

Risk Perception and Preventive Practices of Anemia among Pregnant Women Attending Antenatal Clinics in Ilorin Metropolis, Nigeria

Hafsat Abolore AMEEN., Elizabeth Ogandima EBOH., Angela Adaku ELEGBUA., Olanrewaju Olawale MUSBAU., Zainab Ajoke JIMOH., Issa Babatunde AREMU., Hadijat Olaide RAJI., Sunday Adedeji ADERIBIGBE

Department of Epidemiology and Community Health, Faculty of Clinical Sciences, College of Health Sciences, University of Ilorin

DOI: <https://doi.org/10.51244/IJRSI.2026.1315PH00035>

Received: 13 February 2026; Accepted: 18 February 2026; Published: 28 February 2026

ABSTRACT

Background:

Anemia in pregnancy remains a significant public health burden in Nigeria and is a major contributor to maternal and perinatal morbidity and mortality. Despite routine antenatal care (ANC) services, substantial gaps persist between awareness, knowledge, risk perception, and preventive behaviors. This study assessed knowledge, risk perception, preventive practices, and their determinants among pregnant women attending ANC in Ilorin Metropolis, Nigeria.

Methods:

A facility-based cross-sectional analytical study was conducted among 407 pregnant women selected through a multistage sampling technique. Data were collected using a structured, validated interviewer-administered questionnaire adapted from the extended Theory of Planned Behavior model and a Food Frequency Questionnaire. Descriptive statistics summarized key variables. Associations were examined using Chi-square tests, and independent predictors were identified through multivariable logistic regression. Adjusted Odds Ratios (AORs) with 95% Confidence Intervals (CIs) were computed. Statistical significance was set at $p < 0.05$.

Results:

Although 70.3% of respondents reported awareness of anemia, only 15.5% correctly defined the condition and 9.3% demonstrated high perceived susceptibility. Despite 86% reporting balanced dietary intake and over half indicating supplement use, 55% exhibited poor overall preventive practices. Secondary education independently predicted good preventive practices (AOR = 1.97; $p = 0.009$).

Conclusion:

Awareness of anemia does not translate into adequate knowledge, risk perception, or sustained preventive behavior. Strengthening personalized risk communication within ANC, integrating theory-informed behavior change strategies, and addressing structural barriers to supplementation are critical for improving anemia prevention and advancing maternal health outcomes.

Keywords: Anemia in Pregnancy; Risk Perception; Preventive Practices; Antenatal Care; Maternal Health

INTRODUCTION

Anemia in pregnancy remains a critical global health issue, significantly contributing to maternal and neonatal morbidity and mortality. The World Health Organization (WHO) estimates that 37% of pregnant women globally are anemic, with higher burdens in low- and middle-income countries due to nutritional deficiencies, infections, and inadequate healthcare access [1].

In Nigeria, anemia affects more than 55% of pregnant women, driven by poor nutrition, malaria, and socio-economic constraints [2,3]. While antenatal care aims to reduce this burden through education and supplementation, many women fail to adopt effective preventive practices.

Existing studies show that knowledge alone does not guarantee behavior change; risk perception and psychosocial factors are crucial in shaping preventive health actions [4,5]. Understanding how pregnant women perceive and respond to anemia risk can guide context-specific interventions.

Objectives

This study aimed to assess the knowledge of anemia among pregnant women attending antenatal clinics in Ilorin Metropolis. It further sought to determine the level of risk perception regarding anemia in pregnancy among these women and to examine the preventive practices they adopt to mitigate anemia-related risks. Additionally, the study aimed to identify socio-demographic and other influencing factors associated with knowledge, risk perception, and preventive practices concerning anemia during pregnancy.

Justification

Despite regular attendance at antenatal care (ANC) services, significant gaps persist between knowledge and actual preventive behaviors among pregnant women. Understanding the dynamics of risk perception and behavioral determinants is essential for designing effective and targeted public health interventions. By exploring these factors within the context of Ilorin Metropolis, this study provides evidence that can guide improvements in maternal health education, risk communication, and anemia prevention strategies.

