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Assessment of Response Patterns to Pregnancy-Related Danger-Signs among Women Attending Antenatal Clinic of a Maternity Teaching Hospital: A Descriptive Study

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Abstract

Background and Aims: Despite advances in antenatal healthcare services, maternal mortality remains high especially in developing countries, with the sub-Saharan African region bearing the greatest burden. Poor knowledge of and delayed responses to pregnancy-related danger signs among pregnant women have been identified among the contributory factors. This study assessed response to pregnancy-related danger signs among pregnant women attending antenatal clinic at Adeoye Maternity Teaching Hospital, Ibadan, Nigeria.

Materials and Methods: A descriptive cross-sectional study design among 145 women who were selected into the study through convenient sampling technique. Data were collected using structured self-administered questionnaires, and analyzed using descriptive and Chi-square statistics. Level of significance, at $p \leq 0.05$. Results were presented in descriptive tables and charts.

Results: Mean age of respondents was 29.7 ± 7.5 years. Only about half 54.5% of respondents the demonstrated good knowledge of pregnancy-related danger signs. Similarly, about half 55.1% of the respondents reported prompt response by seeking immediate care when they experienced pregnancy-related danger signs. In addition, finding showed no significant association between respondents' knowledge and their response to pregnancy-related danger signs (χ^2=5.484, p=0.064).

Conclusion: Response to pregnancy-related danger signs was partially satisfactory among pregnant women attending antenatal clinic at the study setting. Strengthening maternal health through comprehensive maternal education during routine antenatal care and community educational programs on dangers and importance of timely health-seeking behavior in pregnancy-related dangers cannot be over-emphasized. This will help towards reduction of maternal mortality rate associated with pregnancy-related danger signs.

Keywords: Assessment; Pregnancy-related Danger Signs; Response Pattern; Pregnant Women

1. Introduction

Pregnancy is a natural physiological process during which a developing fetus grows within the mother's body, lasting approximately 280 days from the first day of the last normal menstrual period. Pregnancy-related danger signs refer to warning symptoms that may signal complications requiring prompt medical attention to ensure safety of the mother and the baby (1, 2). The term "danger signs" refers to any symptoms or indicators that suggest a pregnant woman may

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be at risk during pregnancy. They include symptoms such as loss of consciousness, persistent vomiting, severe persistent abdominal pain, vaginal bleeding, swelling of the face, fingers, and feet, blurred vision, severe recurring frontal headache, and high-grade fever (3). Every pregnant woman is at risk of experiencing unanticipated, sudden problems related to pregnancy-related danger signs (4). Pregnancy and its related complications remain one of the major causes of maternal morbidity and mortality worldwide, with over half a million women dying each year due to pregnancy-related causes (5). Pregnant women with limited awareness often fail to recognize critical warning signs which tends to result to poor response in seeking prompt appropriate care (6).

Globally, despite advances in medical technology and increased global attention to maternal health, maternal mortality remains high which poses a significant global health challenge (7, 8). In 2023, there was about 260,000 maternal deaths worldwide, equivalent to about one maternal death every two minutes (7). Sub-Saharan Africa accounts for the highest proportion of global maternal deaths, with a maternal mortality ratio (MMR) estimated at 454 deaths per 100,000 live births in 2023 (9, 8). This region was responsible for approximately 70% of all maternal deaths worldwide same year, amounting to around 182,000 deaths (WHO, 2025). Nearly 28.5% of global maternal deaths happen in Nigeria (10, 11), indicating that a woman in Nigeria has a 1 in 19 lifetime risk of dying during pregnancy, childbirth, or postpartum. An estimated 75% of maternal deaths are attributed to preventable or treatable causes including pregnancy-related danger signs such as hemorrhage, hypertensive disorders, and infections (12). However, inadequate knowledge and response to pregnancy-related danger signs by pregnant women has been identified as one of the contributory factors to maternal mortality rate in Nigeria (5, 13).

