



Determinants of maternal mortality in south-western Nigeria: Midwives' perceptions

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ABSTRACT

Background: Maternal mortality remains one of Nigeria's most significant public health challenges. In order to address this issue sustainably, it is necessary to consider the perceptions of all stakeholders involved, including midwives.

Objectives: To examine the determinants of maternal mortality in south-western Nigeria from the midwife's perspective.

Design: A cross-sectional study was employed using mixed methods with a semi-structured questionnaire and an in-depth interview guide.

Participants: Quantitative data were obtained from 215 midwives using a convenience sampling technique. Qualitative data were obtained from 25 midwives from five government health centres, selected using a stratified sampling technique.

Methods: Quantitative data were analysed using SPSS Version 20 using descriptive and inferential statistics with 95 % confidence intervals, while qualitative data were analysed using thematic analyses.

Findings: The mean age and work experience of the participants were 35.2 ± 9.3 years and 8.4 ± 7.0 years, respectively. The midwives perceived that the main determinants of maternal mortality were postpartum haemorrhage (86.5 %), hypertensive disorder in pregnancy (80.9 %), mismanagement at mission homes/traditional birth attendant centres (MH/TBAs) (79.1 %) and sepsis (70.1 %). Some of the priority target areas to improve the well-being of pregnant women as identified by the midwives, were increased awareness of pregnancy danger signs (97 %), destigmatising caesarean section (CS) (96 %), regulation of MH/TBAs (92 %), and increased accessibility of hospitals (84 %). Findings from the qualitative data also affirmed that regulating MH/TBAs, destigmatising CS and subsidising healthcare expenses were prerequisites to curbing maternal mortality. Inferential analysis revealed that determinants such as unsafe abortion ($p < 0.001$), ectopic pregnancy ($p = 0.001$), domestic violence ($p = 0.023$), malaria ($p = 0.029$), short interbirth interval ($p = 0.03$), and patients' negative perceptions of CS delivery ($p = 0.036$) were more commonly perceived to be associated with maternal mortality by younger midwives (age 17–34 years) compared with older midwives.

Key conclusion: The results indicate that resolving the maternal mortality crisis sustainably in Nigeria will require increased accessibility to basic health care and health promotion campaigns to counteract unhelpful sociocultural norms.

Implications for practice: Future interventions must be tailored to address both traditional and emerging causes of maternal mortality in southwestern Nigeria.

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Introduction

Maternal mortality has been increasing in recent years, posing a threat to the socio-economic progress of impacted countries. Even more concerning is the fact that developing countries account for 99 % of all maternal deaths globally (Olonade et al., 2019). The global maternal mortality ratio (MMR) fell by 38 % from 2000 to 2017; while this is significant, it still falls short of the 6.4 % annual rate required to meet the Sustainable Development Goal target of 70 maternal deaths per 100,000 live births (Oye-Adeniran et al., 2014; Geller et al., 2018; WHO, UNICEF, UNFPA, World Bank, 2019). Furthermore, regional MMRs have decreased at varying rates since 1990, ranging from 18 % in the Caribbean to 50 % in eastern Asia (Alkema et al., 2016), demonstrating that progress towards eliminating maternal mortality is slow. Despite a substantial decrease in maternal mortality in sub-Saharan Africa (SSA) of 39 % between 2000 and 2017, a high MMR of 533 per 100,000 live births, or 200,000 maternal deaths annually, still persists, accounting for approximately two-thirds (68 %) of all maternal deaths, followed by south Asia with 19 % of maternal deaths globally (WHO, UNICEF, UNFPA, World Bank, 2019). Haemorrhage remains the predominant cause of maternal death globally, accounting for over one-quarter (27 %) of all deaths, followed by pregnancy-related hypertensive disorders, including eclampsia, as well as sepsis, embolism and complications from unsafe abortion (Geller et al., 2018; Sageer et al., 2019; WHO, UNICEF, UNFPA, World Bank, 2019).

Nigeria is one of the nations in SSA where maternal mortality is still a major challenge, and progress in reducing maternal deaths has largely been insufficient. Nigeria's maternal mortality problem persists despite efforts such as increasing institutional births and training and deploying more qualified health workers. Nigeria was recently identified as one of the top six countries with more than half of all maternal deaths worldwide (Meh et al., 2019). The most common causes of death during pregnancy, according to a study conducted in Lagos State, south-west Nigeria, were abortion, ectopic pregnancy and hypertension (Oye-Adeniran et al., 2014). Anaemia, prolonged labour and obstructed labour were reported to be the most prevalent causes of death during childbirth, while AIDS, infection and malaria are the leading causes of death 6 weeks after birth (Oye-Adeniran et al., 2014). Furthermore, various studies found that financial hardship is another factor contributing to maternal death, such that communities with families with higher incomes were likely to report lower MMRs (Lanre-Abass, 2008; Robson et al., 2012; Zolala et al., 2012; Meh et al., 2019). Other societal drivers include low educational attainment and gender relations, such as spouses' guardianship and polygamous marriages (Hardie and Landale, 2013; Hernandez and Moser, 2013; Piane, 2019). Inadequate health care and a shortage of health professionals also contribute significantly to high mortality rates, particularly in rural areas where women are exposed to unsafe delivery practices (Amutah-Onukagha et al., 2017; Maduka and Ogu, 2020; Ojima et al., 2021).

Maternal care workers such as skilled birth attendants (SBAs) are essential stakeholders in preserving maternal and neonatal health, and reducing preventable maternal deaths by providing proficient and competent care to women before, during and after childbirth (WHO, 2018). An SBA, according to the World Health Organization, is a licensed health provider, such as a midwife, nurse or doctor who has received education and proficient training in managing women during normal (uncomplicated) delivery and the first few days after delivery, and in the detection, management or referral of complications in both mothers and newborns (WHO, 2004, 2018). Studies have found that deliveries assisted by an SBA may prevent 66 % of maternal deaths and 43 % of neonatal deaths (WHO, UNICEF, UNFPA, World Bank, 2019; Damian et al., 2020). In 2017, 59 % of births in SSA were assisted by SBAs, compared with 90–95 % in South America and 99 % in high-income countries such as Belgium (Damian et al., 2020). This percentage for SSA falls short of one of the key indicators of Sustainable Development Goal 3.1, which is to increase the percentage of births

supported by trained health professionals to 90 % (WHO, 2015). Among Nigerians, skilled health workers only assisted 41.2 % of live births (Amutah-Onukagha et al., 2017). Many women in Nigeria receive care from traditional birth attendants (TBAs), who are described by WHO as people who aid a mother during childbirth, and who either acquired their skills from delivering babies themselves or through training with other TBAs (WHO, UNFPA, UNICEF, 1992). The Nigerian National Demographic Health Survey found that, between 2014 and 2018, 39 % of live births took place in hospital and 63 % took place at home (NPC, ICF, 2019).

The concept of midwives in this study refers to trained and experienced registered nurses; midwives are also described as SBAs. This is because nurses and midwives are the first contact with pregnant women during antenatal care, fetal monitoring care during antenatal visits, maternal care and nursing mother care. In addition to interacting with women in health centres, midwives frequently speak with expectant mothers who have had complications during home deliveries or visits from TBAs. Therefore, this study aimed to identify and evaluate the current factors contributing to maternal mortality in Nigeria based on the perceptions of midwives from five healthcare facilities in south-western Nigeria.

Methodology

Study location

This survey was carried out across four states (Ondo, Ekiti, Oyo and Osun) in south-western Nigeria. Five public/government medical institutions were selected, namely University of Medical Sciences, Ondo State (UNIMED); Federal Medical Centre, Ido, Ekiti State (FMC, IDO); Ekiti State University Teaching Hospital, Ekiti State (EKSUTH); University College Hospital, Oyo State (UCH); and University of Osun Teaching Hospital, Osun State (UTH). The obstetrics and gynaecology departments of these institutions were engaged in the study.

