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Assessment of Birth Preparedness and Complication Readiness Among Pregnant Women Attending Antenatal Clinic in Primary Health Care Centers in Ede North Local Government Area, Osun State, Nigeria

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Abstract- Background: ***Maternal mortality remains a leading public health crisis in sub-Saharan Africa, with Nigeria contributing disproportionately to global maternal deaths. Birth preparedness and complication readiness (BPCR) is a safe motherhood strategy designed to reduce life-threatening delays in accessing skilled obstetric care. However, evidence on its uptake in primary health care settings in Osun State, Nigeria, remains limited. This study assessed birth preparedness and complication readiness among pregnant women attending an antenatal clinic in Ede North Local Government Area, Osun State, Nigeria, examining their knowledge of obstetric danger signs, attitudes toward BPCR components, level of implementation, and factors influencing BPCR practices.***

Methods: ***A descriptive cross-sectional survey design was adopted. Using a simple random sampling technique, 220 pregnant women were recruited from five primary health care facilities. Data were collected via a structured, pretested questionnaire and analyzed using IBM SPSS Statistics version 20.0. Descriptive statistics (frequencies and percentages) were computed, and chi-square tests were applied to assess associations between variables at a 5% significance level.***

Results: ***The majority of respondents (40%) were aged 26–35 years, married (50%), monogamous (80%), Christian (59.1%), Yoruba (77.7%), and had a tertiary education (45.5%). Knowledge of obstetric danger signs was moderate to good across the pregnancy (52.3%–75%), labor (50.9%–59.1%), and postpartum (51.4%–51.8%) phases. Attitudes toward BPCR were highly positive, with 93.2% affirming the value of antenatal clinic attendance and 95.5% endorsing spousal involvement. Implementation levels were high: 88.2% identified a preferred delivery site, 89.1% saved funds for delivery, 94.6% procured essential materials, and 90.0% arranged a birth companion. Key inhibitors included low education and income (93.2%), cultural beliefs (93.2%), inadequate health facilities and personnel (72.8%), and poor community support (72.7%). While birth preparedness and complication readiness practices were generally high among antenatal attendees in Ede North, systemic barriers continue to undermine optimal implementation. Multi-level interventions targeting education, health infrastructure strengthening, community mobilization, and spousal engagement are urgently needed to reduce maternal morbidity and mortality in the region.***

Keywords: ***Birth Preparedness, Complication Readiness, Maternal Mortality, Antenatal Care, Danger Signs, Nigeria, Primary Health Care***

I. INTRODUCTION

Maternal mortality remains one of the most profound indicators of health inequity across the globe, reflecting disparities in access to skilled obstetric care, health system capacity, and socioeconomic conditions. Each year, hundreds of thousands of

women lose their lives during pregnancy or within 42 days of delivery, with the overwhelming majority of these deaths occurring in low- and middle-income countries (LMICs). According to the World Health Organization (2019), approximately 295,000 women died from pregnancy- or childbirth-related causes in 2017 alone, corresponding to a global maternal mortality ratio (MMR) of 211 deaths per 100,000 live births. Sub-Saharan Africa bears the heaviest burden, accounting for approximately two-thirds of all global maternal deaths, despite harboring only about 14% of the world's population. Nigeria is particularly emblematic of this crisis. With a maternal mortality ratio of approximately 512 deaths per 100,000 live births, and some estimates exceeding 800 in rural and underserved communities, Nigeria ranks among the countries with the highest absolute number of maternal deaths globally (WHO, 2019). The Nigerian Demographic and Health Survey consistently documents that skilled birth attendance rates remain below 40%, institutional delivery rates fall short of 50%, and antenatal care (ANC) coverage, while improving, remains inconsistent in rural and peri-urban settings (National Population Commission, 2018). These alarming statistics underscore a profound systemic failure to protect women at the most vulnerable moments of their reproductive lives.

The dominant framework for understanding why women die in childbirth is rooted in the Three Delays Model, originally articulated by Thaddeus and Maine (1994). This model identifies three critical points of failure in the pathway to maternal survival: delay in recognizing danger signs and deciding to seek care; delay in reaching an appropriate health facility; and delay in receiving adequate care upon arrival. A complex interplay of individual knowledge and attitudes, household dynamics, community norms, geographic access, and health system quality mediates each of these delays. Critically, all three delays can be substantially mitigated through well-implemented birth preparedness and complication readiness (BPCR) strategies. Birth Preparedness and Complication Readiness (BPCR) is a safe motherhood initiative promoted by JHPIEGO (2004) and endorsed by the World Health Organization as a cost-effective, multi-pronged approach to reducing the three delays. BPCR encompasses a suite of proactive measures that pregnant women, their families, and communities are encouraged to undertake before the onset of labor. These measures include: acquiring knowledge of obstetric danger signs during pregnancy, labor, and the postpartum period; identifying and arranging for a skilled birth attendant; selecting an appropriate health facility for delivery; making transportation arrangements to reach the facility; identifying a potential blood donor in anticipation of obstetric hemorrhage; and saving money to defray the costs of delivery and emergency obstetric care. Additional components include knowing the expected date of delivery, arranging childcare for other children during labor, planning for postnatal care, and discussing contraception post-delivery (JHPIEGO, 2004; WHO, 2016).