Effective reduction in maternal deaths requires that pregnant women not only attending antenatal clinics but also possess the knowledge to identify warning signs early and seek obstetric care promptly. In this context, antenatal education becomes a vital tool for empowering women and enhancing their decision-making during pregnancy. However, existing evidence suggests that knowledge gaps remain significant in many settings, including among women attending formal healthcare facilities. Adeoyo Maternity Teaching Hospital, Yemetu, Ibadan, is a focal point for antenatal care in Oyo State, Nigeria. Despite its role in providing antenatal and delivery care to a large number of women, there is limited information on the extent to which pregnant women attending the clinic are aware of pregnancy-related danger signs and how they respond when such signs occur. Without this understanding, health education and maternal health interventions may remain suboptimal. Therefore, this study seeks to assess pregnant women's knowledge of and response pattern to pregnancy-related danger signs at Adeoyo Maternity Teaching Hospital. Identifying existing gaps in awareness and action is essential for informing targeted, culturally sensitive interventions aimed at improving maternal outcomes. Such efforts are pivotal to Nigeria's progress toward achieving Sustainable Development Goal 3, which focuses on ensuring healthy lives and promoting well-being for all at all ages. The study will also contribute to existing limited literatures on the subject matter which can serve as a valuable reference for future researchers.

2. Materials and Methods

2.1. Study Design

A cross-sectional descriptive design to assess pregnant women's knowledge and response pattern to pregnancy-related danger signs.

2.2. Study Setting

The study was carried out at Adeoyo Maternity Teaching Hospital (AMTH), Ibadan, Oyo State in Southwestern Nigeria. Adeoyo Maternity Teaching Hospital is a healthcare facility owned by Oyo State Government and located in Ibadan, Oyo State, Nigeria. The hospital is a well-established institution specializing in maternal and child health services. It was established in 1928. The hospital functions as a major teaching and referral healthcare center for both primary and secondary healthcare institutions within Ibadan and surrounding communities. It is in affiliation with University College Hospital, Ibadan for training of healthcare professionals, particularly in obstetrics and gynecology (14). In addition to clinical care, the hospital supports numerous research initiatives and community-based programs that inform health policy and strengthen the regional healthcare system. It has a capacity of 153 beds and provides a wide range of specialized services across 10 wards including obstetrics and gynecology, general outpatient care, pediatrics, and pharmacy services. The antenatal clinic at AMTH is being patronized by approximately 4,000 clients per month and up to 50,000 annually. The clinic operates on weekdays and holds sessions three times a week, with each session attended by an average of 56 pregnant women.

2.3. Study Population

The study population comprises of eligible pregnant women who attend antenatal clinic at AMTH, Ibadan and those who were available at the time of the administration of the questionnaires in the clinic. Women in all trimesters of pregnancy who consented to participate were included. However, pregnant women with cognitive impairments that affect their ability to respond accurately, as well as those who decline participation, were excluded.

2.4. Sample Size Determination

The sample size for this study was determined using Yamane's formula (1967), which is appropriate for finite populations in descriptive cross-sectional studies in known population sizes (15). The formula is stated as:

- $n = N / [1 + N(e)^2]$
- Where, n = sample size
- N = Population of study participants
- e = Margin of error tolerance set at 0.05 for 95% confidence level, = 5%
- Weekly antenatal attendees at AMTH, Yemetu Ibadan, provided N-population of study participants.
- Thus, n = 196/ [1+196 (0.05)2]
- Sample size (n) = 131.5

Considering 10% attrition rate, the total sample size was 145 respondents

2.5. Sampling Procedure

A convenient sampling technique was used to recruit respondents among pregnant women attending ANC until the required sample size is reached. The sampling technique was chosen based on the accessibility of the target population to the researchers. Since pregnant women were already present at the ANC for routine care, their recruitment into the study would be more feasible than locating them in the community which will also ensure minimal disruption to respondents' daily routine.

2.6. Instruments for Data Collection

A structured, self-administered questionnaire in line with the objectives of study was used for data collection. The questionnaire was written in English; however, it was interpreted to Yoruba and Hausa to serve the respondents who were not able to comprehend English. In addition, questions were read and interpreted to the respondents who were not able to read or write any of the languages. Such were also assisted to fill the questionnaire based on their responses to the questions. The questionnaire has five main sections, each targeting a specific objective of the research.

