KNOWLEDGE OF THE IMPACT OF MATERNAL ANXIETY AND STRESS ON PREGNANCY OUTCOMES AMONG PREGNANT WOMEN ATTENDING A PRIMARY HEALTH FACILITY IN AKURE, NIGERIA

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ABSTRACT

Pregnancy constitutes one of the most physiologically and psychologically demanding periods in a woman's life. Maternal anxiety and stress during this period have been increasingly associated with adverse pregnancy outcomes, yet knowledge of these associations among pregnant women in low- and middle-income countries remains poorly documented. This study evaluated the knowledge of the impact of maternal anxiety and stress on pregnancy outcomes among pregnant women attending the comprehensive health center, Arakale, Akure, Ondo State. A descriptive cross-sectional design was employed. A systematic random sample of 171 pregnant women was recruited over four weeks. Data were collected using a structured, researcher-administered questionnaire comprising five sections. Descriptive statistics (frequencies, percentages) and inferential statistics (Pearson's chi-square) were used for analysis via SPSS version 27.0. The majority, (83.0%) of respondents was aware of maternal anxiety and stress; 54.4% demonstrated good overall knowledge. A high prevalence of maternal anxiety and stress was reported by 60.2% of respondents. Over 62.6% had good knowledge of the effects of anxiety and stress on pregnancy outcomes. Key associated factors included fear of childbirth (54.4%), financial difficulties (48.5%), relationship conflict (48.5%), and significant life changes (78.4%). Chi-square analysis revealed a statistically significant relationship between knowledge level and prevalence of maternal anxiety and stress ($\chi 2 = 2.00$, $df = 2$, $p = 0.004$). Pregnant women in this setting exhibit a significant yet imperfect understanding of maternal anxiety and stress and their consequences. Structured integration of mental health education into routine antenatal care is recommended to improve knowledge and mitigate adverse outcomes.
Keywords: Maternal anxiety, maternal stress, pregnancy outcomes, antenatal care, knowledge, Nigeria

INTRODUCTION

Pregnancy represents a pivotal bio-psychosocial transition in the life of a woman, characterized by profound physiological, emotional, and psychological transformations. While these changes are an inherent aspect of normal gestation, they simultaneously predispose pregnant women to heightened psychological vulnerability, particularly to anxiety and stress (Obrochta *et al*., 2020). Mounting epidemiological evidence underscores the adverse consequences of these psychological states on both maternal and fetal health, yet awareness and knowledge of such consequences among expectant mothers remains inadequate, especially in resource-limited settings. The prevalence of clinically significant anxiety in pregnancy ranges between 15% and 26% in low- and middle-income countries (LMICs), with stress prevalence estimated between 33% and 52.9% in developing nations (Gokoel *et al*., 2021; Jha *et al*., 2021). These elevated rates are attributable to multifactorial determinants, including financial insecurity, relationship dysfunction, fear of childbirth, cultural pressures, and inadequate social support (McKee *et al*., 2020; Van den Bergh *et al*., 2020). Pathophysiological maternal stress activates the hypothalamic-pituitary-adrenal (HPA) axis, precipitating hypercortisolemia and systemic inflammation. These mechanisms compromise uteroplacental perfusion, impair fetal neurodevelopment, and increase the risk of preterm birth, low birth weight, and neonatal complications (Nazzari *et al*., 2023; Delagneau *et al*., 2023).

Despite this established evidence base, pregnant women, particularly in sub-Saharan Africa, often lack sufficient knowledge regarding the psychological dimensions of pregnancy and their implications. A Canadian survey of 1,207 participants found that only 26.6% accurately recognized anxiety in pregnancy as harmful to fetal development (Sunday *et al*., 2019). In Nigeria, studies have similarly documented significant knowledge gaps, with antenatal care services predominantly focused on physiological parameters while systematically under addressing maternal mental health (Adeyemi *et al*., 2023; Adewuyi *et al*., 2022).

This study therefore sought to evaluate the knowledge of the impact of maternal anxiety and stress on pregnancy outcomes among pregnant women attending the Comprehensive Health Center, Arakale, Akure, Ondo State, Nigeria. The findings are expected to contribute to the evidence base for integrating mental health interventions into routine antenatal care in LMICs.