Despite its conceptual simplicity and demonstrable effectiveness, implementation of BPCR remains uneven across sub-Saharan Africa. Studies from Ethiopia have documented that as few as 17% to 22% of pregnant women are adequately prepared for birth and potential complications (Tebekaw et al., 2018). In Kenya, a significant proportion of antenatal clients, 44.9%, had not arranged transport for obstetric emergencies, and 37.1% had not saved money for such purposes (Simkhada et al., 2018). Northern Nigerian data from Iliyasu et al. paint an equally sobering picture: while 71.5% of expectant fathers planned for naming ceremonies, fewer than one-third made arrangements for maternal health care, and only 19.5% saved for obstetric emergencies. Even more troublingly, plans to identify skilled delivery attendants, arrange emergency blood donation, and choose a delivery site were made by just 6.2%, 0.8%, and 9.0% of respondents, respectively. Within Nigeria, evidence on BPCR is largely facility-based and concentrated in select geopolitical zones, with the southwest, despite its relatively higher educational attainment, being underrepresented in the peer-reviewed literature. A study in southwestern Nigeria found that only 28.3% of antenatal attendees could identify four or more danger signs without prompting (Dako-Gyeke et al., 2015), while another in South-Eastern Nigeria reported high general awareness (70.6%) but poor knowledge of specific danger signs (Daniel et al., 2020). These findings suggest that awareness and knowledge are not synonymous, and that targeted

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health education interventions remain necessary even in communities with moderate literacy levels.

Ede North Local Government Area (LGA) in Osun State exemplifies the sociodemographic diversity of southwestern Nigeria. With a population of approximately 83,818 (National Population Commission, 2006), the LGA encompasses both urban and peri-urban communities, a mix of Christian and Muslim households, and a predominantly Yoruba population with significant minority representation. Primary health care (PHC) facilities constitute the first point of contact for most pregnant women in the LGA, making them critical entry points for BPCR interventions. However, no published study had previously examined BPCR practices among pregnant women attending PHC antenatal clinics specifically in this locality, creating a critical evidence gap that this study sought to address. The importance of generating locally contextualized evidence cannot be overstated. National and regional data frequently mask important variations at the local government level, and program managers require granular information to design targeted interventions. By systematically assessing the knowledge, attitudes, implementation, and determinants of BPCR among antenatal attendees in Ede North LGA, this study contributes to the evidence base needed to guide PHC strengthening, community health worker programming, and health promotion campaigns in Osun State and comparable settings across Nigeria.

Statement of the Problem

Maternal mortality remains unacceptably high in Nigeria, with approximately 830 women dying globally from pregnancy- or childbirth-related complications every day, and Nigeria accounting for a disproportionate share of these deaths; despite the proven efficacy of birth preparedness and complication readiness as a safe motherhood strategy, there exists a critical dearth of empirical evidence on its practice among pregnant women attending primary health care antenatal clinics in Ede North Local Government Area, Osun State, thereby limiting the capacity of public health authorities to design contextually appropriate, evidence-driven interventions to reduce maternal morbidity and mortality in the region (WHO, 2018).

II. LITERATURE REVIEW

Conceptual Framework of Birth Preparedness and Complication Readiness

Birth preparedness and complication readiness (BPCR) is conceptualized as a proactive, multi-dimensional strategy that empowers pregnant women, their families, and communities to plan for safe deliveries and to respond effectively to obstetric emergencies. The JHPIEGO (2004) framework identifies six core components of BPCR: knowledge of danger signs; identification of a skilled birth attendant; identification of an appropriate health facility; transportation arrangement; identification of a potential blood donor; and savings for delivery and emergency costs. This framework has been widely adopted across sub-Saharan Africa and Asia as the operational basis for BPCR assessment and intervention design.

The theoretical underpinning of BPCR draws on several behavioral change models. The Health Belief Model (HBM) posits that a woman's likelihood of taking preparatory action is shaped by her perceived susceptibility to obstetric complications, the perceived severity of those complications, and her perceived self-efficacy in taking preventive action (Rosenstock, 1974). The Theory of Planned Behavior (TPB) further emphasizes that intention to act—in this case, to prepare for childbirth—is mediated by attitudes toward the behavior, subjective norms (the perceived expectations of significant others), and perceived behavioral control (Ajzen, 1991). These frameworks collectively inform the assessment of BPCR by highlighting cognitive, normative, and structural determinants of preparedness behavior.