Study design and sample population

This study used quantitative and qualitative methodologies to adopt an exploratory cross-sectional, mixed-methods design. Mixed methods research collects qualitative and quantitative data in one study and integrates these data at some stage of the research process (Halcomb and Hickman, 2015). As a methodology, it involves pragmatic assumptions that are philosophical as well as methods of inquiry that guide the direction of data collection using the mixture of qualitative and quantitative approaches in many phases of the research process within a single study. Among the various approaches of mixed methods, this study was guided by a convergent mixed method. This involved concurrent procedures in which the researcher converged quantitative and qualitative data to analyse the research problem comprehensively. Mixed methods research provides strengths that offset the weaknesses of both quantitative and qualitative research. This is necessitated by the probable quantitative or qualitative shortfalls to fully investigate midwives' perceptions of the determinants of maternal mortality in south-western Nigeria.

The sample population consisted of midwives who worked in the obstetrics and gynaecology departments of the selected health facilities. Midwives from teaching and secondary hospitals were chosen because these hospitals are usually the point of contact in terms of healthcare delivery. Also, teaching and secondary hospitals serve as referral points for primary health centres close to the population. Therefore, the midwives in the teaching and secondary hospitals are in a better position to discuss their perceptions of the determinants of maternal mortality, as they are more involved in the care of pregnant mothers referred from other facilities. Additionally, midwives in teaching and secondary hospitals do not practice in the community. It is worth noting that there are three tiers of health institution in Nigeria: local government (primary

health centres), state government (state hospitals) and federal government (teaching hospitals). Maternal health services in Nigeria are separate from state hospitals, teaching hospitals and primary health centres, but referrals are possible from one institution to another. However, in practice, it does not work that way because nurses do not switch roles within institutions. Midwives who worked full-time and had at least 1 year of experience working in the obstetrics and gynaecology departments of the selected health facilities were recruited for the quantitative survey. In contrast, midwives who worked full-time and had at least 5 years of experience in the obstetrics and gynaecology departments of the selected health facilities were recruited for the qualitative segment. Midwives with at least 5 years of experience were chosen for the qualitative study because the researchers felt that these midwives had more experience in midwifery services and were likely to have more information about maternal mortality.

Sampling technique and sample size

Using a convenience sampling method, 215 midwives across the selected health facilities participated in the quantitative survey (UNIMED 50; FMC, IDO 15; EKSUTH 20; UCH 80; UTH 50). A stratified sampling technique was used to select the respondents (midwives) for in-depth interviews. Twenty-five nurses, comprising five nurses [three junior nurses (senior nursing officer and below) and two senior nurses (principal/assistant chief nursing officer and above)] from each hospital, were interviewed.

Data collection instruments

Quantitative data were collected via semi-structured self-administered paper questionnaires. The questionnaire was divided into three sections: sociodemographic characteristics, perceptions of leading causes of maternal mortality, and perceptions of priority target areas to reduce maternal mortality. The questionnaire was designed after an extensive literature review and was validated via face validation by health professionals. Face and content validity of the questionnaire and the in-depth interview guide were determined by subjecting these instruments to the judgements of experts in the field of obstetrics and gynaecology, and clinical nursing and a statistician during the pilot study and the main study. All experts reviewed the test items for the accuracy of content. The content of the instrument was also read several times for comparison of research objectives, research questions and hypotheses. This was to ensure that the items on the instrument covered the relevant content of the study. The content validity index was calculated by tallying the results of the experts based on the degree to which the experts agreed on the relevance and clarity of the items. The experts were asked to rate each item based on relevance, clarity, simplicity and ambiguity on a four-point scale, as follows: relevance – 1 = not relevant, 2 = item needs some revision, 3 = relevant but needs minor revision, 4 = very relevant; clarity – 1 = not clear, 2 = item needs some revision, 3 = clear but needs minor revision, 4 = very clear; simplicity – 1 = not simple, 2 = item needs some revision, 3 = simple but needs minor revision, 4 = very simple; and ambiguity – 1 = doubtful, 2 = item needs some revision, 3 = no doubt but needs minor revision, 4 = clear. The items were amended based on the experts' recommendations. Items with a content validity index > 0.8 were retained, those with a content validity index of 0.70–0.5 were amended, and those with a content validity index < 0.5 were discarded.

The intra-class correlation coefficient was used to assess the inter-rater reliability of the instrument based on the observations recorded independently by the raters, and this was conducted among 25 midwives in Adeoyo Ringroad State Hospital to ensure the adaptability and consistency of the instruments. The internal consistency of the instruments was checked using the alpha coefficient. Cronbach's alpha for the semi-structured questionnaire and interview guide were 0.80 and 0.88, respectively. The results of the reliability test were above the minimum

acceptable standard of 0.6 (George and Mallery, 2003); as such, the instrument was considered reliable.

The midwives filled out the questionnaires in the presence of the research assistants and were retrieved accordingly. For qualitative data, an in-depth interview guide was designed to gain a deeper understanding of the most pertinent issues raised in the questionnaires. The interviews were conducted with the selected midwives via telephone calls; conversations were recorded and transcribed accordingly. Interviews were carried out in English.

Data analysis

For quantitative data, questionnaire data were entered and analysed using SPSS Version 20 (IBM Corp., Armonk, NY, USA). Descriptive statistics, such as measures of frequencies and proportions, were used to break down the respondents' sociodemographic data and perceptions. Moreover, inferential statistics were performed with 95 % confidence intervals (CI). Chi-squared statistics were used to determine the association between midwives' sociodemographic characteristics and their perceptions. Odds ratios and 95 % CI of the associations were also provided to reveal the degree of certainty and strength of the associations. For qualitative data, thematic analyses were employed.

Ethical considerations

This study was granted ethical approval by Ekiti State University Teaching Hospital Ethics and Research Committee (Protocol No. EKSUTH/A67/2020/08/002). Participants gave informed consent before data collection for both qualitative and quantitative data. Participants were assured that all information would be kept confidential and anonymous.

Results

Quantitative data

Sociodemographic characteristics

Midwives' ages ranged from 17 to 58 years, with a mean age of 35.2 ± 9.3 years and mean work experience of 8.4 ± 7.0 years. The majority (67 %) of respondents worked in tertiary health facilities. All of the respondents were educated, with most midwives (94 %) having attained a tertiary education, and approximately 80 % had a nursing/midwifery-related degree. Table 1 shows the respondents' sociodemographic characteristics.

Midwives' perceptions of leading causes of maternal mortality

Fig. 1 highlights the midwives' perceptions of the leading causes of maternal mortality. Conditions such as postpartum haemorrhage (86.5 %), hypertensive disorder in pregnancy (80.9 %) and sepsis (70.1 %) were the most prevalent medical diagnoses linked to maternal mortality. Mismanagement/complications from mission homes and TBAs (79.1 %), and delay in the patient's decision to seek care (73.1 %) were reported to be the major external causes of maternal mortality. Other diagnoses such as prolonged obstructed labour (67.5 %) and antepartum haemorrhage (63.2 %), and external factors such as unsafe abortion (69.3 %), poverty/lack of financial resources (67 %), delay in referral services (64.2 %) and patient inaccessibility to health centres (62.3 %) were also leading causes of maternal mortality as perceived by the midwives.

Priority target areas to improve the well-being of pregnant women

The midwives were generally unanimous about three priority areas that need to be addressed promptly: health education of pregnant women about the danger signs to look out for during pregnancy; stigmatisation of CS delivery by raising awareness about its importance as a child delivery option; and stringent regulation of TBAs and mission homes. In addition, approximately 50 % of the midwives proposed the

Table 1
Sociodemographic characteristics of respondents.