2.6.1. Section A: Socio-Demographic Information consists of 11 items.

Section B: Explores respondents' knowledge of pregnancy-related danger signs. It consists of five direct questions and a table consisting of 17 items, out of which 10 are recognized pregnancy-related danger signs as outlined by the World Health Organization and related health guidelines (7). Each correct "Yes," response for a recognized danger sign was awarded one point, while incorrect or uncertain responses scored zero. The maximum obtainable score in this section is therefore 10. Respondents' knowledge levels were categorized as follows: good knowledge (7-10 points, ≥70%), fair knowledge (4-6 points, 40 to 60%) and poor knowledge (0-3 points, ≤30%).

Section C: Focuses on respondents' response patterns to pregnancy-related danger signs. It contains nine questions. This section does not follow a strict scoring system but allows for categorical coding of responses such as immediate versus delayed care-seeking to analyze response patterns.

Section D: Highlights respondents perceived factors influencing their response patterns to pregnancy-related danger signs. It comprises of one multiple-response table with 20 items labeled A to T. All the 20 items represent recognized barriers to accessing healthcare (7). Respondents mark "Yes" or "No" for each barrier. The total score reflected the number of barriers perceived by each respondent.

A pilot-test of the questionnaire was conducted in 10% of sample size among pregnant women attending ANC at Jericho General Hospital, Ibadan. The Cronbach's alpha was 0.924 which was regarded as suitable for the study.

2.7. Procedure for Data Collection

After obtaining permission from hospital authorities, the research team visited the clinic on antenatal clinic days for data collection. While in the waiting area during their routine antenatal clinic visits, the eligible participants were approached and recruited into the study. The purpose, confidentiality, and voluntary nature of participation were clearly explained to them. Informed consents were obtained from eligible respondents. They were guided to a quiet space within the clinic to complete the questionnaire, with assistance provided as needed. Completed questionnaires were checked for errors to ensure prompt correction. Researchers ensured that the process of data collection did not interfere with routine clinic activities. Data collection took place three times a week over two weeks during ANC clinic hours.

2.8. Ethical Considerations

Ethical approval (NHREC/OYOSHRIEC/10/11/22) was obtained from the Ministry of Health, Oyo State Ethics Review Board. Permission was also sought from the management of the study setting and Head of Antenatal Clinic before commencement of data collection. Furthermore, purpose of study and benefits were explained to each respondent. Participation in the study was entirely voluntary, and informed consent was sought from all respondents before administration of questionnaire. There was no risk to the respondents during and after this study. Confidentiality and anonymity of respondents' information were strictly maintained, with data stored securely and accessible only to the research team.

2.9. Method of Data Analysis

Data collected from the respondents were carefully coded, entered, and analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the results. Data were presented using frequency tables and charts. Chi-square test was employed to examine association between categorical variables such as respondents' socio-demographic characteristics, knowledge of pregnancy-related danger signs, response patterns to these signs and factors influencing their response responses to PRDSs. Logistic regression analysis was further conducted to identify factors influencing the response patterns and healthcare-seeking behavior of pregnant women. Statistical significance was established at $p < 0.05$.

3. Results and Discussion

Mean age of respondents was 29.7 ± 7.5 years; most 84.1% were married and about half 55.9% had tertiary education. About 35.9% of the respondents had two children (details in table 1).

Table 1 Socio-Demographic Characteristics of Respondents (n = 145)

Socio-Demographic Characteristics	**Frequency**	**Percent**
Age group		
<30 years	82	56.6
30 - 39 years	48	33.1
40 years and above	15	10.3
Mean age ± SD year	**29.71 ± 7.51 years**	
Educational Qualification		
No formal education	6	4.1
Primary Education	8	5.5
Secondary Education	50	34.5
Tertiary Education	81	55.9
Marital Status		
Single	10	6.9
Married	135	93.1

Employment Status		
Unemployed	12	8.3
Self-employed	85	58.6
Civil Servant	34	23.4
Private Sector Worker	14	9.7
Parity		
0	34	23.4
1	44	30.3
2	52	35.9
3	15	10.3
Median Parity (IQR)	**1.00 (1.00 – 2.00) Children**	
Gestational Age		
1st trimester	1	0.7
2nd trimester	25	17.2
3rd Trimester	119	82.1
Median Gestational Age (IQR)	30.00 (26.00 – 34.00) weeks	

About three-quarter 62.8% respondents demonstrated good knowledge of pregnancy-related danger signs (figure 1).