Knowledge of Obstetric Danger Signs and BPCR

Knowledge of obstetric danger signs is foundational to BPCR because it determines whether a woman can recognize when normal pregnancy, labor, or the postpartum period transitions into a life-threatening emergency. Studies across sub-Saharan Africa have documented wide variation in this knowledge. In North Ethiopia, a study revealed that only 15.4% of women could spontaneously identify one key danger sign in pregnancy. In contrast, recognition of danger signs during labor and the postpartum period was even lower, underscoring the critical need for

antenatal health education (Tebekaw et al., 2018). Similarly, in Kyrgyzstan and Tajikistan, surveys found that knowledge of key danger signs during pregnancy and the postnatal period was dangerously inadequate, with most women unable to identify more than one or two critical warning signs. In contrast, community-based studies from urban India reported substantially higher awareness, with 79.2%, 78.5%, and 82.1% of women in Indore city recognizing at least one danger sign during pregnancy, labor, and for the newborn, respectively (Kabakyenga et al., 2014). Within Nigeria, Dako-Gyeke et al. (2015) found that only 28.3% of antenatal clients in southwestern Nigeria could identify four or more danger signs without prompting, while a study in southeastern Nigeria by Daniel et al. (2020) reported high general awareness (70.6%) but poor knowledge of specific, actionable danger signs. This distinction between awareness and actionable knowledge is clinically important: a woman may know that complications exist without knowing which specific symptoms require immediate emergency attention.

Attitude Toward BPCR Components

Attitudes toward BPCR components, including preferences for facility delivery, acceptance of skilled birth attendants, and spousal involvement in delivery planning, are critical mediators of preparedness behavior. Studies have shown that even where women hold positive attitudes toward antenatal care, they may simultaneously hold negative attitudes toward facility-based delivery, due to socio-cultural factors, prior negative experiences with health workers, or fear of cesarean delivery (Campbell et al., 2013). A field trial of birth preparedness packages in Nepal found that despite a two-year intervention, the proportion of women who viewed skilled attendance at birth as important remained stagnant at approximately 17–18%, largely due to entrenched preferences for home delivery and cost barriers (Pembe et al., 2014). In southwestern Nigeria, studies have documented that while women generally hold favorable attitudes toward antenatal care, their attitudes toward identifying transportation in advance and saving money for emergencies are more variable, influenced by household income levels, decision-making authority, and spousal support. Husbands' and partners' attitudes and involvement are among the strongest predictors of women's BPCR practices across sub-Saharan Africa, with male partner support significantly increasing the likelihood that a woman will deliver in a health facility with a skilled attendant (Kabakyenga et al., 2014).

Level of BPCR Implementation

The level of BPCR implementation, defined as the actual adoption of preparedness practices rather than merely expressed intentions, varies substantially across settings. In Adigrat Town, North Ethiopia, Tsegaye et al. (2016) found that only 22.1% of recently delivered women were well-prepared for birth and complications, with saving money (69%) and identifying a delivery site (77%) being the most common preparedness actions undertaken. In Kenya, Simkhada et al. (2018) documented relatively higher implementation, with 87.3% of antenatal clients knowing their expected delivery date, 84.3% setting aside transport funds, and 62.9% saving for emergencies. However, the gap between intention and action remained. In southwestern Nigeria, Lassi et al. (2015) found that 61% of pregnant women had adequate overall preparation for delivery. However, only 4.8% had made specific arrangements for emergency complications, highlighting the critical gap between general birth preparedness and emergency-specific readiness. Mpembeni et al. (2017) documented that in rural Tanzania, 92% of antenatal attendees identified a health facility for delivery, 83% saved money, 72% arranged a skilled birth attendant, but only 44% had knowledge of emergency preparedness contacts and procedures, reinforcing the finding that comprehensive BPCR implementation remains elusive even where individual components are reasonably well-practiced.

Factors Influencing BPCR

Research consistently identifies sociodemographic, economic, cultural, and health system factors as the primary determinants of BPCR practices. Educational attainment emerges as one of the most powerful predictors: literate women are approximately twice as likely to be well prepared for birth and complications as illiterate women, likely because education enhances access to health information, decision-making confidence, and financial literacy (Kabakyenga et al., 2014; WHO, 2019). Income and economic status are closely related: women from

lower-income households face structural barriers to saving money for delivery and to accessing transportation and quality health services. Cultural practices and beliefs represent significant contextual determinants. In many communities across Nigeria and sub-Saharan Africa, pregnancy and childbirth are viewed as normal physiological processes that do not require professional medical intervention, and cultural taboos may discourage discussions about obstetric complications (Dako-Gyeke et al., 2015). The role of traditional birth attendants (TBAs), while important for social support, may sometimes conflict with the uptake of facility-based delivery and skilled birth attendance. Health system factors, including facility availability and quality, provider attitudes, availability of emergency obstetric care services, and transport infrastructure, further mediate the relationship between intention and action in BPCR (Sialubanje et al., 2021). Low-income family and community support, particularly the absence of supportive spousal involvement, compounds individual-level barriers and reduces the likelihood that women will successfully implement BPCR plans (Mukora-Mutseyekwa et al., 2018).