Variable	Frequency	Proportion (%)
Health facility		
UNIMED	50	23.3
FMC, IDO	15	7.0
EKSUTH	20	9.3
UCH	80	37.2
UTH	50	23.3
Type of health facility		
Tertiary	145	67.4
Secondary	70	32.6
Age of respondents (years)		
17–34	110	51.2
35–58	105	48.8
Work experience (years)		
1–10	155	72.1
11–33	60	27.9
Marital status		
Single	52	24.2
Married	151	70.2
Separated/divorced	11	5.1
Widowed	1	0.5
Highest level of education		
Primary	4	1.9
Secondary	8	3.7
Tertiary	203	94.4
No formal education	0	0.0
Degrees earned		
Diploma in Nursing/midwifery	61	28.4
Bachelors in nursing	110	51.2
Diploma in another field	24	11.2
Bachelors in another field	18	8.4
No degree	2	0.9
Ethnic group		
Yoruba	187	87.0
Igbo	24	11.2
Other	4	1.9

UNIMED, University of Medical Sciences, Ondo State; FMC, IDO, Federal Medical Centre, Ido, Ekiti State; EKSUTH, Ekiti State University Teaching Hospital, Ekiti State; UCH, University College Hospital, Oyo State; UTH, University of Osun Teaching Hospital, Osun State.

need to reduce the cost burden on pregnant women, and the employment of more healthcare workers to cater for the needs of pregnant women. Table 2 provides details of the midwives' suggestions.

Association between midwives' sociodemographic characteristics and perceived causes of maternal mortality

There were significant differences in midwives' perceptions based on their sociodemographic characteristics. Considering the respondents' age, a significantly higher proportion of younger midwives (age 17–34 years) felt that prolonged obstructed labour ($p = 0.023$), unsafe abortion ($p < 0.001$), ectopic pregnancy ($p = 0.001$), malaria ($p = 0.029$), anaesthetic complications ($p = 0.001$), primary haemorrhage ($p = 0.02$), domestic violence ($p = 0.023$), short interbirth interval ($p = 0.03$), patients' antagonistic perceptions of CS delivery ($p = 0.036$), and unavailability of blood at blood banks ($p = 0.001$) were frequently associated with maternal mortality. A similar trend was observed when considering years of experience. Midwives with <11 years of experience were 2.6 times more likely (95 % CI 0.207–0.714) to attribute prolonged obstructed labour as a frequent cause of maternal mortality than more experienced midwives (≥ 11 years). Younger midwives were three times more likely to highlight unsafe abortion (95 % CI 0.161–0.567), domestic violence (95 % CI 0.197–0.702) and malaria (95 % CI 0.153–0.591) as frequent causes of maternal mortality. Younger midwives were also approximately six times more likely to highlight anaesthetic complications as a frequent cause of maternal mortality (95 % CI 0.184–0.659).

Considering the type of healthcare facility, a significantly higher proportion of midwives working in tertiary health facilities highlighted

antepartum haemorrhage ($p = 0.005$, 95 % CI 0.242–0.784) as a frequent cause of maternal mortality. Conditions such as prolonged obstructed labour ($p = 0.035$, 95 % CI 1.044–3.842), ectopic pregnancy ($p = 0.037$, 95 % CI 1.034–3.296), anaesthetic complications ($p = 0.011$, 95 % CI 1.192–4.126), postoperative complications ($p = 0.03$, 95 % CI 1.062–3.375), patients' antagonistic perceptions of CS delivery ($p = 0.036$, 95 % CI 1.040–3.548), lack of antenatal care ($p = 0.017$, 95 % CI 1.129–3.635), lack of financial capacity ($p = 0.005$, 95 % CI 1.321–5.083), inaccessibility of health facility ($p < 0.001$, 95 % CI 1.757–6.718), short interbirth interval ($p = 0.014$, 95 % CI 1.154–3.672), pregnancy in old age ($p < 0.001$, 95 % CI 1.593–5.169), pregnancy in young girls ($p = 0.004$, 95 % CI 1.296–4.149), lack of resuscitative skills ($p = 0.038$, 95 % CI 1.030–3.267) and lack of ambulatory services ($p < 0.001$, 95 % CI 1.636 to 5.313) were more frequently highlighted by midwives in secondary health centres. Table 3 provides details of all the associations.

Qualitative data (causes of maternal mortality)

Socio-economic status and health-seeking behaviour

The midwives in this study perceived that eclampsia, pre-eclampsia and postpartum haemorrhage are the major causes of maternal mortality in various tertiary hospitals in Nigeria, and this can be linked to the lack of awareness of pregnancy danger signs and lack of financial resources. An assistant director in nursing with approximately 29 years of professional experience in the Obstetrics and Gynaecology Department at UCH noted:

We do have cases of pre-eclampsia and eclampsia – that is common. It majorly happens to mothers who are young, maybe under 17 – teenage pregnancy. We also see it in elderly women. We have recorded cases of postpartum haemorrhage which, if not well attended, lead to death.

All of the interviewees noted that most problems are a result of several factors, including the socio-economic status of the patient, cultural beliefs, health-seeking behaviour, social values and educational level.

In the interviews, 60 % of midwives were of the opinion that patronisation of mission homes and TBAs by expectant mothers also contributes to the increase in maternal deaths because most TBAs and personnel in mission homes are perceived to be inexperienced and untrained. Mission homes in Nigeria are regarded as faith-based clinics operating under the guidance of religious organisations. A midwife from UTH with 16 years of experience said:

These people do not know what they are doing, especially in the mission homes. They are not well equipped and trained. They just do things the way they see it.

Sometimes in mission homes, we have trained retired medical nurses, but the TBAs themselves are not trained to know the signs that can lead to maternal mortality.

Stigma, cultural influences and religious beliefs surrounding caesarean section

Regarding cultural influences and beliefs, the participating midwives perceived that women in Nigeria decline CS because of sociocultural pressures, financial constraints, religious concerns, fear, and the idea that CS is only appropriate for frail or weak women. Comments included:

Overall, in my years of experience, I can't count how many women we have had who were defiant and refused to undergo CS and eventually go to other places. Then the child dies in the womb, and they come back to deliver the dead baby through the same CS they ran away from.

Women are adamant to prove to their families and in-laws that they can have a normal vaginal delivery, so they are not perceived as lazy and unfortunate.

Some even say their religious leaders asked them not to do CS or would rather lose the baby or their lives than get a CS delivery. They see it as taboo, something that should not happen to a woman.