Research Questions

This study sought to answer key questions regarding anemia in pregnancy among women attending antenatal clinics in Ilorin Metropolis. Specifically, it explored the level of knowledge pregnant women possess about anemia, including its causes, symptoms, and prevention. It also examined how these women perceive their personal risk of developing anemia during pregnancy. Furthermore, the study investigated the preventive practices adopted by pregnant women to mitigate anemia-related risks and assessed the socio-demographic and contextual factors influencing knowledge, risk perception, and preventive behaviors.

Research Hypotheses

This study was guided by the null hypotheses that there is no statistically significant association between the level of knowledge and preventive practices regarding anemia among pregnant women attending antenatal clinics in Ilorin Metropolis. It also hypothesized that there is no statistically significant association between socio-demographic characteristics and preventive practices related to anemia among these women.

METHODS

Study Design and Setting

A cross-sectional analytical study was conducted between November 2024 and January 2025 in Ilorin Metropolis, comprising Ilorin East, Ilorin South, and Ilorin West Local Government Areas of Kwara State, Nigeria. The metropolis features both urban and peri-urban populations with multiple healthcare facilities providing antenatal services.

Study Population

Pregnant women aged 15-49 years attending ANC in selected public health facilities were eligible. Women with hematologic disorders unrelated to anemia were excluded.

Sample Size and Sampling Technique

The sample size was calculated using the Cochran formula for cross-sectional studies estimating a single population proportion. A conservative prevalence estimate of 50% was assumed for adequate knowledge of anemia among pregnant women, given the absence of precise local baseline data. This assumption maximizes sample size and enhances statistical power. Using a 95% confidence level ($Z = 1.96$) and a margin of error of 5%, the minimum required sample size was computed. The calculated value was adjusted for the finite population of antenatal clinic attendees within the study area and further increased by 10% to account for potential non-response or incomplete questionnaires, resulting in a final sample size of 407 participants.

A multistage sampling technique was utilized to ensure representativeness across the three Local Government Areas (LGAs) within Ilorin Metropolis. In the first stage, one public healthcare facility offering antenatal services was randomly selected from each LGA. In the second stage, proportional allocation was applied based on the average antenatal clinic attendance in each selected facility to determine the number of respondents recruited per site. In the final stage, systematic random sampling was employed to select eligible pregnant women attending the clinics during the study period, using a predetermined sampling interval derived from daily attendance registers.

Data Collection Instrument

Data were collected using a structured, pre-tested interviewer-administered questionnaire adapted from two validated instruments: a 45-item extended Theory of Planned Behavior (eTPB) questionnaire [6] and a validated Food Frequency Questionnaire (FFQ) [7]. The adapted instrument comprised five sections assessing socio-demographic characteristics, knowledge of anemia, risk perception, preventive practices, and influencing factors. To ensure contextual relevance and methodological rigor, the questionnaire underwent expert review for content validity, pilot testing in a comparable setting, and internal consistency assessment, demonstrating strong reliability (Cronbach's $\alpha > 0.8$).

Data Analysis

Data were cleaned, coded, and entered into IBM Statistical Package for the Social Sciences (SPSS) version 27 for analysis. Descriptive statistics were computed to summarize socio-demographic characteristics and key study variables, including knowledge, risk perception, and preventive practices. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations where appropriate.

Knowledge, risk perception, and preventive practice scores were computed based on predefined scoring criteria. Composite scores were categorized into levels (e.g., good, fair, poor; high vs. low) using established cut-off thresholds.

Bivariate analysis was conducted using the Chi-square (χ^2) test of independence to examine associations between categorical independent variables (such as age, education, parity, religion, and gestational age) and outcome variables (knowledge level, risk perception, and preventive practices).

Variables found to be statistically significant at the bivariate level ($p < 0.05$) were included in a multivariable binary logistic regression model to identify independent predictors of good preventive practices. Adjusted Odds Ratios (AORs) with 95% Confidence Intervals (CIs) were computed to quantify the strength of associations while controlling for potential confounders. Statistical significance was set at $p < 0.05$, and all tests were two-tailed.

Ethical Considerations

Ethical approval for this study was obtained from the Ethical Review Committee of the University of Ilorin (Approval Number: UERC/ASN/2024/2992). The study adhered to the principles outlined in the Declaration of Helsinki for research involving human participants.