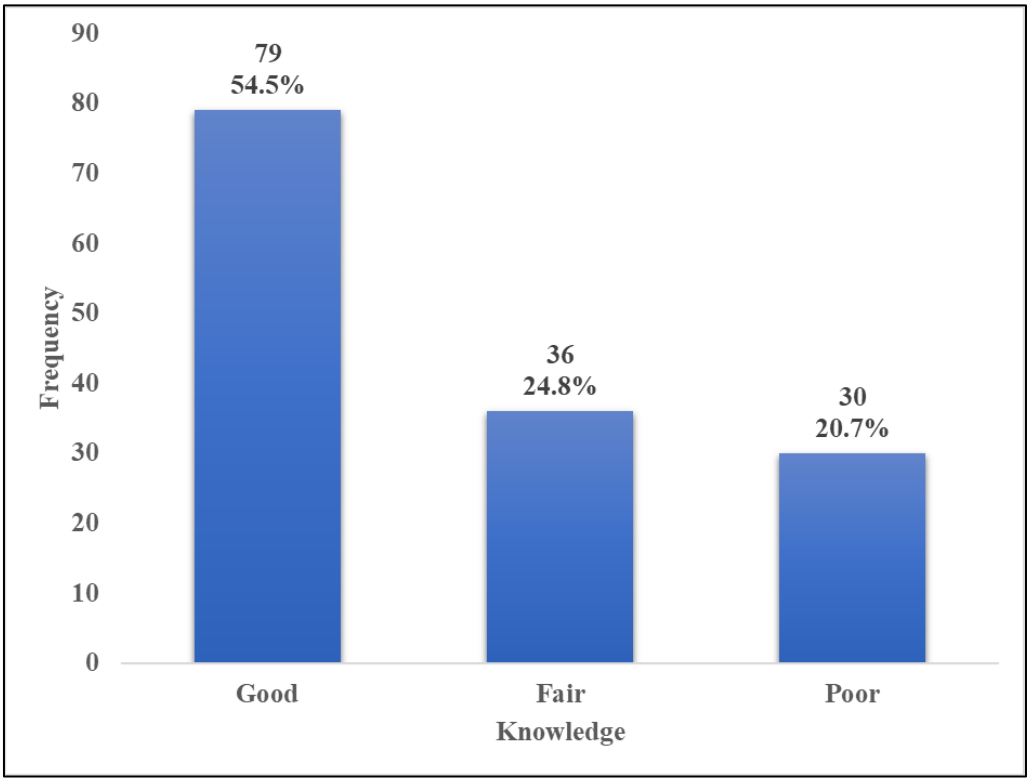

Figure 1 Respondents' Knowledge of Pregnancy-Related Danger Signs

Findings also revealed that the three most danger signs ever experienced by respondents include severe vaginal bleeding (63.6%), severe headache (53.4%) and severe abdominal pain (50.8%) respectively. The least reported danger sign was convulsion as reported by 2.5% of the respondents (figure 2).