Objectives of the Study

General Objective

The general objective of this study was to assess birth preparedness and complication readiness (BPCR) among pregnant women attending antenatal clinics in primary health care centers in Ede North Local Government Area, Osun State, Nigeria.

Specific Objectives

The specific objectives were to:

1. Assess the maternal level of knowledge of obstetric danger signs during pregnancy, labor, and the postpartum period.
2. Evaluate the attitudes of pregnant women toward the components of birth preparedness and complication readiness.
3. Determine the level of implementation of birth preparedness and complication readiness practices among pregnant mothers.
4. Identify factors affecting the implementation of birth preparedness and complication readiness among pregnant women in Ede North LGA.

III. METHODOLOGY

Study Design

A descriptive cross-sectional survey design was employed to assess birth preparedness and complication readiness among pregnant women attending antenatal clinics in primary health care centers in Ede North Local Government Area, Osun State, Nigeria. This design was appropriate because it allowed simultaneous collection of data on multiple variables at a single point in time, enabling assessment of knowledge, attitudes, implementation practices, and associated factors without requiring longitudinal follow-up.

Study Location

The study was conducted in the Ede North Local Government Area (LGA) of the Osun West Senatorial Zone in Osun State, Nigeria. The LGA has its administrative headquarters in Oja Timi and covers an area of approximately 111 km². According to the 2006 National Population Census, Ede North LGA had a population of 83,818, comprising 42,282 males and 41,536 females, with the Yoruba ethnic group constituting the majority. The LGA comprises 11 electoral wards and is bounded by Egbedore, Osogbo, Atakumosa West, and Ede South LGAs. Primary health care facilities serve as the primary point of contact for most pregnant women in the LGA.

Study Population

The study population consisted of all pregnant women attending antenatal care clinics in primary health care centers within Ede North LGA during the study period. The estimated target population for the study comprised 550 pregnant women registered across the PHC facilities in the LGA.

Sample Size Determination

The minimum sample size was calculated using the Yamane (1967) formula for finite populations:

$$n = N / [1 + N(e)^2]$$

Where: n = minimum required sample size; N = target population size (550); e = margin of error (0.05 at 95% confidence level).

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Substituting: $n = 550 / [1 + 550(0.05)^2] = 550 / [1 + 550(0.0025)] = 550 / [1 + 1.375] = 550 / 2.375 = 231.6 \approx 232$.

To account for potential non-response, incomplete questionnaires, and missing data, the sample size was conservatively reduced to 220 participants, representing a 94.8% effective sampling fraction of the calculated minimum. All 220 questionnaires administered were retrieved, yielding a response rate of 100%.

Sampling Technique

A two-stage sampling procedure was employed. In the first stage, five primary health care facilities were selected from all facilities in Ede North LGA using simple random sampling without replacement. In the second stage, pregnant women attending antenatal clinics at the selected facilities were recruited using simple random sampling, with selection proportional to the registered antenatal population at each facility, until the target sample of 220 was attained.

Data Collection Instrument

Data were collected using a structured, self-administered questionnaire developed based on the JHPIEGO (2004) BPCR assessment framework and adapted to the local socio-cultural context. The questionnaire was divided into five sections: Section A elicited sociodemographic information; Section B assessed knowledge of obstetric danger signs during pregnancy, labor, and the postpartum period; Section C evaluated attitudes toward BPCR components using a four-point Likert scale (Strongly Agree to Disagree Strongly); Section D assessed the level of implementation of BPCR practices; and Section E identified factors affecting BPCR implementation. The questionnaire was pre-tested among a comparable group of antenatal attendees outside the study area, and necessary modifications were made to improve clarity and reduce ambiguity.

Data Collection Procedure

Data collection was conducted over four weeks in 2023. Research assistants trained in the study instruments administered questionnaires to eligible participants after obtaining informed consent. Participants who required assistance due to literacy limitations were supported through interviewer-administered questionnaires, with questions read aloud and responses recorded by the research assistant without prompting.

Data Analysis

Data were entered, cleaned, and analyzed using the IBM Statistical Package for the Social Sciences (SPSS) version 20.0. Descriptive statistics—including frequencies, proportions, means, and standard deviations—were computed for all variables. Categorical variables were summarized using frequency counts and percentages. Chi-square (χ^2) tests were applied to assess associations between categorical variables, with statistical significance set at $p < 0.05$. Results are presented as frequency tables with accompanying narrative descriptions.

