

Knowledge of Antenatal Attendees Regarding Maternal Mortality Risk Factors at Primary Healthcare Facilities in Oluyole Local Government, Oyo State, Nigeria

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Abstract: Nigeria is bewildered with so many public health challenges, and one among them is maternal mortality. The study was purposeful to assess knowledge of antenatal attendees regarding maternal mortality risk factors at primary healthcare facilities in Oluyole local government (LG), Oyo State, Nigeria. The study adopted a descriptive cross-sectional survey design. The population of the study comprised antenatal attendees at primary healthcare facilities in Oluyole LG. A multi-stage sampling technique was used to select the sample size of 230. Validated structured questionnaire was used to obtain data. Reliability was established using Cronbach's alpha, yielding a coefficient of 0.86. A chi-square was used to test the null hypotheses at 0.05 level of significance. The findings revealed that there was difference in the distribution of responses with significantly more antenatal attendees demonstrated adequate knowledge regarding maternal age ($\chi^2 = 477.37, > 3.841. p < .001$); low economic status ($\chi^2 = 375.24 > 3.841. p < .001$); and inadequate knowledge regarding malnutrition ($\chi^2 = 59.40 > 3.841. p < .001$) as risk factors for maternal mortality in Oluyole LG, Oyo State. Antenatal attendees had adequate knowledge regarding maternal age and low economic status, while there was inadequate knowledge regarding malnutrition as risk factors for maternal mortality. It was recommended that, during antenatal sessions, health personnel should emphasis on dangers associated with pregnancy among adolescents and > 40 years, the benefits of attending nearby health facilities during delivery, and nutrition education through food demonstration to dispel food myths, and thereby promote healthy pregnancy outcomes.

Keywords: antenatal attendees, knowledge, maternal mortality, primary healthcare facilities, risk factors

INTRODUCTION

Nigeria is bewildered with so many public health challenges. One among them is maternal mortality. Government and non-governmental agencies are daily working on measures to reduce it. Each day, about 830 women die through pregnancy and childbirth, which is preventable, with 99% of pregnancy-related death taking place in the developing countries (World Health Organization (WHO), 2018). In developing countries such as Nigeria, there are several factors associated with maternal mortality which include sepsis, obstetric haemorrhage, unsafe abortions complications, eclampsia and obstructed labour (Akpan et al., 2020), and mental health conditions (Ray, et al., 2018) among others. Knowledge of pregnant women attending antenatal clinics at primary healthcare facilities on predisposing factors to maternal mortality is important for its effective mitigation. In this study, knowledge of pregnant women attending primary healthcare facilities on maternal age, economic status and malnutrition as maternal mortality risk factors shall be examined.

Globally, younger women under age 15 face a higher risk of maternal mortality (WHO, 2019). Other studies have reported that women aged 10–24 years were at higher risk of maternal mortality and pregnancy complications than other age groups (Althabe et al., 2015). Childbirth among teenagers can result into harmful for both young mothers and their babies (Kassa et al., 2019). Being too old has also been shown to increase the chances of maternal mortality. Kadhila and Tjomombura (2022) posited that women above age 40 are at high risk of mortality during the childbirth. Althabe et al. (2015) reported that the age of mother such as being within the age of 10 and 24 years increases their risk of maternal mortality and complications during pregnancy. Childbirth in teenagers can have harmful consequences on both the young mothers and their babies which could increase the chances of maternal mortality (Kassa et al., 2019).