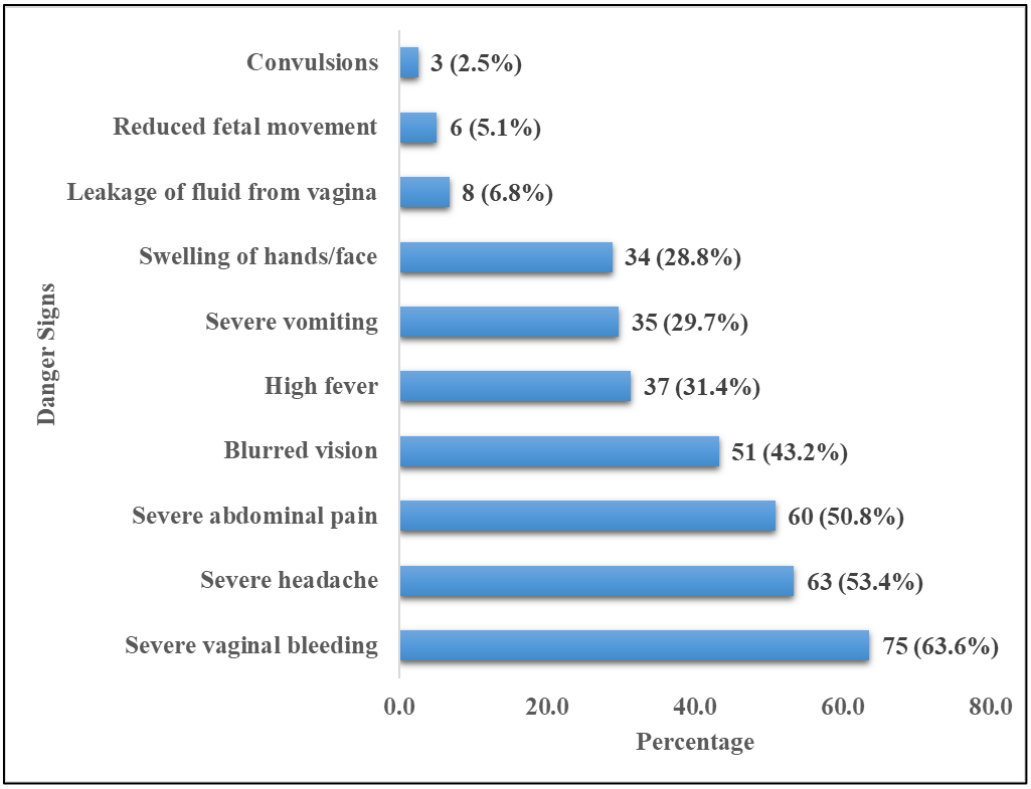

Figure 2 Pregnancy-Related Danger Signs Experienced by Respondents

Regarding response patterns to pregnancy-related dangers among respondents, 55.1% sought care immediately, 21.2% responded within 24 hours, 7.6% responded after a day or more, while 16.1% did not seek obstetrics care at all. Out of those who acted, 88.9% visited a formal healthcare facility, 8.1% self-medicated, while 1.0% of respondents consulted a traditional healer. It was also reported that decision-making was mostly influenced by individual respondents in 55.6% cases, while spouses, family members and friends influenced decision-making in some cases (details in table 2).

Table 2 Response Pattern to Pregnancy Related Danger Sign among Respondents

Statements	Responses	Frequency	Percent
Time responded to pregnancy-related dangers, experienced (n=118)	Immediately	65	55.1
	Within 24 hours	25	21.2
	After a day or more	9	7.6
	Did not seek care	19	16.1
Action taken when experienced danger sign (n=99)	Visited a healthcare facility	88	88.9
	Self-medicated	8	8.1
	Consulted a traditional healer	1	1.0
	Did nothing	1	1.0
	Others	1	1.0
Influencer of your decision to seek medical help (n=99)	Myself	55	55.6
	Spouse/partner	35	35.4
	My family	6	6.1
	Friends	3	3.0

Why not acted (n=19)	I didn't think it was serious	7	36.8
	I was scared	5	26.3
	I waited for it to pass	4	21.1
	My spouse and/in-laws said there was no need to do anything to it	3	15.8
Ever lost a pregnancy due to delayed response to a danger sign (n=118)	Yes	11	9.3
	No	107	90.7
Need permission from anyone before going to a health facility (n=145)	Yes	49	33.8
	No	96	66.2
If yes, from whom (n=49)	Friend	1	2.0
	Husband	42	85.7
	Mother-in-law	2	4.1
	Mummy	4	8.2

Regarding factors influencing respondents' response patterns to pregnancy-related danger signs, the most cited factors were long waiting times 54.5%, unfriendly attitude of healthcare workers 49.7%, health worker incessant strikes 49.0%, fear of male healthcare providers 29.0%, and financial constraint 29.7%. Other reasons include fear of hospital procedures 24.8%, and lack of family support 23.4%. The least reported influencing factors were cultural beliefs, preference for traditional birth attendants, and fear of being stigmatized by people around (table 3).