Prior to data collection, written informed consent was obtained from all eligible participants after providing a detailed explanation of the study's objectives, procedures, potential risks, and benefits. Participation was entirely voluntary, and respondents were informed of their right to decline participation or withdraw from the study at any stage without any consequences to their access to healthcare services.

Confidentiality and anonymity were strictly maintained throughout the study. No personally identifiable information was recorded on the questionnaires, and completed instruments were securely stored and accessible only to the research team. Data were entered into password-protected electronic databases to ensure privacy and data security.

RESULTS

Table 1: Socio-Demographic Characteristics of Respondents

Most respondents (mean age = 28 ± 5 years) were married, Yoruba, urban dwellers, and tertiary-educated. Monthly income remained low, with over half earning below ₦50,000.

Table 2a–2b: Knowledge of Anemia

Awareness of anemia was high (70%), but only 15.5% correctly defined it. Fewer than 10% showed comprehensive understanding of anemia prevention.

Figure 1: Level of Knowledge of Anemia in Pregnancy among Respondents

Most respondents (74.4%) had fair knowledge, 24.1% poor, and only 1.5% good.

Figure 2 & 3: Risk Perception of Anemia

Although 75% acknowledged anemia's risks, only 35% perceived themselves personally at risk; 9.3% exhibited high risk perception.

Figure 4: Preventive Practices

While 86% reported eating balanced diets and 60% received anemia education during ANC, only 29% had dewormed recently, indicating behavior–knowledge gaps.

Table 3: Predictors of Preventive Practices

Binary logistic regression identified secondary education (AOR = 1.97, $p = 0.009$) as a significant predictor of good preventive behavior.

DISCUSSION

This study demonstrates a marked disparity between awareness, accurate knowledge, and preventive behaviors regarding anemia among pregnant women in Ilorin Metropolis. Although the majority of respondents reported having heard of anemia, substantially fewer demonstrated accurate understanding of its causes, prevention, or personal susceptibility. This finding underscores the persistent gap between exposure to health information and meaningful comprehension.

Consistent with previous African studies [8,9], knowledge alone did not reliably translate into preventive action. Notably, only 9% of respondents perceived themselves as personally vulnerable to anemia, suggesting inadequate risk communication during antenatal care (ANC) encounters. Without a strong sense of perceived susceptibility, behavioral change is unlikely, even in the presence of general awareness.

Educational attainment emerged as an important determinant of preventive behavior, with secondary education significantly associated with improved practices. However, even among women with tertiary education,

preventive behaviors were suboptimal. This suggests that structural, socioeconomic, and health-system constraints—such as limited access to supplements, inconsistent counseling, and financial barriers—may undermine the translation of knowledge into sustained action.

Addressing anemia in pregnancy therefore requires a multidimensional approach that integrates structured health promotion, strengthened ANC counseling, male-partner engagement, and community-level education. In addition, system-level improvements, including reliable supplement supply chains and consistent provider communication, are critical for sustained preventive outcomes.

Implications for Policy and Practice

The findings highlight the need for targeted and participatory health education strategies within ANC services. Healthcare providers should adopt interactive counseling approaches supported by culturally relevant materials and visual aids to enhance understanding and retention. Strengthening risk communication through provider training is equally important, enabling healthcare workers to personalize discussions of anemia risk and reinforce perceived susceptibility.

Community engagement strategies, including male-partner involvement and the mobilization of community health workers, may help address sociocultural barriers that influence maternal health behaviors. Furthermore, sustained improvements in anemia prevention depend on strengthening health systems, particularly ensuring reliable availability of iron-folic acid supplements, deworming medications, and malaria prevention tools. Integrated behavioral and structural interventions are therefore essential to achieving measurable reductions in anemia prevalence.

Limitations

This study is subject to certain limitations. The cross-sectional design precludes causal inference and limits the ability to determine temporal relationships between knowledge, risk perception, and preventive practices. Additionally, reliance on self-reported data introduces the possibility of recall and social desirability biases, potentially leading to overestimation of preventive behaviors. Future research employing longitudinal or mixed-method designs, including objective biomarker assessments, would provide deeper insight into causal pathways and contextual influences.

