utilization is depicted in Table 2. The findings indicate that educational attainment of the women influenced the utilization of maternal health services. This was found to be statistically significant (p=0.001). Thus, educational status influenced their utilization of maternal health services significantly.

Majority 388 (79.2%) of the respondents reported that cost did not affect the frequency of their antenatal visit to healthcare centers. Almost all 451 (92.0%) of the respondents reported that high cost did not affect their choice of delivery in healthcare center. Most 290 (69.2%) of the respondents indicated that cost did not affect their decision of antenatal visit in the first trimester of pregnancy. Majority of the respondents 375 (76.5%) indicate that high cost of transport did not affect the number of their clinic visit.

**Table 4: Categorization of autonomy.**

Categorization of autonomy	Frequency (n=490)	Percent
<b>Have autonomy</b>	370	75.5
<b>Do not have autonomy</b>	120	24.5

Most of the respondents 347 (70.8) indicate that free or low cost of maternal health services will improve their regular clinic visits.

Majority, 370 (75.5%) of the women had autonomy in their decision making while a few, 120 (24.5%) of the respondents did have autonomy as shown in Table 4.

**Table 5: Chi-square analysis of the influence of women’s autonomy on maternal healthcare service utilization.**

Autonomy	Maternal healthcare service utilization		Chi-Sq.	df	P value
	Unlikely utilizers (n=211)	Likely utilizers (n=279)			
<b>Have autonomy</b>	120 (56.9%)	250 (89.6%)	69.61	1	0.001
<b>Do not have autonomy</b>	91 (43.1%)	29 (10.4%)			

Majority, 250 (89.6%) of the likely utilizers were women who had autonomy, while majority, 91 (43.1%) of those who did not have autonomy were unlikely to use the service. This was found to be statistically significant. (Chi-square =69.1, df=1, p=0.001). Thus, women’s autonomy influenced the utilizations of maternal health service utilization.

**DISCUSSION**

This study investigated the determinants of maternal health service utilization by women in Edo State Central Senatorial District. The research questions and hypotheses were aimed at determining factors that influence the utilization of maternal health services. Place of residence in relation to location of maternal health services, level of education, cost of services and women’s autonomy were the variables used to assess maternal health services utilization in Edo State.

**Demographic characteristics of respondents**

The participants under study were women of childbearing age; their ages ranged from 15-49 years (mean age being 28 years). The teenage mothers, ages 15-19 years were fewer than 3 percent.

In addition, 193 (39.4%) of the total respondents have basic primary education, 220 (44.9%) had secondary school education and 57 (11.6%) had postsecondary school education. However, only about 4% of the respondents had no formal education. This could be the reason why education was not found to affect visit to maternal health centres. The findings of this study agree with that of Bain et al, who consistently reported that a higher level of formal education significantly increases

utilization of maternal healthcare services, even after controlling for other socioeconomic determinants.<sup>24</sup>

The result of this study evidently showed high utilization of maternal health care service which is likely as due to a high population of the respondents having basic and higher level of education. More so, secondary or higher education consistently correlates with modern family planning practices and contraceptive use.<sup>25</sup>

#### ***Influence of place of residence on maternal healthcare services utilization in Edo State***

The finding of this study showed that women in Edo State Central Senatorial zone were not affected by distance in term of accessing maternal health care services. The reason may likely be that the health facilities were sited within the reach of the users they were meant to serve. This type of accessible distribution of health facilities reported in this study is quite laudable and should be encouraged.

#### ***Influence of educational attainment on maternal healthcare services utilization in Edo State***

Findings from this study showed that the higher the educational attainment of the women the more they utilized the maternal health services. In other words, educational level of the women significantly influenced their utilization of maternal health services. Furthermore, the result of the socio-demography in this study shows, that most of the respondents were educated, this is quite encouraging. It was evident that advocacy for girl-child education is yielding expected outcome. However, women who had only basic primary education were 193 (39.4%) out of the total respondents.