The study aimed to: (i) assess the level of knowledge of pregnant women regarding maternal anxiety and stress; (ii) determine the prevalence of maternal anxiety and stress during pregnancy; (iii) evaluate knowledge of the effects of maternal anxiety and stress on pregnancy outcomes; and (iv) identify factors associated with the occurrence of maternal anxiety and stress.

THEORETICAL FRAMEWORK

This study was anchored on the Health Belief Model (HBM), originally conceptualized by Rosenstock (1974) and subsequently refined by Becker and colleagues. The HBM posits that health-related behavior is shaped by an individual's perceptions of susceptibility, severity, benefits, and barriers, as well as cues to action and self-efficacy. Within the context of maternal anxiety and stress, the HBM offers a coherent explanatory framework for understanding how pregnant women appraise psychological risk, evaluate the utility of coping strategies, and navigate structural and sociocultural barriers to help-seeking.

Perceived susceptibility relates to a woman's subjective assessment of her vulnerability to adverse pregnancy outcomes attributable to unmanaged stress and anxiety. Research demonstrates that elevated perceived susceptibility correlates with increased engagement in preventive health behaviors, such as attendance at antenatal counseling or participation in stress management programs (Kingston et al., 2021). Perceived severity—the extent to which women appreciate the gravity of consequences such as preterm labor, impaired fetal neurodevelopment, or postpartum depression, is similarly associated with motivation to seek intervention (Glynn et al., 2022).

Perceived benefits and barriers operate in dialectical tension: women who recognize the efficacy of mindfulness-based interventions, cognitive-behavioral therapy, or social support in reducing anxiety are more likely to engage with such modalities, whereas stigma, financial constraints, and cultural taboos function as barriers that suppress help-seeking (Adeyemi *et al*., 2023; Doyle *et al*., 2022). Cues to action, whether internal (symptom experience) or external (provider counseling, educational materials) and self-efficacy beliefs regarding stress management competence further modulate behavioral response. The HBM thus provides a robust scaffold for both interpreting study findings and designing targeted educational interventions.

MATERIALS AND METHODS

Study design

A descriptive cross-sectional design was employed. The study was conducted at the Comprehensive Health Center, Arakale, Akure South Local Government Area, Ondo State, Nigeria. This primary health care facility provides comprehensive maternal and child health services, including antenatal care, and registers an average of 300 pregnant women monthly.

Population, Sample Size, and Sampling

The target population comprised all pregnant women registered for antenatal care at the study facility during the one-month data collection period (N = 300). Sample size was calculated using Slovin's formula at a 95% confidence level and 5% margin of error, yielding n = 171.

A systematic random sampling technique was employed. The sample was distributed evenly across eight clinic days (21–22 women per day). On each clinic day, the sampling interval (k) was calculated by dividing the total attendance by the daily target. A random starting point was selected, and every k^{th} eligible woman was recruited. This process was repeated until the total sample of 171 was achieved.

Inclusion and Exclusion Criteria

Eligible participants were pregnant women who were registered for antenatal care at the facility, present on designated clinic days, and who provided verbal informed consent. Women who declined to participate or who were too unwell to respond were excluded.

Data Collection Instrument

Data were collected using a structured, researcher-administered questionnaire developed from the study objectives and a comprehensive literature review. The instrument comprised five sections: Section A: Socio-demographic data (7 items); Section B: knowledge of maternal anxiety and stress (9 items, 4-point Likert scale); Section C: prevalence of maternal anxiety and stress (9 yes/no items); Section D: knowledge of effects on pregnancy outcomes (9 items, 4-point Likert scale); and Section E : factors associated with maternal anxiety and stress (6 yes/no items).

Validity and Reliability

Content validity was established through expert review by midwifery specialists, and items were aligned with stated research questions and the extant literature. Face validity was ensured by using clear, accessible language

verified through a pilot review. Reliability was assessed using the split-half method, yielding a reliability coefficient of 0.87, indicating strong internal consistency (Nunnally & Bernstein, 1994).