Similarly, Lisonkova et al. (2017) reported that there is more severe maternal morbidity among teenage mothers than among those between the ages of 25 to 29, and that this chance of morbidity increases exponentially when the age of the mother is above 39 years to above 5.4 odd ratio compared to 1.2 when the mothers age is between 35 to 39 years. On the contrary, Tanaka et al. (2023) observed that high maternal mortality rates were associated with advanced maternal age in Japan, compared to those who were below the age of 20 who had about 0.8 rate of death. Mothers that are of age 40 years and above had 11.2 rate of death which strengthened the argument that age is indeed a significant factor in maternal mortality, and that the older the mothers' age, the more their likelihood of death during the child birth (Tanaka et al., 2023). The higher risk in this younger age group may be because their reproductive organs are not yet matured enough to carry pregnancy due to early marriage. Among teenagers, lack of experience, care, and overall capacity to carry out the roles of a mother are other key factors. It might also be due to poor access to standard family planning services, especially in rural and hard-to-reach areas (Adebayo, 2017).

Poverty is one of the key social determinants of maternal-mortality. The socio-economic status of a family often affects their decision to seek professional help during childbirth. Pregnant women without definite income or a source of livelihood with low spousal support may experience pregnancy-related problems which could lead to maternal mortality. Studies conducted among pregnant women showed that poor economic status was a contributory factor to the low patronage of primary healthcare services (Azuh et al., 2017; Okonofua et al., 2017). A high number of pregnant women in both rural and urban areas were reported to have indicated that the perceived high cost of maternal healthcare services in hospitals negatively impacted their use of antenatal and postnatal care services, since they could not afford it (Azuh et al., 2017). The high cost of maternal care influenced the attitude of most pregnant women to either give birth at home without assistance or at spiritual homes, and other non-orthodox centres which were perceived to be cheaper compared with orthodox maternal healthcare services (Ndikom et al., 2017).

The WHO (2019) defined maternal malnutrition as a severe lack of energy and micronutrients. Proper food and good nutrition are essential for survival, physical growth, mental development, performance and productivity, health, and wellbeing. However, dietary needs differ depending on age, gender, and during physiological changes like pregnancy (Ayensu et al., 2020). A woman's pregnancy is a crucial time in her life because she requires the best possible nourishment to support the growing foetus. For a pregnant woman's health and the success of her pregnancy, she needs to be in appropriate nutritional condition. Pregnancy is a crucial time for addressing the body's demand for macro- and micronutrients because of the increased nutritional requirements. In addition to inadequate nutrition, social and psychological variables, mothers' nutritional awareness, and physiologic changes that affect perceptions of eating habits during pregnancy all play a role in maternal malnutrition (Serbesa et al., 2019).

On the knowledge of the importance of nutrition, Sindhu et al. (2017) report shows that 98% of the women in their study were very much in the know about the necessity of nutrition to pregnancy and complications encountered by antenatal mothers. Similarly, Dalaba et al. (2021) observed that most of their respondents recognized the importance of optimal diets for mother, child and better pregnancy and breastfeeding. Malnutrition is a contributing factor in at least 20% of maternal deaths. Because of the detrimental effects that food restrictions imposed by cultural taboos, many pregnant women steer clear of certain protein-rich foods during pregnancy (Chakona & Shackleton, 2019). Lack of zinc has been linked to prolonged labour and an increased risk of maternal mortality (Manfredini, 2020). Different studies show that education plays a prominent role on the nutritional status of pregnant women. Serbesa et al. (2019) reported that family education affects nutrition; educated pregnant women were more careful about what they ate than the uneducated ones.

Maternal mortality remains one of the major public health challenges globally and is particularly prevalent in low- and middle-income countries, including Nigeria (WHO, 2025a). In Oyo State, maternal mortality was reduced from 296.1 per 100,000 live births in 2023 to 244 per 100,000 live births in 2024 (Oyo State Primary Health Care Board, 2025). Increasing maternal health knowledge is important for promoting timely health-seeking behaviour and the utilization of skilled maternal healthcare services (WHO, 2025b). Over the years, Oyo State has implemented a series of intervention programmes, community awareness

campaigns, and skill-upgrading programmes for health personnel at secondary and primary healthcare facilities, as well as at the community level, with the aim of mitigating maternal mortality and improving maternal health services. Oguntunji et al. (2025) reported that the Midwives Service Scheme (MSS) was adopted, while the “Tomotiya Initiative” was implemented by the Oyo State government to improve safe delivery through skilled birth attendance. At primary healthcare facilities, antenatal care includes health education sessions focused on educating pregnant women about conception care, laboratory investigations, emergency care, birth preparedness, the importance of skilled birth attendance, balanced diet, personal hygiene, environmental sanitation, and immunization, among others.