3.9 Ethical Considerations

Ethical approval for the study was obtained from the Research Ethics Committee of the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife. The officer-in-charge of each selected health facility granted administrative approval. Written informed consent was obtained from all participants prior to enrolment. Participants were assured of the confidentiality and anonymity of their responses and informed of their right to withdraw from the study at any time without consequences for their care. Questionnaire data were coded and stored securely with access restricted to authorized study personnel.

IV. RESULTS

A total of 220 structured questionnaires were administered to pregnant women attending antenatal clinics in primary health care centers in Ede North Local Government Area, Osun State, Nigeria. All 220 questionnaires were returned fully completed, yielding a 100% response rate. The results are presented below in accordance with the study's specific objectives.

Sociodemographic Characteristics of Respondents

Table 1: Sociodemographic Characteristics of Respondents (N = 220)

Variable	Category	Frequency (n)	Percentage (%)
Age Group	15–25	46	20.9

(years)			
	26–35	88	40.0
	36–45	75	34.1
	> 46	11	5.0
Marital Status	Single	88	40.0
	Married	110	50.0
	Divorced	22	10.0
	Widowed	0	0.0
Family Type	Monogamous	176	80.0
	Polygamous	44	20.0
Religion	Christianity	130	59.1
	Islam	70	31.8
	Traditional	20	9.1
Ethnicity	Yoruba	171	77.7
	Igbo	31	14.1
	Hausa	18	8.2
Level of Education	Tertiary	100	45.5
	Secondary	66	30.0
	Primary	39	17.7
	No Formal Education	15	6.8

Table 1 presents the sociodemographic profile of the 220 respondents. The majority (40.0%) were aged 26–35 years, indicating that the peak reproductive age group was well represented in the sample. Approximately 34.1% were aged 36–45 years, 20.9% were aged 15–25 years, and only 5.0% were 46 years or older. Regarding marital status, half (50.0%) were married, 40.0% were single, and 10.0% had experienced divorce, with no widowed respondents recorded. Most respondents (80.0%) belonged to monogamous households, while 20.0% were in polygamous unions. Christianity was the predominant religion, practiced by 59.1% of respondents, followed by Islam (31.8%) and traditional worship (9.1%). Ethnically, Yoruba respondents constituted the overwhelming majority (77.7%), consistent with the LGA's demographic composition, while Igbo (14.1%) and Hausa (8.2%) minorities were also represented. Educational attainment was relatively high: 45.5% had a tertiary education, 30.0% had completed secondary schooling, 17.7% had primary education only, and 6.8% had no formal education.

4.2 Knowledge of Obstetric Danger Signs During Pregnancy

Table 2: Knowledge of Danger Signs During Pregnancy (N = 220)

Danger Sign	Aware (n)	Aware (%)	Not Aware (n)	Not Aware (%)
Abdominal pain	165	75.0	55	25.0
Convulsions	134	60.9	86	39.1
Severe headache	128	58.2	92	41.8
Reduced fetal movement	124	56.4	96	43.6
Severe vaginal bleeding	115	52.3	105	47.7
Blurring of vision	115	52.3	105	47.7
Swollen hands and face	114	51.8	106	48.2

Table 2 summarizes respondents' knowledge of danger signs during pregnancy. Knowledge was moderate to good across all indicators assessed. Abdominal pain was the most widely recognized danger sign, with three-quarters (75.0%) of respondents correctly identifying it. Convulsions (60.9%), severe headache (58.2%), and reduced fetal movement (56.4%) were also recognized by more than half of respondents. Severe vaginal bleeding and blurring of vision were each correctly identified by 52.3% of respondents, while swollen hands and face were recognized by 51.8%. These findings indicate that while knowledge is present in the majority of the sample, a substantial minority, ranging from 25.0% to 48.2%, remains uninformed about each specific danger sign.

4.3 Knowledge of Danger Signs During Labor

Table 3: Knowledge of Danger Signs During Labor (N = 220)

Danger Sign	Aware (n)	Aware (%)	Not Aware (n)	Not Aware (%)
Severe vaginal bleeding	130	59.1	90	40.9
Convulsions	128	58.2	92	41.8
Retained placenta	113	51.4	107	48.6
Labor longer than 12 hours	112	50.9	108	49.1

Table 3 presents respondents' knowledge of danger signs during labor (intrapartum period). Severe vaginal bleeding was the most recognized intrapartum danger sign (59.1%), followed by convulsions (58.2%), retained placenta (51.4%), and labor lasting longer than 12 hours (50.9%). While more than half of respondents recognized each of these danger signs, near-equal proportions remained unaware, particularly for prolonged labor (49.1% unaware) and retained placenta (48.6% unaware), suggesting that health education during antenatal visits must more explicitly address these critical warning signs.