Data Analysis
Data were analyzed using SPSS version 27.0. Descriptive statistics (frequencies, percentages) were computed for socio-demographic and outcome variables. Knowledge scores were computed by summing weighted Likert responses (Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1), with a maximum score of 36. Scores of 25–36 were rated "good," 12–24 "average," and below 12 "poor." Prevalence scores were computed from yes/no responses (Yes = 1, No = 0; maximum = 9), with scores of 6–9 rated "high" and below 5 "low." Inferential analysis employed Pearson's chi-square test, with significance set at $p < 0.05$.

Ethical Considerations
Ethical approval was obtained from the Ondo State Ministry of Health (Protocol No. OSHREC/09/07/2025/1036). All participants provided verbal informed consent. Participation was voluntary; anonymity was preserved by excluding identifying information from questionnaires, and all participants were informed that the study posed no direct personal benefit but that findings would contribute to improved antenatal care practices.

RESULTS

Socio-demographic Characteristics of Respondents
All 171 recruited participants completed the questionnaire, representing a 100% response rate. Table 1 presents the socio-demographic profile of respondents.

Table 1: Sociodemographic Characteristics of Respondents (n = 171)

Variable	Category	n	%
Age (years)	< 20	26	15.2
	20–30	96	56.1
	31–40	28	16.4
	> 40	21	12.3
Marital Status	Married	161	94.2
	Single	7	4.1
	Divorced	3	1.8
Religion	Christianity	127	74.3
	Islam	44	25.7
Education Level	Primary	55	32.2
	Secondary	70	40.9
	Tertiary	46	26.9
Employment Status	Employed	111	64.9
	Self-employed	53	31.0
	Unemployed	7	4.1
Gestational Age	First trimester	47	27.5
	Second trimester	20	11.7
	Third trimester	104	60.8
Parity	1	45	26.3
	2–3	48	28.1
	4–5	57	33.3
	≥ 6	21	12.3

The majority of respondents were aged 20–30 years (56.1%), consistent with peak reproductive age. Most were married (94.2%), Christian (74.3%), and had attained secondary education (40.9%). Over half (64.9%)

were employed, and 60.8% were in their third trimester. Parity of four to five pregnancies was the most common (33.3%).

Knowledge of Maternal Anxiety and Stress

A substantial majority (83.0%) of respondents reported awareness of maternal anxiety and stress. Approximately 76.0% acknowledged that these conditions could affect pregnancy outcomes (39.2% agreed; 36.8% strongly agreed). However, only 52.6% reported having received information on this topic during antenatal visits. While 73.0% recognized the risk of obstetric complications such as preterm birth and low birth weight (38.6% strongly agreed; 37.4% agreed), exposure to formal educational materials was limited, with 64.9% indicating they had not encountered relevant materials. Overall, 54.4% of respondents demonstrated good knowledge, 44.4% average knowledge, and 1.2% poor knowledge (Table 2).

Table 2: Overall Level of Knowledge of Maternal Anxiety and Stress (n = 171)

Knowledge Level	Frequency	%
Good	93	54.4
Average	76	44.4
Poor	2	1.2
Total	**171**	**100.0**

Prevalence of Maternal Anxiety and Stress

A markedly high prevalence of maternal anxiety and stress was documented in this cohort. Nearly all respondents (92.4%) reported currently experiencing stress in their pregnancy, and 81.9% reported feeling anxious. Physical symptoms attributable to stress and anxiety—including fatigue, palpitations, and headaches—were reported by 84.8% of participants, while emotional symptoms were acknowledged by 94.2%. More than three-quarters (74.9%) reported that stress or anxiety had interfered with their ability to carry out daily activities, and 63.7% had raised concerns at antenatal visits. Overall, high prevalence was recorded in 60.2% of respondents and low prevalence in 39.8%.

Knowledge of Effects of Maternal Anxiety and Stress on Pregnancy Outcomes

The majority (62.6%) of respondents demonstrated good knowledge of the effects of maternal anxiety and stress on pregnancy outcomes, while 37.4% exhibited average knowledge. Notably, 80.1% disagreed that the impact of maternal anxiety and stress on pregnancy outcomes is minimal, indicating appropriate risk appreciation. Approximately 85.4% recognized that elevated anxiety and stress can cause obstetric complications including preterm birth and low birth weight, and 54.4% acknowledged the association with increased risk of cesarean delivery. However, awareness of subtler consequences was lower: only 54.3% recognized the link between maternal stress and impaired infant neurodevelopment, and 53.2% were aware of the risk of postpartum depression.