Although several studies have examined maternal mortality, safe motherhood, antenatal care knowledge, and maternal health literacy in different parts of Nigeria (Jesuyajolu et al., 2022; Bello et al., 2022; Oguntunji et al., 2026), to the best of the researchers' knowledge, there is limited empirical evidence on the current study in the study area. The lack of locally specific evidence may limit the ability of health personnel and policymakers to develop targeted health education interventions that address the knowledge needs of antenatal attendees regarding maternal mortality risk factors. In addition, the extent of knowledge gained by pregnant women through health education sessions delivered during antenatal care regarding maternal mortality risk factors needs to be assessed. Sustainable Development Goal target 3.1 is to reduce maternal mortality to less than 70 maternal deaths per 100,000 live births by 2030 (WHO, 2025a), and this has not been achieved in Oluyole local government (LG). It is upon this premise that this study was undertaken to assess the knowledge of antenatal attendees regarding maternal mortality risk factors at primary healthcare facilities in Oluyole LG, Oyo State, Nigeria.

Hypotheses

The following hypotheses were tested in this study:

1. There is no significant difference in the proportions of antenatal attendees at primary healthcare facilities with adequate and inadequate knowledge regarding maternal age as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria.
2. There is no significant difference in the proportions of antenatal attendees at primary healthcare facilities with adequate and inadequate knowledge regarding low economic status as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria.
3. There is no significant difference in the proportions of antenatal attendees at primary healthcare facilities with adequate and inadequate knowledge regarding malnutrition as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria.

MATERIAL AND METHOD

A descriptive cross-sectional survey design was employed in this study. The study was conducted in 2022 among the selected antenatal attendees at primary healthcare facilities in Oluyole LG, Oyo State, Nigeria. A multistage sampling technique involving purposive, proportionate and simple random sampling method was used to select 219 respondents in the study area. A purposive sampling technique was used to select

9 facilities with the highest number of antenatal attendees. Proportionate sampling technique was used to calculate the samples from each selected facility, while simple random sampling technique was used to select the final respondents in each facility. The study excludes antenatal attendees attending private hospitals/clinics, non-consented, and less than 18 years. Data were collected using a structured questionnaire titled “Knowledge of Antenatal Attendees regarding Maternal Mortality Risk Factors at Primary Healthcare Facilities (KAAMMRFPFH)”. The instrument was divided into two sections: Section A elicited socio-demographic information, while Section B assessed the three variables under the study. A dichotomous Yes = 2 and No = 1 response scale was used for scoring each item. The instrument was validated by three experts from the field of Public Health. Reliability of the instrument was established using Cronbach’s alpha, yielding a coefficient of 0.86. Ethical approval was obtained from the relevant authority, consent of each participant obtained, participation was voluntary, and confidentiality of responses was maintained. Two trained research assistants helped in data collection during the antenatal clinic days in selected facilities. Data were analyzed using SPSS version 25.0. A chi-square goodness-of-fit test was used to test the null hypotheses at 0.05 level of significance.

RESULTS

Hypothesis One: There is no significant difference in the proportions of antenatal attendees at primary healthcare facilities with adequate and inadequate knowledge regarding maternal age as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria.

Table 1: Chi-square Analysis Showing Difference in the Proportions of Antenatal Attendees’ Knowledge at Primary Healthcare Facilities regarding Maternal Age as a Risk Factor for Maternal Mortality in Oluyole LG, Oyo State, Nigeria

Variable	Adequate (Observed)	Inadequate (Observed)	Cal χ^2	Df	χ^2 Crit.	p-value	Dec.
Knowledge of Maternal Age as a Risk Factor	909	186	477.37	1	3.841	0.001	H ₀ Rej.