CONCLUSION

Although awareness of anemia among pregnant women in Ilorin Metropolis is relatively high, actionable knowledge, risk perception, and consistent preventive practices remain inadequate. Bridging this knowledge–practice gap requires integrated, culturally responsive, and behaviorally informed interventions supported by strengthened health systems. Enhancing personalized risk communication, community engagement, and reliable access to preventive commodities is critical to improving maternal and neonatal outcomes and advancing maternal health priorities in Nigeria.

REFERENCES

1. World Health Organization. Anaemia [Internet]. Geneva: World Health Organization; 2025 Feb 10. Available from: <https://www.who.int/news-room/fact-sheets/detail/anaemia#:~:text=Key%20facts,age%20are%20affected%20by%20anaemia>
2. Okunade KS, Olowoselu FO, Oyedeji OA, Oshodi YA, Ugwu AO, Olumodeji AM, et al. Prevalence and determinants of moderate to severe anaemia in the third trimester of pregnancy: a multicenter cross-sectional study in Lagos, Nigeria. *Sci Rep.* 2024;14(1):11411. doi:10.1038/s41598-024-11411-x
3. Dairo MD, Lawoyin TO. Socio-demographic determinants of anemia in pregnancy. *Afr J Med Med Sci.* 2012;41(3):161–165. Available from: <http://adhlui.com.ui.edu.ng/handle/123456789/2548>

4. Balcha WF, Eteffa T, Arega Tesfu A, Abeje Alemayehu B. Maternal knowledge of anemia and adherence to its prevention strategies: A health facility-based cross-sectional study design. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*. 2023 Apr;60:00469580231167731
5. Appiah PK, Nkuah D, Bonchel DA. Knowledge of and adherence to anaemia prevention strategies among pregnant women attending antenatal care facilities in Juaboso District in Western North Region, Ghana. *J Pregnancy*. 2020;2020:2139892.
6. Alem AZ, Efendi F, McKenna L, Felipe Dimog EB, Chilot D, Tonapa SI, et al. Prevalence and factors associated with anemia in women of reproductive age across low- and middle-income countries based on national data. *Sci Rep*. 2023;13(1):20335. doi:10.1038/s41598-023-46739-z
7. Aboud SA, El Sayed HA, Ibrahim HF. Knowledge, attitude, and practice regarding prevention of iron deficiency anemia among pregnant women in Tabuk region. *Int J Pharm Res Allied Sci*. 2019;8(2):123–132.
8. Boti N, Bekele T, Godana W, Getahun E, Gebremeskel F, Tsegaye B, et al. Adherence to iron folate supplementation and associated factors among pastoralist pregnant women in Southern Ethiopia: community-based cross-sectional study. *Int J Reprod Med*. 2018;2018:2365362. doi:10.1155/2018/2365362
9. Morrison J, Giri R, Arjyal A, Kharel C, Harris-Fry H, James P, et al. Addressing anaemia in pregnancy in rural plains Nepal: a qualitative formative study. *Matern Child Nutr*. 2021;17:e13170. doi:10.1111/mcn.13170

Table 1: Socio-Demographic Characteristics of Respondents (n = 407)

Variable	Category	Frequency (n)	Percentage (%)
Age Group (years)	15–25	173	42.5
	26–35	186	45.7
	36 and above	48	11.8
	Mean ± SD	27.9 ± 6.1	
Marital Status	Single	70	17.2
	Married	320	78.6
	Divorced/Widowed	17	4.2
Religion	Christian	141	34.6
	Muslim	258	63.4
	Others	8	2.0
Residence	Urban	255	62.7
	Rural	152	37.3
Ethnicity	Yoruba	333	81.9
	Others	74	18.1
Family Type	Monogamous	296	72.7
	Polygamous	111	27.3

Educational Level	None/Primary	58	14.5
	Secondary	85	20.9
	Tertiary	263	64.6
Occupation	Unemployed/Student	108	26.5
	Civil Servant/Artisan	153	37.6
	Trader	146	35.9
Average Monthly Income (₦)	≤ ₦20,000	149	36.6
	₦21,000–₦50,000	144	35.4
	> ₦50,000 or None	114	28.0

Table 2a: Knowledge about Anemia in pregnancy among respondents

Knowledge about anemia in pregnancy	Frequency	Percentage (%)
Have you ever heard of anemia?		
No	88	21.6
Yes	286	70.3
Not sure	33	8.1
Total	407	100.0
If yes, where?		
School	26	6.4
Antenatal clinic	234	57.5
Social media	15	3.7
Others	132	32.4
Total	407	100.0
Anemia is the decrease of RBCs?		
Yes	63	15.5
No	267	65.6
Not sure	77	18.9
Total	407	100.0
What do you think causes anemia?		