Table 3 Factors Influencing Response Pattern to Pregnancy-related Danger Signs among Respondents

Factor Influencing Response Pattern	**Yes (Percent)**	**No (Percent)**
Lack of money	43 (29.7)	102 (70.3)
Long distance to the healthcare facility	35 (24.1)	110 (75.9)
Non-availability of healthcare facility in my area	22 (15.2)	123 (84.8)
Fear of hospital procedures/protocols.	36 (24.8)	109 (75.2)
Lack of supports (financial, physical and emotional) from my spouse and family.	34 (23.4)	111 (76.6)
Preference for traditional remedies	14 (9.7)	131 (90.3)
Preference for divine intervention according to my religious beliefs.	20 (13.8)	125 (86.2)
I didn't think it was a serious thing requiring urgent action.	31 (21.4)	114 (78.6)
I was scared.	25 (17.2)	120 (82.8)
I waited for it to pass.	23 (15.9)	122 (84.1)
My spouse and/family said there was no need to do anything about it.	18 (12.4)	127 (87.6)
It was a natural sign according to my cultural belief.	12 (8.3)	133 (91.7)
Fear of being accused of wasting family resources or stigmatization	20 (13.8)	125 (86.2)
It is a taboo to discuss pregnancy related problems publicly.	10 (6.9)	135 (93.1)
Fear of being gossip about in my community.	14 (9.7)	131 (90.3)
I preferred visiting traditional birth attendants than trained healthcare workers in the hospital.	12 (8.3)	133 (91.7)

I was scared of a male healthcare provider attending to me in the hospital.	42 (29.0)	103 (71.0)
Long waiting times.	79 (54.5)	66 (45.5)
Incessant health workers strike.	71 (49.0)	74 (51.0)
Unfriendly attitude of healthcare workers.	72 (49.7)	73 (50.3)

Finding also showed no significant association between respondents' knowledge and response to pregnancy-related danger signs ($\chi^2 = 5.484$, $p = 0.064$) (table 4).

Table 4 Association between Pregnant Women's Knowledge and their Response to Pregnancy-Related Danger Signs

Knowledge	**Response Pattern**		**Total**
	Responded (%)	Did Not Respond (%)	
Good	57 (90.5)	6 (9.5)	63 (100.0)
Fair	23 (71.9)	9 (28.1)	32 (100.0)
Poor	20 (83.3)	4 (16.7)	24 (100.0)
Chi-Square = 5.484, p-value = 0.064			

This study found that the majority of respondents were young, well-educated and married. Education tends to play a central role in shaping women's ability to recognize obstetric danger signs and respond effectively. A significant proportion of participants were engaged in either self-employment or civil service, and this economic engagement was significantly associated with positive response behaviors. This is consistent with prior research indicating that employed women tend to exhibit better preparedness and quicker responses to obstetric emergencies (6). The findings suggest that employment may contribute to increased financial independence and decision-making power, which, in turn, influence timely and appropriate care-seeking behavior.

Findings from this study indicated that good knowledge of pregnancy-related danger signs was demonstrated in only about half of the respondents. This finding is in tandem with previous studies in Chiro and Wolaita Sodo, Ethiopia respectively, where poor knowledge of PRDSs was reported (16, 17). Present study also corroborates finding in a similar study in India where only half of respondents exhibited good knowledge of pregnancy danger signs (18). These evidences could also be the reason why maternal mortality rate associated with pregnancy-danger signs is high in lower-middle-income countries such as Nigeria and Ethiopia as identified by international organizations and numerous scholars (7, 8). This information underscores the crucial role of structured maternal education during routine ANC programs and improvement in maternal health services in health institutions and communities in developing nations including Nigeria towards improving maternal literacy and pregnancy-related danger signs. Furthermore, findings in the present study were also in line with a study in the USA, where more than half of respondents including pregnant women, were unable to correctly identify pregnancy-related danger signs, with the gap being more pronounced among the less-educated group (19). These findings suggest that knowledge dissemination by all possible means to pregnant women is crucial to improve their literacy level on pregnancy-related danger signs.