In the Table 1, since the calculated $\chi^2 = 477.37 > \chi^2$ critical value = 3.841 and $p < 0.001$, the null hypothesis is rejected. This implies that there is a statistically significant difference in the distribution of responses with significantly more antenatal attendees at primary healthcare facilities demonstrated adequate knowledge regarding maternal age as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria.

Hypothesis Two: There is no significant difference in the proportions of antenatal attendees at primary healthcare facilities with adequate and inadequate knowledge regarding low economic status as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria.

Table 2: Chi-square Analysis Showing Difference in the Proportions of Antenatal Attendees' Knowledge at Primary Healthcare Facilities regarding Low Economic Status as a Risk Factor for Maternal Mortality in Oluyole LG, Oyo State, Nigeria

Variable	Adequate (Observed)	Inadequate (Observed)	Cal χ^2	Df	χ^2 Crit.	p-value	Dec.
Knowledge of Low Economic Status as a Risk Factor	868	227	375.24	1	3.841	0.001	H ₀ Rej.

In the Table 2, since the calculated $\chi^2 = 375.24 > \chi^2$ critical value = 3.841 and $p < 0.001$, the null hypothesis is rejected. This implies that there is a statistically significant difference in the distribution of responses with significantly more antenatal attendees at primary healthcare facilities demonstrated adequate knowledge regarding low economic status as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria.

Hypothesis Three: There is no significant difference in the proportions of antenatal attendees at primary healthcare facilities with adequate and inadequate knowledge regarding malnutrition as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria.

Table 3: Chi-square Analysis Showing Difference in the Proportions of Antenatal Attendees' Knowledge at Primary Healthcare Facilities regarding Malnutrition as a Risk Factor for Maternal Mortality in Oluyole LG, Oyo State, Nigeria

Variable	Adequate (Observed)	Inadequate (Observed)	Cal χ^2	Df	χ^2 Crit.	p-value	Dec.
Knowledge of Malnutrition as a Risk Factor	420	675	59.40	1	3.841	0.001	H ₀ Rej.

In the Table 3, since the calculated $\chi^2 = 59.40 > \chi^2$ critical value = 3.841 and $p < 0.001$, the null hypothesis is rejected. This implies that there is a statistically significant difference in the proportions of antenatal attendees at primary healthcare facilities with adequate and inadequate knowledge regarding malnutrition as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria. Since a greater proportion had inadequate knowledge (61.6%) than adequate knowledge (38.4%), the finding indicates that knowledge of antenatal attendees regarding malnutrition as a risk factor for maternal mortality was inadequate.

DISCUSSION

The finding in the Table 1 showed a statistically significant difference in the distribution of responses with significantly more antenatal attendees at primary healthcare facilities demonstrated adequate knowledge regarding maternal age as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria. The highest level of adequate knowledge were observed for the fact that the risk of maternal mortality varies according to a woman's age (91.8%), and that maternal age is an important factor that influence the risk of maternal death (88.6%). Similarly, 82.2% of the respondents correctly recognized that pregnancy among women aged 40 years and above is associated with the increased maternal death. However, comparatively lower level of adequate knowledge were found regarding the risks associated with teenage pregnancy (77.6%), and the comparatively lower risk reproductive age of 25-34 years (74.9%) with these two items recorded the highest proportions of inadequate knowledge (22.4% and 25.1%) respectively.