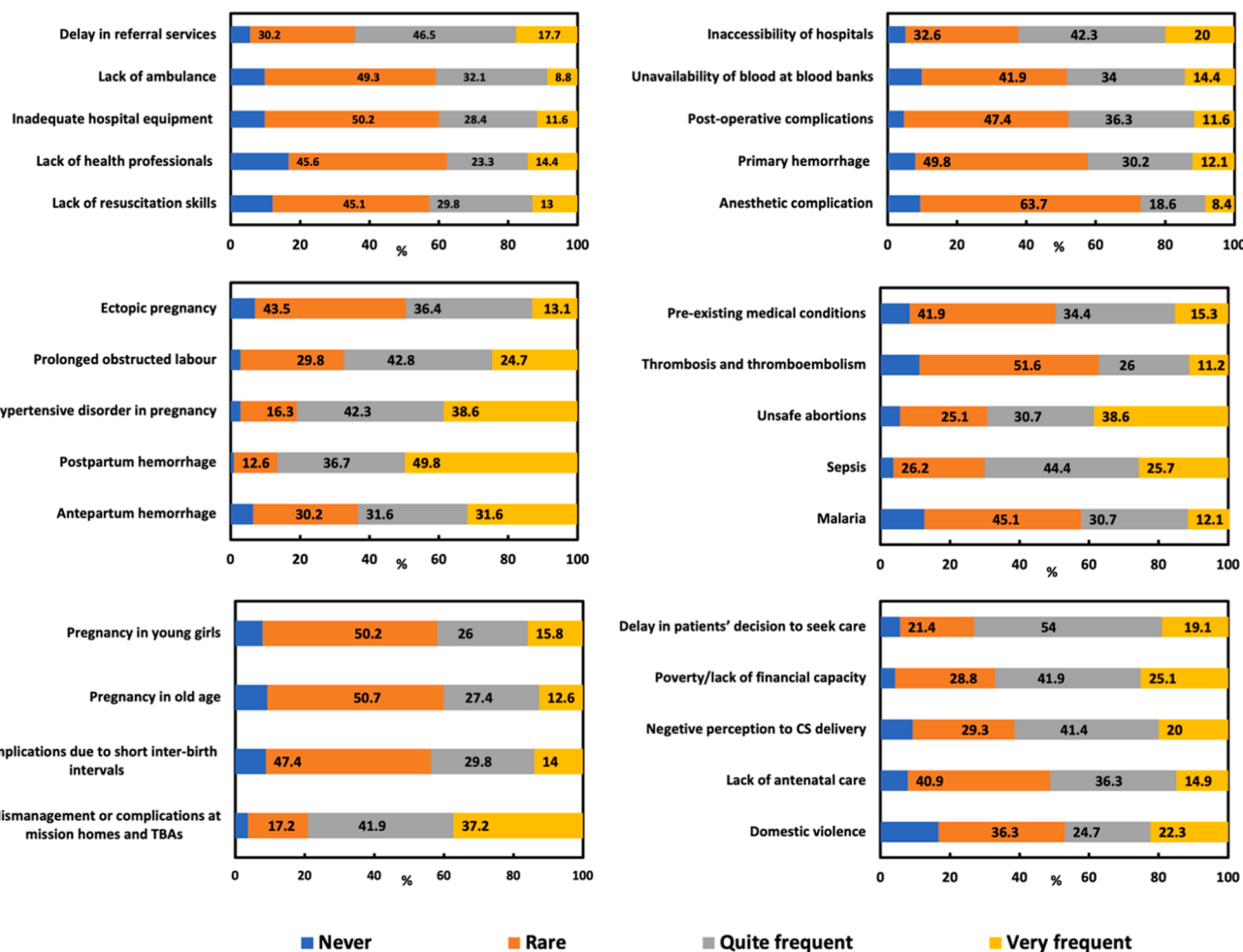


Fig. 1. Midwives' perceptions of leading causes of maternal mortality. CS, caesarean section; TBA, traditional birth attendant.

Table 2

Midwives' perceptions of priority target areas—improve the well-being of pregnant women.

Perception	Frequency	Proportion (100 %)
Sufficient hospital beds—accommodate all maternal health cases	158	73.5
Sufficient healthcare workers—cater for the needs of pregnant women	118	54.9
Adequate obstetrics and gynaecology professionals—handle pregnancy-related cases	156	72.6
Cost of pregnant women receiving care at your health facility is beyond the financial capacity of the patients	104	48.4
Health facility is easily accessible—everyone seeking treatment	181	84.2
Pregnant women need—be educated more about the danger signs—look out for during pregnancy	208	96.7
More awareness is needed—encourage pregnant women—be comfortable with caesarean section delivery	206	95.8
Pregnant women need—be discouraged from employing the services of traditional birth attendants and mission homes	197	91.6

Poverty (cost of enrolling for antenatal and delivery care)

The participating midwives also perceived that poverty is a contributing factor to maternal mortality. One of the midwives said:

Even when someone knows that they are to book at a maternity

hospital, the money involved in bookings and investigations might be a problem. So, they prefer to wait till the pregnancy is like 7–8 months, whereas they should have booked earlier and then have a series of investigations done, attend antenatal care.

According to the interviews, delivery costs may vary between tertiary hospitals in Nigeria. For instance, the cost of spontaneous vaginal delivery may range from 3500 Naira (US\$7.60) to 50,000 Naira (US \$108.55) depending on the location and region of the hospital, while the cost of CS may range from 50,000 Naira (US\$108.55) to 170,000 Naira (US\$369). In addition, although some hospitals include medications, laboratory tests, postoperative management and necessary care in their delivery cost, other hospitals charge additional fees. Unfortunately, as low as the price is, the majority of pregnant women still cannot afford it, leaving them financially vulnerable.

Perceived hospital stress

An additional factor perceived by participating midwives to contribute to maternal mortality is the perceived stress of attending a hospital when the woman can get everything she needs from a TBA with little or no stress. A midwife with 8 years of experience working at EKSUTH stated:

Most of the time, the patients too are always running away from the orthodox hospital because they feel like our procedures, protocols are too much for them to bear. They will say they don't attend to them in time in teaching hospitals, the protocols to do tests, and buying drugs, and all is too much for them to bear.

Table 3a
Association between midwives' sociodemographic characteristics and perceived causes of maternal mortality (medical diagnosis).

Variables	Cause of mortality		Chi value	p-value (Eta)	OR, 95 % CI
	Antepartum haemorrhage				
Age range (years)	Infrequent	Frequent	1.564	0.211	0.701 0.402–1.224
17–34	36 (32.7 %)	74 (67.3 %)		(0.085)	
≥35	43 (41.0 %)	62 (59.0 %)			
Work experience (years)					
1–10	52 (33.5 %)	103 (66.5 %)	0.118	0.617	0.336–1.134
≥11	27 (45.0 %)	33 (55.0 %)	2.441	(0.107)	
Type of facility					
Tertiary health facility	44 (30.3 %)	101 (69.7 %)	7.847	0.005*	0.436 0.242–0.784
Secondary health facility	35 (50.0 %)	35 (50.0 %)		(0.191)	
Age range (years)	Postpartum haemorrhage				
17–34	13 (11.8 %)	97 (88.2 %)	0.538	0.463	0.745 0.340–1.637
≥35	16 (15.2 %)	89 (84.8 %)		(0.050)	
Work experience (years)					
1–10	19 (12.3 %)	136 (87.7 %)	0.720	0.396	0.699 0.304–1.604
≥11	10 (16.7 %)	50 (83.3 %)		(0.058)	
Type of facility					
Tertiary health facility	18 (12.4 %)	127 (87.6 %)	0.441	0.507	0.760 0.338–1.711
Secondary health facility	11 (15.7 %)	59 (84.3 %)		(0.045)	
Age range (years)	Hypertensive disorder				
17–34	14 (12.7 %)	96 (87.3 %)	5.871	0.015	0.421 0.207–0.858
≥35	27 (25.7 %)	78 (74.3 %)		(0.165)	
Work experience (years)					
1–10	25 (16.1 %)	130 (83.9 %)	3.112	0.078	0.529 0.259–1.081
≥11	16 (26.7 %)	44 (73.3 %)		(0.120)	
Type of facility					
Tertiary health facility	30 (20.7 %)	115 (79.3 %)	0.757	0.384	1.399 0.655–2.988
Secondary health facility	11 (15.7 %)	59 (84.3 %)		(0.059)	
Age range (years)	Prolonged obstructed labour				
17–34	28 (25.5 %)	82 (74.5 %)	5.176	0.023*	0.512 0.287–0.915
≥35	42 (40.0 %)	63 (60.0 %)		(0.155)	
Work experience (years)					

Table 3a (continued)

Variables	Cause of mortality		Chi value	p-value (Eta)	OR, 95 % CI
1–10	41 (26.5 %)	114 (73.5 %)	9.432	0.002*	0.384 0.207–0.714
≥11	29 (48.3 %)	31 (51.7 %)		(0.209)	
Type of facility					
Tertiary health facility	54 (37.2 %)	91 (62.8 %)	4.448	0.035*	2.003
Secondary health facility	16 (22.9 %)	54 (77.1 %)		(0.144)	1.044–3.842

OR, odds ratio; CI, confidence interval

* Significant

Help provided to pregnant women by hospitals

It is perceived that healthcare professionals, particularly nurses and midwives, are doing their best to create awareness of the danger signs of maternal mortality while debunking the myths about CS to reduce the prevalence of maternal mortality. For instance, UNIMED has a programme that helps mothers with free delivery upon registration under the name 'IGBEAYO'. Our interviewee stated:

If the mother registers under IGBEAYO, CS and vaginal delivery will be free. Once the women come to register, we immediately advise them to go for the programme, as they would enjoy the benefits during pregnancy alone and keep enjoying the benefits after birth. This is to encourage them not to go to mission homes and TBAs. Even those not registered in the programme and had CS delivery but could not raise funds for the fees are often supported by our social workers. The IGBEAYO scheme covers all their bills ranging from drugs to hospital beds and so on.