Poor diet	84	20.6
Severe blood loss	50	12.3
Genetic factors	25	6.1
Chronic diseases	20	4.9
Infections	19	4.7
Malaria	21	5.2
Others	19	4.7
Multiple answers	120	29.5
Don't know	49	12.0
Total	407	100.0
Knowledge of anemia symptoms?		
Yes	212	52.1
No	195	47.9
Total	407	100.0

Table 2b: Knowledge about Anemia in pregnancy among respondents

Knowledge about anemia in pregnancy	Frequency	Percentage (%)
Uses of mosquito net?		
Yes	243	59.7
No	164	40.3
Total	407	100.0
Dewormed recently?		
Yes	118	29.0
No	289	71.0
Total	407	100.0
Can anemia affect pregnancy?		
Yes	300	73.7
No	37	9.1
Not sure	70	17.2

Total	407	100.0
Is anemia a fatal condition?		
Yes	269	66.1
No	48	11.8
Not sure	90	22.1
Total	407	100.0
Can anemia be prevented?		
Yes	291	71.5
No	41	10.1
Not sure	75	18.4
Total	407	100.0
How can anemia be prevented?		
Eating balance diet	108	26.5
Eating balance diet and the use of supplements	12	2.9
Use of insecticide treated net	5	1.3
Others	96	23.6
No idea	186	45.7
Total	407	100.0

Table 3: Preventive Practice of Anemia in Pregnancy among respondents

Variables	Frequency	Percentage (%)
Do you take balanced diet?		
Yes	350	86.0
No	57	14.0
Total	407	100.0
Are you currently taking any supplements to prevent or treat anemia?		
Yes	223	54.8
No	184	45.2

Total	407	100.0
What types of food do you consume regularly to prevent anemia?		
Protein, fruits, and vegetables	45	11.1
Balanced diet	40	9.8
Protein	30	7.4
Don't know	186	45.7
Others	106	26.0
Total	407	100.0
Do you attend ANC regularly?		
Yes	318	78.1
No	89	21.9
Total	407	100.0
Have you received any health education about anemia during your antenatal visits?		
Yes	239	58.7
No	168	41.3
Total	407	100.0
Do you follow the dietary advice given by your healthcare provider?		
Always	278	68.3
Sometimes	107	26.3
Never	22	5.4
Total	407	100.0

Table 4: Socio-Demographic Factors Influencing Level of Knowledge of Anemia among Respondents

Variables	Poor Knowledge Level	Fair Knowledge Level	Good Knowledge Level	χ^2	df	p-value
Religion				20.133	4	<0.001*
Christian	27 (6.6%)	114 (28.0%)	1 (0.3%)			
Muslim	71 (17.4%)	186 (45.7%)	4 (1.0%)			