The implication of the finding is that although antenatal attendees have a good general understanding that maternal age influences the risk of maternal mortality, some do not clearly recognize which age groups are at greater risk. Also, they may underestimate the dangers associated with teenage pregnancy or fail to appreciate that pregnancies during the optimal reproductive age (25-34) are generally associated with better maternal outcomes. This finding is in line with the report of Kadhila and Tjomombura (2022) that mothers being above the age of 40 increase the chances of maternal-mortality. In line with this result is the report of Kasa et al., (2019) that childbirth among teenagers can have harmful consequences on both the young mothers and their babies which could increase the chances of maternal mortality. This high risk that has been observed among younger mothers could be as a result of their reproductive organs that are yet to be fully matured to carry the burden of very early pregnancy (Adebayo, 2017). Moreover, in Japan, Tanaka et al. (2023) revealed that high maternal mortality rate was associated with advanced maternal age that is, 40 years and above.

The finding in the Table 2 revealed a statistically significant difference in the distribution of responses with significantly more antenatal attendees at primary healthcare facilities demonstrated adequate knowledge regarding low economic status as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria. High proportions of respondents had the understanding that financial limitations including inability to afford skilled delivery services (92.7%), essential maternal healthcare services (90.9%), and patronizing traditional birth homes (81.3%), could increase the risk of maternal mortality. However, comparatively lower level of knowledge were observed regarding the effects of transportation costs on antenatal clinic attendance (34.7%), and low purchasing power on adequate nutrition (33.8%). The implication of the findings is that while antenatal attendees demonstrated the knowledge of influence of economic factors regarding maternal mortality, there exists knowledge gaps in areas related to nutrition, and access to maternal healthcare based on mobility issue. This result is in line with the findings of Azuh et al. (2017); Okonofua et al (2017) conducted in southwestern Nigeria whereby poverty and low income were prominent identified factors hindering pregnant women from accessing maternal healthcare services.

Therefore, inability to access care may force many pregnant women to prefer home delivery which may result into maternal and fetal loss. Also, poverty or low socio-economic status may result into poor maternal nutrition leading to poor pregnancy outcome.

The finding in the Table 3 indicated that most antenatal attendees had limited knowledge regarding malnutrition as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria with inadequate knowledge (61.6%) compare to adequate knowledge (38.4%),. The majority of the respondents understood that poor maternal nutrition (68.5%), and poor dietary intake (60.3%) increased the risk of maternal mortality. However, wide knowledge gap that is, inadequate knowledge were observed regarding the roles of nutritional deficiencies (90.0%), anaemia (81.3%), and cultural food taboos (65.8%) as risk factors for maternal mortality. The implication of the findings is that many antenatal attendees had low level of knowledge on the adverse effects of nutritional deficiencies, anaemia, and harmful dietary practices during pregnancy on maternal health. This poor knowledge of the importance of good nutrition is in contrast to the findings of Sindhu et al., (2017) in which 98% of women who formed their respondents knew how necessary nutrition is to pregnancy and complications encountered by antenatal mothers. Also, contrary to the findings of this study, is the report of Dalaba et al., (2021) in which the majority of their respondents recognized the importance of an optimal diet for mothers, and good pregnancy outcomes.

CONCLUSION

Based on the findings of the study, it was concluded that most antenatal attendees at primary healthcare facilities demonstrated adequate knowledge regarding maternal age and low economic status, while there was inadequate knowledge regarding malnutrition as a risk factor for maternal mortality in Oluyole LG, Oyo State, Nigeria.

Recommendations

1. Health personnel should place greater emphasis during the antenatal care health talk on dangers associated with pregnancy among adolescents and women above 40 years to improve pregnant women's knowledge and promote safe pregnancy outcomes.
2. Health workers should intensify health education on the importance of affordable, locally available nutritious foods, and encourage pregnant women to utilize nearby primary healthcare facilities for antenatal and delivery services.
3. Health personnel should strengthen nutrition education during antenatal sessions through practical food demonstrations to dispel food myths and cultural taboos, improve pregnant women's knowledge of appropriate maternal nutrition, and promote healthy pregnancy outcomes.

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