Also, some of the midwives interviewed stated that their health facilities allow pregnant women to register for CS by credit, with the option of paying bit by bit to reduce maternal and infant mortality. For instance, a midwife noted:

In my institution, what we do for them is this; they are made to sign an agreement to pay a certain amount monthly. Whether they are always faithful or not, I don't know. But we make them pay bit by bit.

Since the Government and hospitals cannot stop pregnant women from patronising TBAs, a midwife at UCH with over 13 years of experience, who had also worked as a clinical instructor in the labour ward, suggested that maternal mortality can be curtailed if hospitals liaise with TBAs. She gave this account:

I have a friend whose mother is a TBA. She liaises with a gynaecologist who owns a private clinic. So, when things go wrong, she refers the patients there.

Another midwife at UCH with approximately 29 years of professional experience noted that decisions are ongoing to control the effects of patronisation of mission homes and TBAs, but they are also an essential component of the community, so they cannot be totally eradicated. She also recommended that:

TBAs can be trained to be hygienic and also offer services in a hygienic environment, making it easy for medical professionals to offer assistance wherever the TBAs encounter difficulties.

Discussion

Prevalence of maternal mortality and socio-economic factors

The primary perceived cause of maternal mortality in this study was postpartum haemorrhage (86.5 %), which is in line with the WHO report (2019) that haemorrhage remains the leading cause of maternal mortality worldwide. In Nigeria, studies have reported primary postpartum haemorrhage to be the most common type, with uterine atony and delivery by CS being the most common causes of primary postpartum

Table 3b
Association between midwives' sociodemographic characteristics and perceived causes of maternal mortality (health-system gaps).

Variables	Cause of mortality		Chi value	p-value (Eta)	OR, 95 % CI
Age range (years)	Anaesthetic complication				
17–34	69 (62.7 %)	41 (37.3 %)	10.933	0.001*	0.348 0.184–0.659
≥35	87 (82.9 %)	18 (17.1 %)		(0.225)	
Work experience (years)					
1–10	101 (65.2 %)	54 (34.8 %)	15.262	<0.001*	0.170 0.064–0.450
≥11	55 (91.7 %)	5 (8.3 %)		(0.266)	
Type of facility					
Tertiary health facility	113 (77.9 %)	32 (22.1 %)	6.457	0.011*	2.217
Secondary health facility	43 (61.4 %)	27 (38.6 %)		(0.173)	1.192–4.126
Age range (years)	Primary haemorrhage				
17–34	55 (50.0 %)	55 (50.0 %)	5.434	0.020*	0.522
≥35	69 (65.7 %)	36 (34.3 %)		(0.159)	0.301–0.904
Work experience (years)					
1–10	83 (53.5 %)	72 (46.5 %)	3.873	0.049*	0.534
≥11	41 (68.3 %)	19 (31.7 %)		(0.134)	0.285–1.002
Type of facility					
Tertiary health facility	88 (60.7 %)	57 (39.3 %)	1.659	0.198	1.1458
Secondary health facility	36 (51.4 %)	34 (48.6 %)		(0.088)	0.820–2.591
Age range (years)	Post-operative complications				
17–34	52 (47.3 %)	58 (52.7 %)	2.097	0.148	0.672
≥35	60 (57.1 %)	45 (42.9 %)		(0.099)	0.393–1.152
Years of experience					
1–10	73 (47.1 %)	82 (52.9 %)	5.556	0.018*	0.479
≥11	39 (65.0 %)	21 (35.0 %)		(0.161)	0.259–0.889
Type of facility					
Tertiary health facility	83 (57.2 %)	62 (42.8 %)	4.730	0.030*	1.893
Secondary health facility	29 (41.4 %)	41 (58.6 %)		(0.148)	1.062–3.375
	Inaccessibility of health centre				

Table 3b (continued)

Variables	Cause of mortality		Chi value	p-value (Eta)	OR, 95 % CI
Type of facility					
Tertiary health facility	67 (46.2 %)	78 (53.8 %)	13.808	<0.001*	3.436 1.757–6.718
Secondary health facility	14 (20.0 %)	56 (80.0 %)		(0.253)	
Age range (years)	Unavailability of blood at blood banks				
17–34	45 (40.90 %)	65 (59.1 %)	10.362	0.001*	0.409
≥35	66 (62.9 %)	39 (37.1 %)		(0.220)	0.236–0.708
Work experience (years)					
1–10	71 (45.8 %)	84 (54.2 %)	7.537	0.006*	0.423
≥11	40 (66.7 %)	20 (33.3 %)		(0.187)	0.227–0.788
Type of facility					
Tertiary health facility	79 (54.5 %)	66 (45.5 %)	1.453	0.228	1.421
Secondary health facility	32 (45.7 %)	38 (54.3 %)		(0.082)	0.802–2.520
Type of facility	Lack of resuscitation skills				
Tertiary health facility	90 (62.1 %)	55 (37.9 %)	4.296	0.038*	1.835
Secondary health facility	33 (47.1 %)	37 (52.9 %)		(0.141)	1.030–3.267
Age range (years)	Lack of ambulatory services				
17–34	58 (52.7 %)	52 (47.3 %)	3.748	0.053	0.582
≥35	69 (65.7 %)	36 (34.3 %)		(0.132)	0.336–1.009
Work experience (years)					
1–10	85 (54.8 %)	70 (45.2 %)	4.113	0.043*	0.520
≥11	42 (70.0 %)	18 (30.0 %)		(0.138)	0.275–0.788
Type of facility					
Tertiary health facility	98 (67.6 %)	29 (41.4 %)	13.360	<0.001*	2.948
Secondary health facility	47 (32.4 %)	41 (58.6 %)		(0.249)	1.636–5.313

OR, odds ratio; CI, confidence interval
* Significant

haemorrhage leading to maternal mortality (Ajenifuja et al., 2010; Green et al., 2015; Onyegbule et al., 2015). Rogo et al. (2006) reported that obstetric haemorrhage was the direct cause of approximately 80 % of maternal deaths in Africa. Although maternal mortality has declined steadily in Nigeria, from 1200 deaths per 100,000 live births in 2000 to 917 deaths per 100,000 live births in 2017, the country continues to be

Table 3c
Association between midwives' sociodemographic characteristics and perceived causes of maternal mortality (social determinants).