Others	0 (0.0%)	3 (0.7%)	1 (0.3%)			
Level of Education				5.136	6	0.527
No formal education	7 (1.7%)	15 (3.6%)	0 (0.0%)			
Primary	6 (1.5%)	30 (7.4%)	1 (0.3%)			
Secondary	24 (5.9%)	59 (14.5%)	0 (0.0%)			
Tertiary	61 (15.0%)	199 (48.9%)	5 (1.2%)			
Tribe				7.641	6	0.266
Yoruba	85 (20.8%)	243 (59.7%)	4 (1.0%)			
Nupe	6 (1.5%)	19 (4.6%)	1 (0.3%)			
Hausa	1 (0.3%)	19 (4.6%)	1 (0.3%)			
Others	6 (1.5%)	22 (5.4%)	0 (0.0%)			
Parity				3.959	12	0.984
1	49 (12.0%)	144 (35.4%)	2 (0.5%)			
2	23 (5.7%)	89 (21.8%)	2 (0.5%)			
3	15 (3.7%)	34 (8.3%)	1 (0.3%)			
4	7 (1.7%)	24 (5.9%)	1 (0.3%)			
5	2 (0.5%)	7 (1.7%)	0 (0.0%)			
6 and above	2 (0.5%)	5 (1.2%)	0 (0.0%)			
Gestational Age				17.714	8	0.029*
10–20 Weeks	7 (1.7%)	40 (9.8%)	3 (0.7%)			
21–30 Weeks	22 (5.4%)	75 (18.4%)	0 (0.0%)			
31–40 Weeks	28 (6.9%)	104 (25.5%)	2 (0.5%)			
≥40 Weeks	11 (2.7%)	20 (5.0%)	0 (0.0%)			
Don't know	30 (7.4%)	64 (15.7%)	1 (0.3%)			

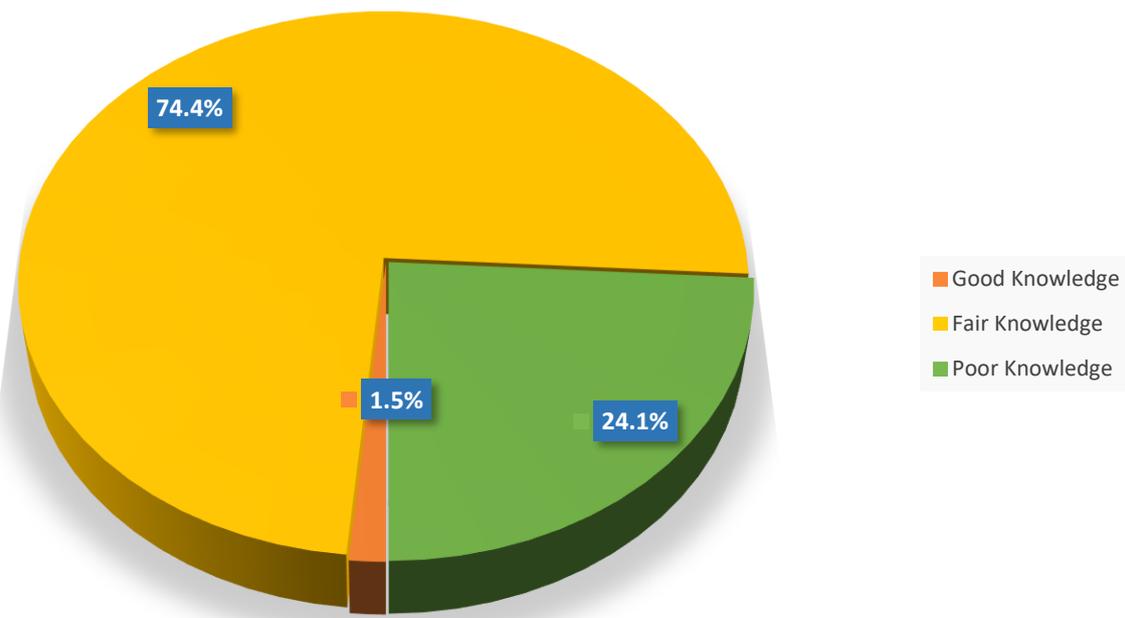


Figure 1: Level of knowledge of anemia in pregnancy among respondents

Figure 1 indicates that the majority of respondents (n = 303, 74.4%) demonstrated a fair level of knowledge regarding anemia in pregnancy. A smaller proportion (n = 98, 24.1%) exhibited poor knowledge, while only a minimal fraction (n = 6, 1.5%) possessed good knowledge—accounting for less than 10% of the total sample.