The study revealed that among the pregnant women who had experienced one or more pregnancy-related danger signs, only about an average of them sought care immediately, while some of them did not seek care at all. The result of this study underscores a critical influence of knowledge on health-seeking behavior among pregnant women. It also suggests that psychosocial, economic, and cultural barriers could be the reason for the delay in maternal health-seeking behavior. The issue of delayed care-seeking is not unique to low-resource settings alone. In high-income countries, similar patterns have been documented among marginalized groups. In the United Kingdom, Black women were found to delay accessing care (20). This indicates that disparities in maternal response patterns are a global concern, though, with different contextual drivers such as misjudgment of symptoms, women perceived danger signs as harmless or preferred to wait for symptoms to resolve naturally which tend to play a substantial role in shaping response behaviors. The tendency to downplay warning signs, compounded by fear of medical interventions and past negative healthcare experiences, could also discourage timely care-seeking behavior.

Regarding the factors influencing respondents' response patterns to pregnancy-related danger signs, the most perceived factors were long waiting times, unfriendly attitude of healthcare workers, and health worker incessant

strikes. Also, among the identified factors were fear of male healthcare providers, financial constraint, fear of hospital procedures and bureaucracies, lack of family support. Other were believing it was not serious, waiting for it to resolve naturally, spouse/family influence on decision-making, and cultural beliefs. These findings are consistent with observations in Southern Mozambique and Bhutan, where fear, mistrust, or previous negative experiences with healthcare providers were reported as determinants of pregnant women health-seeking behavior (20; 18). This suggests that beyond structural barriers, subjective experiences and emotions such as fear and mistrust significantly impact maternal decision-making processes. Additionally, fear of male healthcare providers and spousal/family influence on decision-making was consistent with findings by previous researchers who highlight gender norms and requirement for spousal/family consent inhibit women's autonomy in seeking healthcare services (21, 22). The tendency to avoid male providers has been particularly pronounced in settings where cultural or religious norms discourage interactions between women and unrelated men (22). Thus, enhanced autonomy, improved financial capacity, and greater exposure to health-promoting information and services are very important.

However, finding indicated no significant association between respondents' knowledge and response to pregnancy-related danger signs. This suggests that knowledge level did not have a significant independent influence on pregnant women response to danger signs. Therefore, findings from this study call for comprehensive maternal education and follow-up support as part of routine antenatal care. Nurses should not only raise awareness but also walk alongside women, reinforcing healthy practices and encouraging timely health-seeking behaviors. Adoption of these approaches can play a vital role in saving lives of pregnant women in Nigeria in line with global goals, thus reducing maternal mortality rate associated with pregnancy-related danger signs.

4. Conclusion

Response to pregnancy-related danger signs was partially satisfactory among pregnant women attending antenatal clinic at the study setting. Strengthening maternal health through comprehensive maternal education during routine antenatal care and community educational programs on dangers and the importance of timely health-seeking behavior in pregnancy-related dangers cannot be overemphasized. This will help reduce the maternal mortality rate associated with pregnancy-related danger signs.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors. However, Ethical approval (NHREC/OYOSHRIEC/10/11/22) was obtained from the Ministry of Health, Oyo State Ethics Review Board. Permission was also sought from the management of the study setting and Head of Antenatal Clinic before commencement of data collection. Furthermore, purpose of study and benefits were explained to each respondent. Participation in the study was entirely voluntary, and informed consent was sought from all respondents before administration of questionnaire. There was no risk to the respondents during and after this study. Confidentiality and anonymity of respondents' information were strictly maintained, with data stored securely and accessible only to the research team.

Statement of informed consent

The authors hereby declare no conflict of interest.

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