Factors Associated with Maternal Anxiety and Stress

Table 3 summarizes factors associated with the occurrence of maternal anxiety and stress. The most prevalent factors were emotional or physical abuse (88.3%), significant life changes such as bereavement or divorce (78.4%), fear of childbirth (54.4%), financial difficulties (48.5%), and relationship conflict with a partner or family member (48.5%). Despite these stressors, 80.1% of respondents reported feeling supported by their family, suggesting that social support may serve a protective function.

Table 3: Factors Associated with Maternal Anxiety and Stress (n = 171)

Factor	Yes, n (%)	No, n (%)
Family support during pregnancy	137 (80.1)	34 (19.9)
Relationship conflict with partner/family	83 (48.5)	88 (51.5)
Financial difficulties contributing to stress	83 (48.5)	88 (51.5)
Fear of childbirth	93 (54.4)	78 (45.6)
Emotional or physical abuse	151 (88.3)	20 (11.7)
Significant life changes (bereavement, divorce, etc.)	134 (78.4)	37 (21.6)

Hypothesis Testing

The null hypothesis that there is no significant relationship between knowledge of maternal anxiety and stress and prevalence of maternal anxiety and stress was tested using Pearson's chi-square analysis. Results yielded $\chi^2 = 2.00$, df = 2, p = 0.004, indicating a statistically significant relationship ($p < 0.05$). The null hypothesis was therefore rejected. These findings suggest that higher levels of knowledge are associated with greater self-reported prevalence, which may reflect heightened awareness and recognition of anxiety and stress symptoms among more informed women.

DISCUSSION

Knowledge of Maternal Anxiety and Stress

The finding that over half (54.4%) of respondents demonstrated good knowledge of maternal anxiety and stress is encouraging and is consistent with a growing body of literature suggesting improved awareness in the antenatal population. However, the substantial proportion with average knowledge (44.4%) and the documented gaps in formal education exposure reflect persistent inadequacies in antenatal mental health education in Nigeria. These findings parallel those of Adewuyi *et al*. (2022), who reported that only 46% of pregnant women in sub-Saharan Africa could correctly identify signs of maternal anxiety, and align with Kingston *et al*. (2021), who found that while 78% of women acknowledged stress as a pregnancy concern, fewer than 35% associated it with specific outcomes.

The finding that only 52.6% of respondents had received information on maternal anxiety and stress during antenatal visits is particularly concerning and corroborates Eberhardt *et al*. (2020), who attributed poor knowledge in low-income settings to inadequate integration of mental health content into prenatal care. In Nigeria specifically, Adeyemi *et al*. (2023) documented that cultural stigma surrounding mental health further suppresses awareness, a pattern reflected in this study's finding that 40.4% attributed cultural and religious beliefs as barriers to appropriate perception of maternal mental health. This underscores the necessity of culturally sensitive educational strategies that de-stigmatize psychological distress in pregnancy.

Prevalence of Maternal Anxiety and Stress

The prevalence documented in this study, with 60.2% of respondents meeting criteria for high prevalence substantially exceeds estimates from many high-income country studies but is broadly consistent with reports from sub-Saharan Africa and other LMICs. Gokoel *et al*. (2021) estimated stress prevalence between 33% and 52.9% in developing nations, and Alhassan *et al*. (2022) reported physiological anxiety symptoms in 58% of pregnant Nigerian women. The near-universal endorsement of current stress (92.4%) and emotional symptoms (94.2%) in this cohort, while partly attributable to the broad scope of items assessed, nonetheless signals an urgent public health concern.

The magnitude of reported prevalence is consistent with research implicating HPA-axis dysregulation and elevated cortisol as mediating mechanisms of adverse fetal outcomes (Nazzari *et al*., 2023). Notably, that 63.7% of women had raised concerns at antenatal visits without receiving structured mental health support suggests a critical unmet need within the existing care framework. This echoes findings by Lim *et al*. (2021), who noted significant underreporting due to stigma, and by Miller *et al*. (2023), who documented disparities in reporting among minority populations.