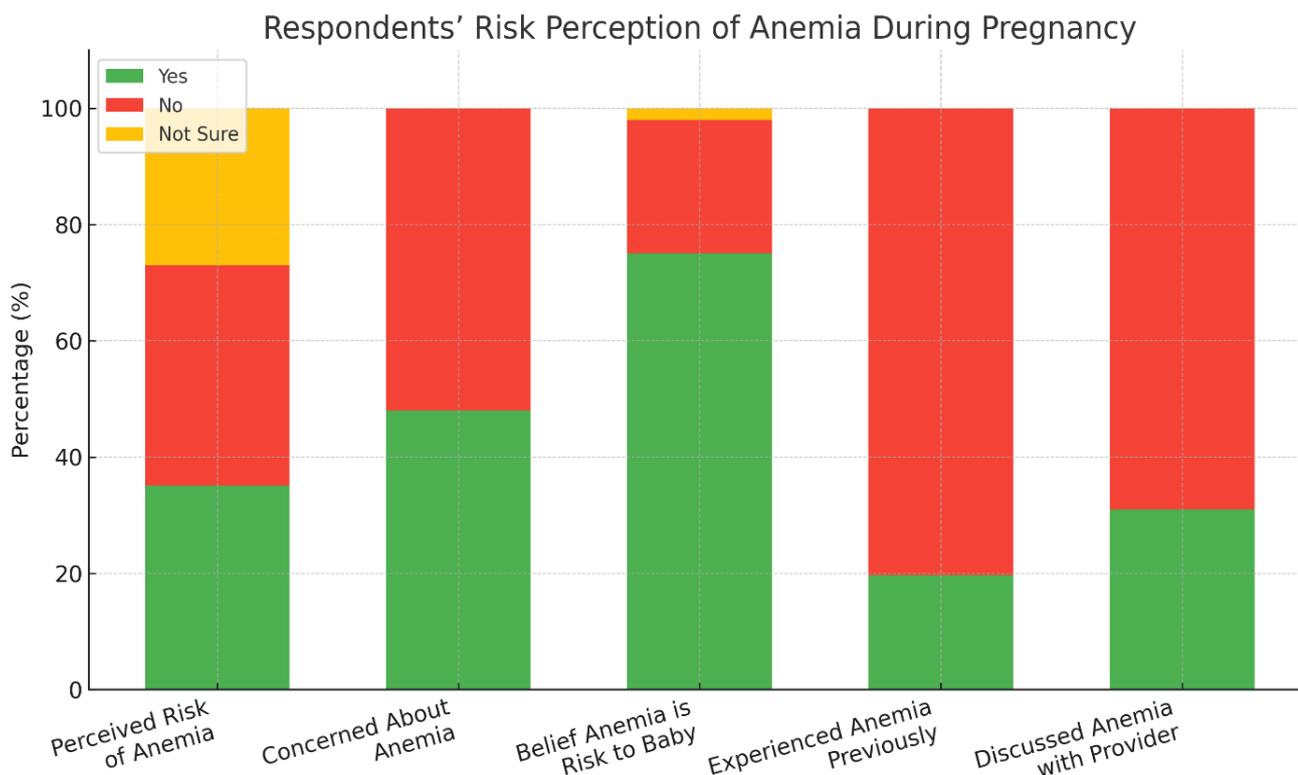


Figure 2: Respondents' Risk Perception of Anemia During Pregnancy

Figure 2 shows that 75.1% of respondents believe anemia poses a risk to mother and baby, yet only 35.1% perceived themselves personally at risk, and 27.0% were unsure. While 48.0% expressed concern, only 31.0% had discussed anemia with a healthcare provider, and just 19.7% had prior experience.