Variables	Cause of mortality		Chi value	p-value (Eta)	OR, 95 % CI
Age range (years)	Domestic violence				
17–34	50 (45.5 %)	60 (54.5 %)	5.180	0.023*	0.534
≥35	64 (61.0 %)	41 (39.0 %)		(0.155)	0.310–0.919
Work experience (years)					
1–10	72 (46.5 %)	83 (53.5 %)	9.630	0.002*	0.372
≥11	42 (70.0 %)	18 (30.0 %)		(0.212)	0.197–0.702
Type of facility					
Tertiary health facility	79 (54.5 %)	66 (45.5 %)	0.381	0.537	1.197
Secondary health facility	35 (50.0 %)	35 (50.0 %)		(0.042)	0.676–2.119
Age range (years)	Lack of antenatal care				
17–34	50 (45.5 %)	60 (54.5 %)	1.031	0.310	0.758
≥35	55 (52.4 %)	50 (47.6 %)		(0.118)	0.443–1.295
Work experience (years)					
1–10	70 (45.2 %)	85 (54.8 %)	3.004	0.083	0.588
≥11	35 (58.3 %)	25 (41.7 %)		(0.161)	0.322–1.075
Type of facility					
Tertiary health facility	79 (54.5 %)	66 (45.5 %)	5.681	0.017*	2.026
Secondary health facility	26 (37.1 %)	44 (62.9 %)		(0.163)	1.129–3.635
Age range (range)	Negative perception of CS delivery				
17–34	35 (31.58 %)	75 (68.2 %)	4.377	0.036*	0.554
≥35	48 (45.7 %)	57 (54.3 %)		(0.143)	0.318–0.966
Work experience (years)					
1–10	48 (31.0 %)	107 (69.0 %)	13.667	<0.001*	0.320
≥11	35 (58.3 %)	25 (41.7 %)		(0.252)	0.173–0.593
Type of facility					
Tertiary health facility	63 (43.4 %)	82 (56.6 %)	4.408	0.036*	1.921
Secondary health facility	20 (28.6 %)	50 (71.4 %)		(0.143)	1.040–3.548

Table 3c (continued)

Variables	Cause of mortality		Chi value	p-value (Eta)	OR, 95 % CI
Type of facility	Lack of financial resources				
Tertiary health facility	57 (39.3 %)	88 (60.7 %)	7.959	0.005*	2.591
Secondary health facility	14 (20.0 %)	56 (80.0 %)		(0.192)	1.321–5.083
Age range (years)	Complications due–short inter-birth intervals				
17–34	54 (49.1 %)	56 (50.9 %)	4.730	0.030*	0.547
≥35	67 (63.8 %)	38 (36.2 %)		(0.148)	0.317–0.944
Type of facility					
Tertiary health facility	90 (62.1 %)	55 (37.9 %)	6.068	0.014*	2.059
Secondary health facility	31 (44.3 %)	39 (55.7 %)		(0.168)	1.154–3.672
Type of facility	Pregnancy in old age				
Tertiary health facility	99 (68.3 %)	46 (31.7 %)	12.709	<0.001*	2.870
Secondary health facility	30 (42.9 %)	40 (57.1 %)		(0.243)	1.593–5.169
Type of facility	Pregnancy in young girls				
Tertiary health facility	94 (64.8 %)	51 (35.2 %)	8.185	0.004*	2.319
Secondary health facility	31 (44.3 %)	39 (55.7 %)		(0.195)	1.296–4.149

OR, odds ratio; CI, confidence interval

* Significant

one of the top 10 countries with the highest MMR (Meh et al., 2019; UNICEF, 2019). In addition to postpartum haemorrhage, this study identified other contributors to maternal mortality, including unsafe abortion, antepartum haemorrhage, delay in accessing health care, and mismanagement or complications from mission homes and TBAs. This reflects other studies which reported that delay in seeking care, lack of adequate transport, and delay in referral services are contributing factors to maternal mortality (Rogo et al., 2006; Oye-Adeniran et al., 2014; Geller et al., 2018; Sageer et al., 2019). In contrast with the present findings, a study by Fantaye et al. (2019) across rural communities in Edo State, Nigeria found that malaria was perceived as the primary cause of maternal mortality.

Socio-economic factors play an essential role in maternal mortality. This is one of the major risk factors embedded in numerous salient predictors, such as low parental education, low household income, and type of family structure and living conditions, particularly in rural areas. This study found a significant link between financial hardship and maternal death. Moreover, a study by Meh et al. (2019) comparing maternal mortality in northern and southern Nigeria found that community wealth was associated with maternal death, where communities with wealthier women had lower odds of maternal mortality than communities with poor women. Other studies have also shown that the low status of women was a vital factor in maternal death (Lanre-Abass, 2008; Robson et al., 2012; Zolala et al., 2012; Hardie and Landale, 2013; Hernandez and Moser, 2013; Amutah-Onukagha et al., 2017;

Najafzada et al., 2017; Meh et al., 2019; Jeong et al., 2020; Maduka and Ogu, 2020; Ojima et al., 2021). Reduced maternal mortality can be attained, in part, through the economic empowerment of women and young mothers.

Health system and healthcare utilization

Lack of access to maternal health care during pregnancy and post-delivery was identified in this study as one of the reasons for maternal mortality. Various studies have linked inequalities in the use of services such as access to antenatal care, health-facility-based delivery and access to SBAs as factors associated with maternal and neonatal mortality (Iyaniwura and Yusuf, 2009; Alam et al., 2015; Olonade et al., 2019; Sageer et al., 2019; Hamal et al., 2020; Jeong et al., 2020; Maduka and Ogu, 2020; Awe et al., 2021; Ojima et al., 2021). These inequalities in healthcare utilisation are underlined by urban–rural disparities, which can be explained by the focus on higher-quality services in urban regions compared with rural regions. Likewise, the delay in referral services from mission homes and TBAs by over 60 % in the present findings is in agreement with other studies as another contributor to maternal mortality (Alam et al., 2015; Norhayati et al., 2016; Sina and Adekeye, 2019; Jeong et al., 2020; Hamal et al., 2020; Ojima et al., 2021). This delay can be attributed to the distance to health centres or poor roads. A study in Tanzania by Damian et al. (2020) found that distance to healthcare facilities was one of the influential predictors of using SBAs, as people living further from health facilities were less likely to use SBAs during childbirth.

Despite the fact that the Nigerian health system does not formally recognise TBAs, studies have found that women opt for deliveries with TBAs because they are perceived as respectable and reasonably priced (Ebuehi and Akintujoye, 2012; Sibley et al., 2012; Leung et al., 2022). A systemic review by Ope (2020) found that TBAs have a higher level of compassion and concern during delivery than SBAs, and women base their decisions on the perceived quality of care they will receive from TBAs rather than the actual quality of care offered at health facilities. Moreover, previous studies have found that an unfriendly attitude of staff towards patients, especially nurses and midwives, is another reason why many women prefer to give birth at mission homes or be attended to by a TBA, as they are considered to be more approachable and secretive (Lanre-Abass, 2008; Idris et al., 2013; Adeyemo et al., 2014; Lowe et al., 2016; Hamal et al., 2020).

From examining pregnant women, the nurses and midwives reported significant areas of concern. These included the need for improved education on pregnancy danger signs among women (96.7 %) and the importance of discouraging pregnant women from seeking the services of traditional birth attendants (TBAs) and mission homes (91.6 %). Studies have shown that TBAs tend to be more compassionate, approachable and respectable than SBAs (Ebuehi and Akintujoye, 2012; Lowe et al., 2016; Ope, 2020; Hamal et al., 2020; Leung et al., 2022), which likely increases the patronage of pregnant women to TBAs. Besides, it may be that SBAs have an unspoken bias toward mission homes and TBAs due to the late presentation of maternal cases from mission homes and TBAs to health institutions, resulting in complications or even maternal death.