#### ***Influence of cost on maternal healthcare services utilization in Edo State***

The finding on the influence of cost in accessing and utilizing maternal health services among women in Edo central zone was found to be significant. In other words, women who had financial power and thus could afford the cost of services utilized the services more than those who could not afford the services. In this study the utilization was quite encouraging probably because some maternal health services have either been subsidized or paid for by the government. Of course, many studies had identified economic status as the most significant predictor of service use, how cost affects the level to which health care facilities are sought and used as often the decision to utilize healthcare service is based upon the cost as compared to the perceived benefit.<sup>26</sup>

#### ***Influence of women's autonomy on the utilization of maternal health services***

This study revealed that the influence of women's autonomy on utilization of health services was

statistically significant as those who had autonomy were more likely to utilize these services. A possible explanation for this could be the fact that close to half of the women in this study had at least secondary school education. This would enable them seek out information and comprehend health education messages better thus improving their autonomy. This was similar to what was seen by Osamor and Grady, where it was revealed that women's ability to attend to their health and utilize healthcare facilities appropriately increased as their decision-making autonomy increased. Similarly the findings was not different from what was seen in many studies where it was shown that utilization of services increased as women's decision making abilities increased.<sup>27</sup>

There are some limitations to this study. The prevalence of COVID-19 was a major barrier as most clinics and maternal health centres had strict protocols which had to be adhered to before women could access maternal health care services.

## **CONCLUSION**

The place of residence did not affect likelihood of utilization of maternal healthcare services utilization in Edo State Central Senatorial District as the findings among urban and rural residents were similar. Also, this study revealed that as educational attainment increased, there was an increase in maternal healthcare services utilization in Edo Central Senatorial Zone among respondents. Also, affordable cost of services increased likelihood of maternal health care services utilization by the women in Edo State among the women. Finally, having autonomy also increased the likelihood of utilization of health services.

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## **REFERENCES**

1. Kifle D, Azale T, Gelaw YA, Melsew YA. Maternal health care service seeking behaviors and associated factors among women in rural Haramaya District, Eastern Ethiopia: a triangulated community-based cross-sectional study. *Reprod Health.* 2017;14(1):6.
2. Mannava P, Durrant K, Fisher J, Chersich M, Luchters S. Attitudes and behaviours of maternal health care providers in interactions with clients: a systematic review. *Glob Health.* 2015;11:36.