4.4 Knowledge of Danger Signs After Delivery

Table 4: Knowledge of Danger Signs After Delivery (N = 220)

Danger Sign	Aware (n)	Aware (%)	Not Aware (n)	Not Aware (%)
Severe vaginal bleeding (pad change > 2–3×/hour)	114	51.8	106	48.2
Foul-smelling vaginal discharge	113	51.4	107	48.6

Table 4 shows respondents' knowledge of postpartum danger signs. Severe vaginal bleeding (requiring pad change more than 2–3 times per hour) was recognized by 51.8% of respondents, while foul-smelling vaginal discharge was identified by 51.4%. Although the majority of respondents demonstrated awareness of these two critical postpartum warning indicators, the near-even split in recognition underscores the continued need for targeted postpartum danger sign counseling, particularly for women who may experience their most severe complications after leaving health facilities.

4.5 Attitude Toward Components of BPCR

Table 5: Attitude of Mothers Toward Components of Birth Preparedness and Complication Readiness (N = 220)

BPCR Component	Strongly Agree n (%)	Agree n (%)	Disagree n (%)	Strongly Disagree n (%)
The husband should be involved in the delivery planning	130 (59.1)	80 (36.4)	7 (3.2)	3 (1.3)
Regular ANC attendance prevents complications	107 (48.6)	98 (44.6)	10 (4.5)	5 (2.3)
Identify transport to the facility before labor	116 (52.7)	79 (35.9)	17 (7.7)	8 (3.7)
Identify the preferred place of delivery	99 (45.0)	92 (41.8)	20 (9.1)	9 (4.1)
Early booking is unimportant for 2nd+ pregnancies*	63 (28.6)	67 (30.5)	60 (27.3)	30 (13.6)

Table 5 displays respondents' attitudes toward key BPCR components measured on a four-point Likert scale. Attitudes were markedly positive across most components. The importance of spousal involvement in delivery planning received the highest level of agreement, with 59.1% strongly agreeing and 36.4% agreeing—a combined agreement rate of 95.5%. Similarly, 93.2% agreed that regular antenatal clinic attendance reduces the risk of complications (strongly agree: 48.6%; agree: 44.6%). The importance of pre-identifying transport to health facilities was affirmed by 88.6% (strongly agree: 52.7%; agree: 35.9%), and 86.8% agreed that pregnant women should identify their preferred delivery site in advance.

Notably, attitudes toward early ANC booking for subsequent pregnancies were more divided: 59.1% agreed that early booking is not essential for non-first pregnancies, reflecting a potentially harmful misconception about the universal importance of early ANC booking—a finding with direct implications for health education programming.

4.6 Level of Implementation of BPCR

Table 6: Level of Implementation of Birth Preparedness and Complication Readiness (N = 220)

BPCR Practice	Implemented n (%)	Not Implemented n (%)

Procured essential materials for facility delivery	208 (94.6)	12 (5.4)
Identified a birth companion for labor	198 (90.0)	22 (10.0)
Saved money for delivery/emergency expenses	196 (89.1)	24 (10.9)
Identified preferred delivery location	194 (88.2)	26 (11.8)
Identified a preferred skilled birth attendant	147 (66.8)	73 (33.2)

Table 6 presents the level of actual implementation of BPCR practices. Implementation was high across all assessed components. Procuring essential materials for health facility delivery was the most commonly implemented action, undertaken by 94.6% of respondents. Identifying a birth companion was reported by 90.0%, saving money for delivery-related expenses by 89.1%, and identifying a preferred delivery location by 88.2%. The lowest implementation rate, while still notable, was for identifying a preferred skilled birth attendant in advance (66.8%), suggesting that although most women plan the logistical aspects of delivery, the formal arrangement of skilled birth attendance requires reinforcement.

4.7 Factors Affecting BPCR Implementation

Table 7: Factors Affecting Birth Preparedness and Complication Readiness (N = 220)

Factor	Strongly Agree n (%)	Agree n (%)	Disagree n (%)	Strongly Disagree n (%)
Low education & income limit ANC access/resources	107 (48.6)	98 (44.6)	10 (4.5)	5 (2.3)
Cultural practices influence care-seeking behavior	107 (48.6)	98 (44.6)	10 (4.5)	5 (2.3)
Inadequate facilities/personnel/supplies limit access	93 (42.3)	67 (30.5)	30 (13.6)	30 (13.6)
Low-income family/community support affects BPCR	63 (28.6)	97 (44.1)	45 (20.5)	15 (6.8)
Age: younger, less prepared and older individuals face a higher risk	63 (28.6)	67 (30.5)	60 (27.3)	30 (13.6)

Note. Source: Field survey, 2023. Combined agreement rates: low education/income = 93.2%; cultural factors = 93.2%; inadequate facilities = 72.8%; poor community support = 72.7%; age = 59.1%.