Sociocultural influences surrounding caesarean section

Despite the widespread availability of evidence-based techniques and advancements in CS, sociocultural factors have long been a barrier preventing women from accepting CS as another delivery route. In this study, participating nurses and midwives perceived that a significant percentage of women who turned down CS felt that CS was indicative of failure or laziness, in addition to religious and cultural stigmatisation associated with CS. This is because Nigeria has a patriarchal sociocultural system, where male dominance is considered the normal way of life. Studies have shown that this cultural norm, particularly in rural

communities and low-income households, creates a barrier for pregnant women to make decisive choices regarding CS because of their increased dependence on their husbands, as well as a fear of disappointing their husbands and in-laws (Odekunle, 2016; Ogu et al., 2016; Azuh et al., 2017). Additionally, CS is perceived as a cultural taboo, including religious and traditional beliefs where expectant mothers are seen as incomplete or weak (Muoghalu, 2010; Marchie, 2012; Lowe et al., 2016; Ogu et al., 2016; Onyese et al., 2019; Omer et al., 2021). It has been reported that expectant mothers assumed that presenting at the healthcare centre during labour frequently resulted in CS, which made them delay seeking medical attention (Marchie, 2012; Odekunle, 2016; Azuh et al., 2017; Onyese et al., 2019).

Study limitations

A limitation of this study was the small sample size. A larger sample size may be effective in capturing more understanding of midwives' perceptions of maternal mortality. In addition, this study was conducted in southwestern Nigeria, thereby only capturing a limited view of the whole geopolitical zones. Further studies should be conducted in other zones to obtain a broader perspective of the factors contributing to maternal mortality in the country. Thirdly, this study was conducted in an urban area. It should be replicated in rural areas to obtain more understanding of the perceptions of nurses and midwives in rural areas. Finally, this study was conducted in teaching hospitals alone. It should be replicated in primary health centres and private hospitals.

Conclusion

This study found that nurses and midwives perceive that the main reason for maternal mortality is postpartum haemorrhage. Other factors include the absence of antenatal care, delay in seeking health care, patronising unskilled TBAs and mission homes, and various sociocultural influences associated with poverty. These challenges may be linked to Nigeria's flawed maternal healthcare system and long-held cultural, religious and traditional beliefs and practices. To address disparities in the utilisation of maternal health services, primary health care should be expanded, particularly in rural areas, to give pregnant mothers access to free health care or, at the very least, high-quality and affordable health services. Moreover, the government ought to consider bolstering maternal healthcare services through increased investment in the healthcare system, as it presently receives less funding when compared to more developed countries.

As nurses and midwives are the first professional contact with pregnant women during antenatal care, maternal care and nursing mother care, they may be perceived as maternal health experts due to their years of experience and knowledge. In this study, midwives perceived that TBAs are an important consideration of communities, particularly rural communities, because of the frequency of patronage by expectant mothers. Therefore, it is important to recognise the significance of TBAs in communities, and discontinuing their services in rural areas will most likely result in an increased number of maternal deaths because it could hinder access to assistance for pregnant women. Based on this perception, the Government, in collaboration with communities, could provide TBAs with training to improve their knowledge of pregnancy-related complications, which will reduce their incapacities and improve their performance. In addition, SBAs could collaborate with TBAs, motivating them to chaperone pregnant women travelling from their communities to health centres by offering incentives such as covering transportation expenses from rural communities to health centres.

In order to reduce maternal mortality over time, there is a need for affordable antenatal care services, health education and economic empowerment of women. Furthermore, it is important to develop socioculturally sensitive initiatives that are specific to each geopolitical zone in Nigeria. This entails broad community support for education,