3. Nuamah GB, Agyei-Baffour P, Mensah KA, Boateng D, Quansah DY, Dobin D, et al. Access and utilization of maternal healthcare in a rural district in the forest belt of Ghana. *BMC Pregnancy Childbirth.* 2019;19(1):6.
4. Alkema L, Chou D, Hogan D, Zhang S, Moller AB, Gemmill A, et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *Lancet.* 2016;387(10017):462-74.
5. Agan TU, Monjok E, Akpan UB, Omoronyia OE, Ekabua JE. Trend and causes of maternal mortality in a nigerian tertiary hospital: a 5-year retrospective study (2010-2014) at the University of Calabar Teaching Hospital, Calabar, Nigeria. *Open Access Macedon J Med Sci.* 2018;6(6):1153-8.
6. Bauserman M, Thorsten VR, Nolen TL, Patterson J, Lokangaka A, Tshetu A, et al. Maternal mortality in six low and lower-middle income countries from 2010 to 2018: risk factors and trends. *Reprod Health.* 2020;17(3):173.
7. Chinkhumba J, De Allegri M, Muula AS, Robberstad B. Maternal and perinatal mortality by place of delivery in sub-Saharan Africa: a meta-analysis of population-based cohort studies. *BMC Public Health.* 2014;14(1):1014.
8. Lawrence ER, Klein TJ, Beyuo TK. Maternal mortality in low and middle-income countries. *Obstet Gynecol Clin North Am.* 2022;49(4):713-33.
9. Olaitan T, Okafor IP, Onajole AT, Abosede OA. Ending preventable maternal and child deaths in western Nigeria: Do women utilize the life lines? *PLoS One.* 2017;12(5):e0176195.
10. Olonade O, Olawande TI, Alabi OJ, Imhonopi D. Maternal mortality and maternal health care in nigeria: implications for socio-economic development. *Open Access Macedon J Med Sci.* 2019;7(5):849-855.
11. Olarewaju OA. Insecurity in northern Nigeria: Implications for maternal and child health. *Clin Epidemiol Glob Health.* 2021;12:100869.
12. Caron RK, Özge T, Bela G, Ahmet Metin G, Group WM-AR. WHO multi-country survey on abortion-related morbidity and mortality in health facilities: study protocol. *BMJ Glob Health.* 2016;1(3):e000113.
13. Kana MA, Doctor HV, Peleteiro B, Lunet N, Barros H. Maternal and child health interventions in Nigeria: a systematic review of published studies from 1990 to 2014. *BMC Public Health.* 2015;15(1):334.
14. Tura G, Fantahun M, Worku A. The effect of health facility delivery on neonatal mortality: systematic review and meta-analysis. *BMC Pregnancy Childbirth.* 2013;13(1):18.
15. Okonofua F, Ntoimo L, Ogungbangbe J, Anjorin S, Imongan W, Yaya S. Predictors of women's utilization of primary health care for skilled pregnancy care in rural Nigeria. *BMC Pregnancy Childbirth.* 2018;18(1):106.
16. Banke-Thomas OE, Banke-Thomas AO, Ameh CA. Factors influencing utilisation of maternal health services by adolescent mothers in Low-and middle-income countries: a systematic review. *BMC Pregnancy Childbirth.* 2017;17(1):65.
17. Ntoimo LFC, Okonofua FE, Igboin B, Ekwo C, Imongan W, Yaya S. Why rural women do not use primary health centres for pregnancy care: evidence from a qualitative study in Nigeria. *BMC Pregnancy Childbirth.* 2019;19(1):277.
18. Imo CK. Influence of women's decision-making autonomy on antenatal care utilisation and institutional delivery services in Nigeria: evidence from the Nigeria Demographic and Health Survey 2018. *BMC Pregnancy Childbirth.* 2022;22(1):141.
19. Yaya S, Uthman OA, Amouzou A, Ekholuenetale M, Bishwajit G. Inequalities in maternal health care utilization in Benin: a population based cross-sectional study. *BMC Pregnancy Childbirth.* 2018;18(1):194.
20. Babalola S, Fatusi A. Determinants of use of maternal health services in Nigeria - looking beyond individual and household factors. *BMC Pregnancy Childbirth.* 2009;9(1):43.
21. Fantaye AW, Okonofua F, Ntoimo L, Yaya S. A qualitative study of community elders' perceptions about the underutilization of formal maternal care and maternal death in rural Nigeria. *Reprod Health.* 2019;16(1):164.
22. Fulbrook P, Lawrence P, Miles S. Australian nurses' knowledge of pressure injury prevention and management: a cross-sectional survey. *J Wound Ostom Cont Nurs.* 2019;46(2):106.
23. Nnebue C, Ebenebe U, Adogu P, Adinma E, Ifeadike C, Nwabueze A. Adequacy of resources for provision of maternal health services at the primary health care level in Nnewi, Nigeria. *Niger Med J.* 2014;55(3):235-41.
24. Bain LE, Aboagye RG, Dowou RK, Kongnyuy EJ, Memiah P, Amu H. Prevalence and determinants of maternal healthcare utilisation among young women in sub-Saharan Africa: cross-sectional analyses of demographic and health survey data. *BMC Public Health.* 2022;22(1):647.
25. Chinaeke EE, Fan-Osuala C, Bathnna M, Ozigbu CE, Olakunde B, Ramadhani HO, et al. Correlates of reported modern contraceptive use among postpartum HIV-positive women in rural Nigeria: an analysis from the MoMent prospective cohort study. *Reprod Health.* 2019;16:1-1.
26. Dassah E, Aldersey H, McColl MA, Davison C. Factors affecting access to primary health care services for persons with disabilities in rural areas: a "best-fit" framework synthesis. *Glob Health Res Polic.* 2018;3(1):36.
27. Osamor PE, Grady C. Women's autonomy in health care decision-making in developing countries: a



synthesis of the literature. *Int J Women's Health.* 2016;8:191-202.

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