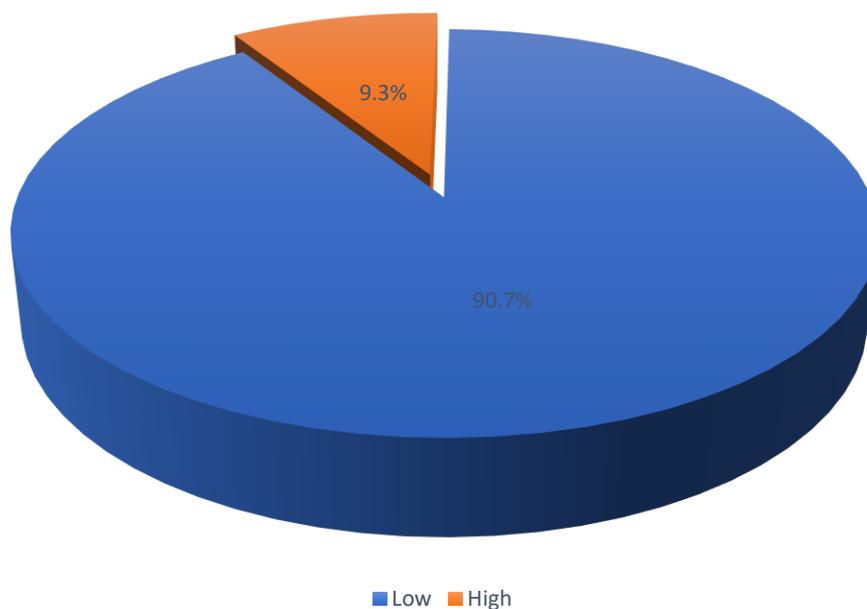


Figure 3: Level of risk perception of anemia among respondents

Figure 3 illustrates that the vast majority of respondents ($n = 369, 90.7\%$) exhibited a low level of risk perception regarding anemia, whereas only a small fraction ($n = 38, 9.3\%$) demonstrated a high level of risk perception, representing less than one-tenth of the study population.

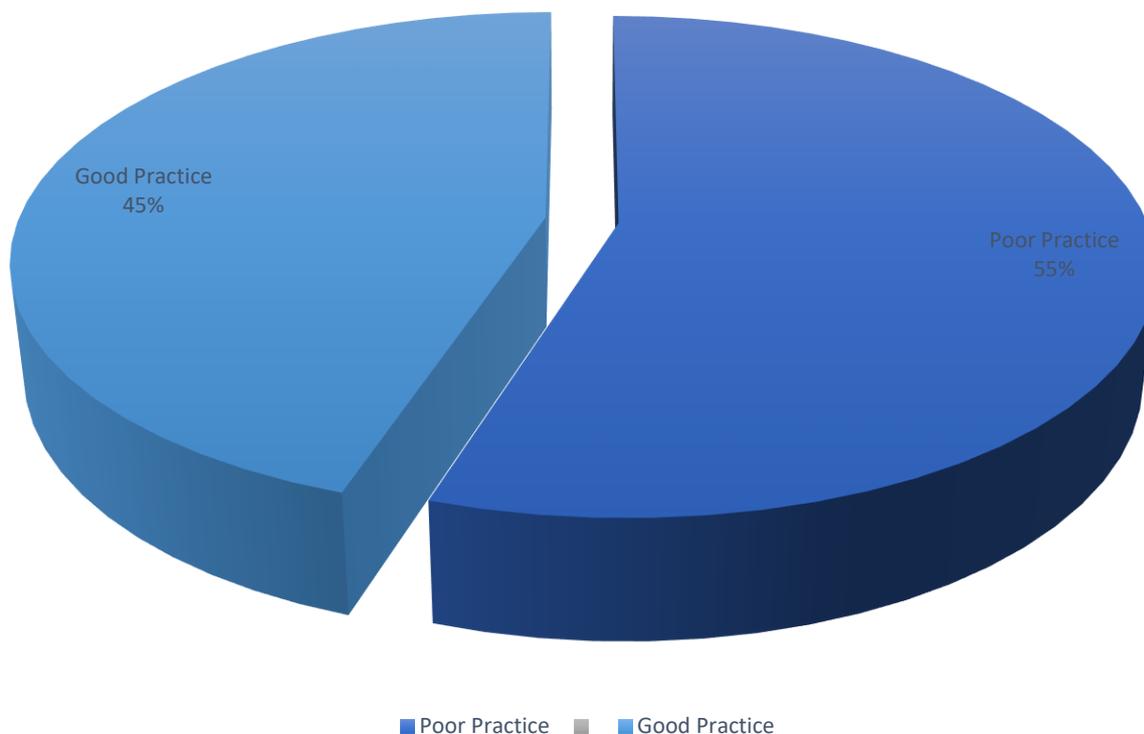


Figure 4: Level of anemia prevention practices among respondents

Figure 4 reveals that a majority of respondents ($n = 224, 55\%$) demonstrated poor preventive practices related to anemia, whereas a smaller proportion ($n = 183, 45\%$) exhibited good practice behaviors.