and promotion by midwives through media campaigns that target various communities, including mentoring mission home workers and TBAs who have influence in these communities, to raise awareness, debunk the myths and increase cultural acceptance of CS.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- Adeyemo, F.O., Oyadiran, G.O., Ijedimma, M.O., Akinlabi, B.O., Adewale, A.J., 2014. Perception of pregnant women towards midwives: attitude and practice during child delivery in health institutions in Ogbomoso, South-West Nigeria. *Epidemiol. Biostatistics Public Health* 11, e8937.
- Ajenifuja, K.O., Adepiti, C.A., Ogunniyi, S.O., 2010. Post partum haemorrhage in a teaching hospital in Nigeria: a 5-year experience. *Afr. Health Sci.* 10, 71–74.
- Alam, N., Hajizadeh, M., Dumont, A., Fournier, P., 2015. Inequalities in maternal health care utilization in Sub-Saharan African countries: a multiyear and multi-country analysis. *PLoS One* 10, e0120922.
- Alkema, L., Chou, D., Hogan, D., Zhang, S., Moller, A.-B., Gemmill, A., et al., 2016. 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 North Am. Ed.* 387, 462–474.
- Amutah-Onukagha, N., Rodriguez, M., Opara, I., Gardner, M., Assan, M., Hammond, R., et al., 2017. Progresses and challenges of utilizing traditional birth attendants in maternal and child health in Nigeria. *Int. J. MCH AIDS* 6, 130–138.
- Awe, O.E., Olawade, D., Afolalu, T., Wada, O., Alabi, D.D., 2021. Prevalence of jaundice among neonates admitted in a tertiary hospital in Southwestern Nigeria. *Adv. Pediatr. Neonatal Care* 3, 121–125.
- Azuh, D., Azuh, A., Iweala, E., Adeyoye, D., Akanbi, M., Mordi, R., 2017. Factors influencing maternal mortality among rural communities in southwestern Nigeria. *Int. J. Women's Health* 9, 179–188.
- Damian, D.J., Tibelerwa, J.Y., John, B., Philemon, R., Mahande, M.J., Msuya, S.E., 2020. Factors influencing utilization of skilled birth attendant during childbirth in the Southern highlands, Tanzania: a multilevel analysis. *BMC Pregnancy Childbirth* 20, 420.
- Ebuehi, O., Akintujoye, I., 2012. Perception and utilization of traditional birth attendants by pregnant women attending primary health care clinics in a rural Local Government Area in Ogun State, Nigeria. *Int. J. Women's Health* 4, 25–34.
- Fantaye, A.W., Okonofua, F., Ntoimo, L., Yaya, S., 2019. A qualitative study of community elders' perceptions about the underutilization of formal maternal care and maternal death in rural Nigeria. *Reprod. Health* 16, 164.
- Geller, S.E., Koch, A.R., Garland, C.E., MacDonald, E.J., Storey, F., Lawton, B., 2018. A global view of severe maternal morbidity: moving beyond maternal mortality. *Reprod. Health* 15, 32–43.
- George, D., Mallery, P., 2003. *SPSS for Windows Step by Step: A Simple Guide and Reference*. 11.0 Update (4th ed.). Allyn & Bacon, Boston. https://books.google.co.uk/books/about/SPSS_for_Windows_Step_by_Step.html?id=AghHAAAMAAJ&redir_esc=y.
- Green, K.I., Ojule, J.D., Mmom, C.F., 2015. Primary postpartum haemorrhage at the University of Port Harcourt Teaching Hospital: prevalence and risk factors. *Nigerian Health J.* 15, 111–117.
- Hamal, M., Dieleman, M., De Brouwere, V., de Cock Buning, T., 2020. Social determinants of maternal health: a scoping review of factors influencing maternal mortality and maternal health service use in India. *Public Health Rev.* 41, 13.
- Hardie, J.H., Landale, N.S., 2013. Profiles of risk: maternal health, socioeconomic status, and child health. *J. Marriage Fam.* 75, 651–666.
- Halcomb, E., Hickman, L., 2015. Mixed methods research. *Nurs. Stand.* 29, 41–47.
- Hernandez, J.C., Moser, C.M., 2013. Community level risk factors for maternal mortality in Madagascar. *Afr. J. Reprod. Health* 17, 118–129.
- Idris, S., Sambo, M., Ibrahim, M., 2013. Barriers to utilisation of maternal health services in a semi-urban community in northern Nigeria: the clients' perspective. *Niger. Med. J.* 54, 27.
- Iyaniwura, C.I., Yusuf, Q., 2009. Utilization of antenatal care and delivery services in Shagamu, South-Western Nigeria. *Afr. J. Reprod. Health* 13, 111–122.
- Jeong, W., Jang, S.-I., Park, E.-C., Nam, J.Y., 2020. The effect of socioeconomic status on all-cause maternal mortality: a nationwide population-based cohort study. *Int. J. Environ. Res. Public Health* 17, 4606.
- Lamre-Abass, B.A., 2008. Poverty and maternal mortality in Nigeria: towards a more viable ethics of modern medical practice. *Int. J. Equity Health* 7, 11.
- Leung, C., Olufunlayo, T., Olateju, Z., MacArthur, C., Taylor, B., 2022. Perceptions and experiences of maternity care workers during COVID-19 pandemic in Lagos State, Nigeria: a qualitative study. *BMC Health Serv. Res.* 22, 606.
- Lowe, M., Chen, D.-R., Huang, S.-L., 2016. Social and cultural factors affecting maternal health in rural Gambia: an exploratory qualitative study. *PLoS One* 11, e0163653.
- Maduka, O., Ogu, R., 2020. Preventing maternal mortality during childbirth: the scourge of delivery with unskilled birth attendants. In: Jovandaric, M.Z., Milenkovic, S.J. (Eds.), *Childbirth*. IntechOpen.
- Marchie, C.L., 2012. Socio-cultural factors as correlates of maternal mortality in Edo South Senatorial District, Nigeria. *Asian Pac. J. Reprod.* 1, 315–317.
- Meh, C., Thind, A., Ryan, B., Terry, A., 2019. Levels and determinants of maternal mortality in northern and southern Nigeria. *BMC Pregnancy Childbirth* 19, 417.
- Muoghalu, C., 2010. Socio-economic and cultural factors in maternal mortality in Nigeria. *Gender Behav.* 8.
- Najafizada, S.A.M., Bourgeault, I.L., Labonté, R., 2017. Social determinants of maternal health in Afghanistan: a review. *Cent. Asian J. Glob. Health* 6, 240.
- NPC, ICF, 2019. *Nigeria Demographic and Health Survey 2018 – final report*. National Population Commission. Available at: <http://dhsprogram.com/pubs/pdf/FR359/FR359.pdf>.
- Norhayati, M.N., Nik Hazlina, N.H., Aniza, Abd.A., Sulaiman, Z., 2016. Factors associated with severe maternal morbidity in Kelantan, Malaysia: a comparative cross-sectional study. *BMC Pregnancy Childbirth* 16, 185.
- Odekunle, F.F., 2016. Maternal morbidity burden: the influence of socio-cultural factors. *Int. J. Health Sci. Res.* 6, 316–324.
- Ogu, R., Agholor, K., Okonofua, F., 2016. Engendering the attainment of the SDG-3 in Africa: overcoming the socio cultural factors contributing to maternal mortality. *Afr. J. Reprod. Health* 20, 62–74.
- Ojima, W.Z., Olawade, D.B., Awe, O.O., Amusa, A.O., 2021. Factors associated with neonatal mortality among newborns admitted in the special care baby unit of a Nigerian hospital. *J. Trop. Pediatr.* 67, fmb060.
- Olonade, O., Olawande, T.I., Alabi, O.J., Imhonopi, D., 2019. Maternal mortality and maternal health care in Nigeria: implications for socio-economic development. *Maced. J. Med. Sci.* 7, 849–855.
- Omer, S., Zakar, R., Zakar, M.Z., Fischer, F., 2021. The influence of social and cultural practices on maternal mortality: a qualitative study from South Punjab, Pakistan. *Reprod. Health* 18, 179–188.
- Onyegbule, O.A., Amajuoyi, C.C., Ejelonu, U.T., Onyebokukwu, D.A., 2015. Primary postpartum haemorrhage in federal medical centre, Owerri, Nigeria: a six year review. *Niger. J. Med.* 24, 242–245.
- Onyegbule, K.N., Ndep, A.O., Offiong, D.A., Omang, J.A., Otu, F.T., 2019. Sociocultural factors influencing maternal health outcomes in Nigeria. *Sci. Res. J.* 7, 86–96.
- Ope, B.W., 2020. Reducing maternal mortality in Nigeria: addressing perception and experience of maternal health services. *J. Glob. Health Rep.* 4, e2020028.
- Oye-Adeniran, B., Odeyemi, K., Gbadegesin, A., Akin-Adenekan, O., Akinsola, O., Ekanem, E., et al., 2014. Causes of maternal mortality in Lagos State, Nigeria. *Ann. Trop. Med. Public Health* 7, 177–181.
- Piane, G.M., 2019. Maternal mortality in Nigeria: a literature review. *World Med. Health Policy* 11, 83–94.
- Robson, M.G., Stephenson, R., Elfstrom, K.M., 2012. Community influences on antenatal and delivery care in Bangladesh, Egypt, and Rwanda. *Public Health Rep.* 127, 96–106.
- Rogo, K.O., Ouchou, J., Mwalali, P., Jamison, D.T., Feacham, R.G., Makgoba, M.W., Bos, E.R., Baingana, F.K., Hofman, K.J., et al., 2006. *Maternal mortality. Disease and mortality in Sub-Saharan Africa*. 2nd ed. The World Bank, Washington, DC. Chapter 16. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK2288/>.
- Sageer, R., Kongnyuy, E., Adebimpe, W.O., Omosehin, O., Ogunsona, E.A., Sanni, B., 2019. Causes and contributory factors of maternal mortality: evidence from maternal and perinatal death surveillance and response in Ogun state, Southwest Nigeria. *BMC Pregnancy Childbirth* 19, 63.
- Sibley, L.M., Sipe, T.A., Barry, D., 2012. Traditional birth attendant training for improving health behaviours and pregnancy outcomes. *Cochrane Database Syst. Rev.* 8, CD005460.
- Sina, O.J., Adekeye, D.S., 2019. Socio-cultural factors and utilization of healthcare facilities: implications for maternal mortality in urban areas of Ekiti State, Nigeria. *Altern. Med. Chiropractic Open Access J.* 2, 180012.
- UNICEF, 2019. *Maternal mortality – UNICEF data*. United Nations Children's Fund. Available at: <https://data.unicef.org/topic/maternal-health/maternal-mortality/>.
- WHO, UNFPA, UNICEF, 1992. *Traditional birth attendants: a joint WHO/UNFPA/UNICEF statement*. World Health Organization, Geneva. Available at: <https://apps.who.int/iris/handle/10665/38994>.
- WHO, 2004. *Making pregnancy safer: the critical role of the skilled attendant*. A joint statement by WHO, ICM and FIGO. World Health Organization. Available at: <https://apps.who.int/iris/bitstream/handle/10665/42955/924?sequence=1>.
- WHO, 2015. *Health in 2015: from MDGs, millennium development goals, to SDGs, sustainable development goals*, pp. 8–9. World Health Organization, Geneva.
- WHO, 2018. *Definition of skilled health personnel providing care during childbirth: the 2018 joint statement by WHO, UNFPA, UNICEF, ICM, ICN, FIGO and IPA*. World Health Organization, Geneva. Available at: <https://apps.who.int/iris/bitstream/handle/10665/272818/WHO-RHR-18.14-eng.pdf>.
- WHO, UNICEF, UNFPA, World Bank, 2019. *Trends in maternal mortality: 2000 to 2017*. World Health Organization, Geneva. Available at: <https://data.unicef.org/topic/maternal-health/maternal-mortality/>.
- Zolala, F., Heidar, F., Afshar, N., Haghdoust, A.A., 2012. Exploring maternal mortality in relation to socioeconomic factors in Iran. *Singapore Med. J.* 53, 684–689.