Table 7 presents respondents' ratings of factors that affect BPCR implementation. The majority of respondents agreed that low education and income (93.2%), cultural practices and beliefs (93.2%), inadequate medical facilities and supplies (72.8%), and low-income family/community support (72.7%) were significant barriers to birth preparedness. The impact of maternal age on preparedness was more contested: while 59.1% agreed that younger women are less prepared and older women face higher risks of complications, 40.9% disagreed—reflecting differing lived experiences and perspectives on how age modulates BPCR practices.

V. DISCUSSION

Sociodemographic Profile

The sociodemographic profile of respondents in this study is broadly consistent with the demographic characteristics of women attending public sector antenatal care in southwestern Nigeria. The predominance of women in the 26–35-year age bracket (40.0%) reflects patterns documented in national-level surveys, which identify this age group as the core of the pregnant antenatal population. The high proportion of married respondents (50.0%) and those in monogamous unions (80.0%) suggests a relatively stable household context for birth planning, which prior studies have identified as a facilitating factor for BPCR implementation (Kabakyenga et al., 2014). The relatively high level of educational attainment, with 75.5% of respondents having completed secondary or tertiary education, distinguishes this sample from many rural populations documented in the literature and likely contributes to the higher-than-average BPCR implementation rates observed in this study. This finding aligns with the established literature demonstrating that education is among the most consistent predictors of BPCR practices (Kabakyenga et al., 2014; WHO, 2019).

Knowledge of Obstetric Danger Signs

This study found that knowledge of obstetric danger signs was moderate across the three phases of the perinatal period assessed (pregnancy, labor, and postpartum), with recognition rates generally exceeding 50% for each danger sign. Abdominal pain (75.0%), convulsions (60.9%), and severe headache (58.2%) were the most widely recognized danger signs during pregnancy. These findings are more favorable than those reported from North Ethiopia by Tebekaw et al. (2018), where fewer than 20% of women could spontaneously identify key danger signs, and from southwestern Nigeria by Dako-Gyeke et al. (2015), where only 28.3% could name four or more danger signs without prompting. However, they are somewhat below the average knowledge score of 86% documented in rural Tanzania by Mpembeni et al. (2017). The consistently near-even split in recognition rates across all danger signs (with approximately 48%–49% of women unaware of several key signs) underscores the persistent gap between adequate and comprehensive knowledge of danger signs in this population. This finding is consistent with the observation that facility-based antenatal education—while better than no education, may still be insufficient to achieve population-level awareness of the full spectrum of obstetric warning signs. Postpartum danger sign recognition was particularly limited: awareness of severe postpartum hemorrhage was 51.8%, and awareness of foul-smelling vaginal discharge as a danger sign stood at 51.4%. Given that over 60% of maternal deaths in developing countries occur in the postpartum period (WHO, 2016), enhanced postnatal health education is urgently warranted.

Attitudes Toward BPCR

Attitudes toward BPCR were remarkably positive overall, with high agreement rates for spousal involvement (95.5%), the value of antenatal clinic attendance (93.2%), pre-identification of transport (88.6%), and selection of a preferred delivery site (86.8%). The finding that 95.5% of women endorsed husband/partner involvement in delivery planning is particularly significant, as it represents one of the enabling conditions for household-level BPCR. This finding aligns with Tsegaye et al. (2016) and Tebekaw et al. (2018), who documented positive attitudes toward many BPCR components among southern Ethiopian women, and supports the conclusion of Kabakyenga et al. (2014) that spousal involvement is a critical enabler of preparedness behaviors. A notable exception was the widespread misconception that early antenatal booking is unnecessary for women in their second or subsequent pregnancies, a view endorsed by 59.1% of respondents. This finding is concerning from a public health perspective, as complications in subsequent pregnancies can be both unexpected and life-threatening, and early ANC booking enables timely screening, counseling, and risk stratification. This misconception should be explicitly addressed in health education sessions during antenatal care.

Level of BPCR Implementation

The level of BPCR implementation observed in this study was notably high, with four of the five assessed practices implemented by at least 88% of respondents. The highest implementation rates were recorded for procuring delivery materials (94.6%) and identifying a birth companion (90.0%), both of which are relatively low-cost and within individual or household control. Saving money for delivery expenses (89.1%) and identifying a preferred delivery site (88.2%) also demonstrated high implementation, reflecting positive household-level planning behaviors. These findings exceed those reported from similar sub-Saharan African contexts. In Adigrat, Ethiopia, Tsegaye et al. (2016) found that only 22.1% of women were well-prepared for birth and complications. In southern Ethiopia, Tebekaw et al. (2018) reported an even lower level of implementation. The higher educational attainment of respondents likely explains the relatively high implementation rates in this study, the peri-urban setting of Ede North, and the fact that respondents were actively engaged in the formal antenatal care system, a selection effect that may not be representative of non-attenders. These findings are more comparable to those from Kenya (Simkhada et al., 2018) and southwestern Nigeria (Lassi et al., 2015), where urban antenatal attendees demonstrated relatively higher implementation rates. The notably lower rate for identifying a preferred skilled birth attendant in advance (66.8%) warrants particular attention. This finding mirrors data from rural Tanzania, where Mpembeni et al. (2017) found that only 72% had formally arranged for skilled birth