Knowledge of Effects on Pregnancy Outcomes

The finding that 62.6% of respondents demonstrated good knowledge of the effects of maternal anxiety and stress on pregnancy outcomes represents a slight improvement upon knowledge of anxiety and stress per se and may reflect the greater salience of outcome-related information in routine antenatal discourse. The 85.4% awareness of the preterm birth and low birth weight risk aligns with the relatively higher salience of these conditions in clinical communication. However, awareness of subtler neurobiological and psychiatric consequence, such as altered fetal brain connectivity (Thomason *et al*., 2021) and postpartum depression (McKee *et al*., 2020)—remained suboptimal.

These findings are consistent with Smith *et al*. (2022), who reported that only 40% of antenatal clinic attendees were aware of the effects of maternal stress on pregnancy, and with Quinn et al. (2020), who observed that prior knowledge did not reliably translate to risk association with specific conditions. This suggests that surface-level awareness is insufficient and that educational interventions must be designed to foster deeper mechanistic understanding, employing evidence-based strategies such as visual aids, interactive sessions, and digital health platforms (Doyle *et al*., 2022; Choi *et al*., 2021).

Factors Associated with Maternal Anxiety and Stress

The predominance of socio-cultural factors; abuse (88.3%), significant life changes (78.4%), financial difficulty (48.5%), and relationship conflict (48.5%), as drivers of maternal anxiety and stress is consistent with multidimensional models of maternal mental health and echoes findings across diverse geographic contexts. Ghosh *et al*. (2022) and Brown *et al*. (2021) demonstrated the primacy of financial insecurity and housing instability as determinants of maternal anxiety, findings that are particularly relevant to the low-resource setting of this study. The high prevalence of fear of childbirth (54.4%) is noteworthy and aligns with Dominguéz-Solís et al. (2021) and Araji *et al*. (2020), who identified tokophobia as a significant contributor to prenatal psychological distress.

Importantly, 80.1% of respondents reported family support during pregnancy, a finding that underscores the potential of social networks as protective resources. Yamada *et al*. (2021) and Lundgren *et al*. (2020) have documented the anxiety-buffering effects of strong partner and family support, suggesting that family centered antenatal interventions could yield meaningful reductions in psychological distress. Healthcare systems should leverage these existing social resources while simultaneously addressing structural determinants such as poverty and gender-based violence.

CONCLUSION

This study demonstrates that pregnant women attending a primary health facility in Akure, Nigeria, exhibit a significant but incomplete understanding of maternal anxiety and stress and their impact on pregnancy outcomes. A high prevalence of anxiety and stress was documented, driven by multifactorial socio-cultural and psychosocial determinants. A statistically significant relationship between knowledge level and prevalence of maternal anxiety and stress was established, reinforcing the imperative for knowledge-enhancing interventions. The routine integration of structured, culturally responsive mental health education into antenatal care is therefore essential to address these knowledge gaps and reduce the burden of adverse pregnancy outcomes associated to psychological distress.

RECOMMENDATIONS

Based on the study findings, the following evidence-based recommendations are proposed:

- Routine screening for maternal anxiety and stress should be implemented at all antenatal bookings using validated, context-appropriate tools such as the Edinburgh Postnatal Depression Scale (EPDS) or the Generalized Anxiety Disorder-7 (GAD-7).
- Structured health education sessions addressing maternal anxiety, stress, and their obstetric implications should be incorporated as standard components of antenatal care at all facility levels.
- Dedicated counseling spaces and referral pathways for psychological support should be established within antenatal care settings.
- Healthcare professionals should receive continuous training in perinatal mental health assessment and evidence-based psychological first aid.
- Digital health interventions, including mHealth applications and SMS-based educational outreach, should be harnessed to extend mental health literacy to hard-to-reach populations (Ali *et al*., 2023).
- Policy frameworks should prioritize the integration of maternal mental health into primary health care systems, with commensurate resource allocation.

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