attendance, despite high rates of facility identification. The gap between identifying a delivery site and formally arranging skilled attendance suggests that, while women plan to deliver in facilities, the specific process of engaging with and formally arranging care with a skilled provider remains an unmet component of comprehensive BPCR.

Factors Affecting BPCR Implementation

The factors identified as barriers to BPCR implementation in this study are consistent with the established international literature. Low education and income (93.2%) and cultural practices and beliefs (93.2%) were the most widely acknowledged barriers, followed by inadequate health facilities and personnel (72.8%) and low-income family and community support (72.7%). These findings align closely with Dako-Gyeke et al. (2015), who identified educational status as the best predictor of BPCR awareness in southwestern Nigeria, and with Mukora-Mutseyekwa et al. (2018), who documented that limited knowledge of danger signs and cultural norms were the primary barriers to BPCR in rural Zimbabwe. The finding that 72.8% of respondents identified inadequate health facilities, personnel, and supplies as a significant barrier is particularly important from a health systems perspective. This reflects the reality that BPCR implementation is not solely a function of individual knowledge and attitudes but is also constrained by supply-side deficiencies in the health system. As Sialubanje et al. (2021) observed, women with adequate access to antenatal care, skilled birth attendants, and emergency obstetric care demonstrated better preparedness and readiness. Strengthening the capacity of primary health care facilities in Ede North LGA is, therefore, a necessary complement to demand-side health education interventions.

VI. CONCLUSION AND RECOMMENDATIONS

Conclusion

This study assessed birth preparedness and complication readiness among pregnant women attending antenatal care clinics in primary health care centers in Ede North Local Government Area, Osun State, Nigeria. The findings demonstrate that knowledge of obstetric danger signs was moderate across the three perinatal phases, with significant proportions of women remaining uninformed about specific warning indicators. Attitudes toward BPCR components were highly positive, with near-universal endorsement of spousal involvement, facility delivery, and transport planning—though a harmful misconception about the necessity of early ANC booking for multigravid women was prevalent. Implementation of BPCR practices was high overall, particularly for procuring delivery materials, saving money, and identifying a delivery site, though formally arranging for skilled birth attendance remained a gap. Key barriers to implementation included low education and income, cultural beliefs, inadequate health facilities, and insufficient community support.

The study concludes that while birth preparedness and complication readiness are broadly practiced in this population, persistent knowledge gaps, implementation inconsistencies, and systemic barriers collectively sustain maternal health risks. A comprehensive, multi-level response addressing both demand-side knowledge and attitude gaps and supply-side health system deficiencies is essential to translate positive BPCR intentions into universal, comprehensive practice.

6.2 Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Strengthen antenatal health education: Health workers at PHC facilities should deliver structured, evidence-based counseling on the full spectrum of obstetric danger signs during each antenatal visit, with particular emphasis on postpartum warning signs and the importance of early ANC booking for all pregnancies, regardless of parity.

2. Expand community-based health education: Community health workers, village health teams, and trained traditional birth attendants should be deployed to deliver BPCR information to women who may not be reached through facility-based antenatal care, using culturally appropriate communication strategies.

3. Engage male partners: Spousal involvement programs should be formally integrated into antenatal care services in Ede North LGA, including designated couple counseling sessions focused on birth planning, emergency preparedness, and financial saving for delivery and obstetric emergencies.

4. Strengthen PHC infrastructure: Government at all levels should prioritize the recruitment and retention of skilled health workers, provision of essential medicines and supplies, and improvement of transport infrastructure serving PHC facilities in Ede North LGA and comparable settings.

5. Implement free maternal health care: Universal free maternal care—including antenatal, intrapartum, and postnatal services—should be institutionalized and consistently enforced to remove financial barriers to facility delivery and emergency obstetric care.

6. Address cultural barriers: Targeted social behavior change communication campaigns should be developed in collaboration with community leaders, religious institutions, and traditional birth attendants to address cultural norms that discourage facility delivery or delay emergency care-seeking.

7. Future research: Longitudinal and community-based studies are recommended to assess BPCR practices among women who do not attend antenatal care and to evaluate the impact of targeted BPCR interventions on maternal and neonatal health outcomes in Ede North LGA and similar settings.

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