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EFFECTIVENESS OF INDIGENOUS FOOD-BASED NUTRITION VERSUS IMPORTED SUPPLEMENTS ON PREGNANCY OUTCOMES AMONG RURAL WOMEN IN ONDO STATE, NIGERIA

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Abstract

This study investigates the comparative effectiveness of indigenous food-based nutrition; fish, snails, seafoods, and bush meats—versus imported supplements among pregnant women in rural Ondo State, Nigeria. Using a cross-sectional design, 250 women were surveyed with structured questionnaires, 24-hour dietary recall forms, and anthropometric measurements, while haemoglobin levels were assessed to determine anaemia prevalence. Findings revealed that indigenous diets, particularly those incorporating protein-rich sources such as fish, snails, seafoods, and bush meats, were associated with higher mean MUAC (27.1 cm), better haemoglobin levels (68% normal), and lower anaemia prevalence (11%) compared to supplement users (24.1 cm MUAC, 42% normal haemoglobin, 25% anaemia). Despite the nutritional richness of these foods, cultural taboos—such as beliefs that snails cause “sluggish babies” or bush meats prolong labour—restricted dietary diversity, while economic and seasonal constraints limited consistent access. The study concludes that food-based interventions, integrated into antenatal care and supported by culturally sensitive education, are more effective than supplement reliance in improving maternal outcomes in rural Ondo State.

Keywords: Antenatal care, indigenous foods, maternal nutrition, Ondo State, pregnancy outcomes,

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Background

Maternal nutrition during pregnancy is a critical determinant of maternal and neonatal outcomes. In Nigeria, malnutrition and poor dietary behaviour among women of reproductive age remains a pressing challenge, particularly in rural communities where food insecurity and cultural practices shape dietary behaviours. Recent studies in Ondo State reveal a double burden of malnutrition, with under nutrition coexisting alongside rising overweight and obesity rates. Adedayo et al. (2024) reported that 10.7% of women were undernourished while 29% were overweight, reflecting nutritional imbalance. Gbayisemore et al. (2025) found that 93.3% of households in Irele and Okitipupa Local Government Areas (LGAs) were food insecure, with maternal overweight (58.4%) coexisting with child stunting (39.3%). Bodunrin & Ariyo (2026) further demonstrated that while antenatal nutrition counselling improved knowledge, cultural myths continued to restrict dietary diversity.

Ondo State is richly endowed with indigenous foods, including yam, garri, eba, beans, leafy vegetables, fish, snails, seafoods, and bush meats. These foods are naturally nutrient-dense and capable of sustaining maternal health. However, cultural taboos and low-level income remain a significant barrier. For example, snails are avoided due to beliefs

that they cause “sluggish babies,” while bush meats are linked to fears of prolonged labour. Authorities (Peltó & Armar-Klemesú, 2024; WHO, 2025) have confirmed that such cultural taboos are widespread barriers to maternal nutrition in low-resource settings.

At the same time, imported supplements are inconsistently available and often unaffordable. Black et al. (2024) and UNICEF (2025) emphasize that food-based interventions outperform supplement-only strategies in improving maternal outcomes. Thus, the nutritional potential of indigenous foods in Ondo State remains underutilized, leaving pregnant women vulnerable to anaemia, low birth weight, and other complications.

Statement of the Problem

Despite the abundance of indigenous foods such as fish, snails, seafoods, and bush meats in rural Ondo State, maternal nutrition remains inadequate. Cultural taboos against these protein-rich foods, combined with economic and seasonal constraints, restrict dietary diversity and undermine maternal health. Adedayo et al. (2024) highlighted nutritional imbalance among rural women, while Gbayisemore et al. (2025) documented widespread food insecurity. Bodunrin & Ariyo (2026) showed that even with antenatal counselling, cultural myths persist, limiting the adoption of balanced diets.

In the same thought, (Pelto & Armar-Klemesu, 2024; WHO, 2025; Black et al., 2024; UNICEF, 2025) confirms that food-based approaches are more effective than supplement reliance in improving maternal outcomes. Yet, in Ondo State, crave and reliance on imported supplements continues, despite their limited accessibility and lower effectiveness compared to indigenous diets.

Consequently, maternal anaemia, low birth weight, and preventable pregnancy complications remain prevalent. Without evidence-based interventions that leverage indigenous foods; particularly fish, snails, seafoods, and bush meats—while addressing cultural barriers, maternal health outcomes in rural Ondo State will continue to lag behind national and global targets of the SDG 3 for reducing maternal and neonatal morbidity.

Research Design

This study adopted a cross-sectional survey design to examine the comparative effectiveness of indigenous food-based nutrition and imported supplements on pregnancy outcomes among rural women in Ondo State. The design was chosen because it allows for the collection of quantitative and qualitative data at a single point in time, providing a snapshot of maternal dietary practices, nutritional status, and pregnancy outcomes.

Study Area

The research was conducted in selected rural communities across Ondo State, Nigeria, with emphasis on local government areas (LGAs) such as Okitipupa, Irele, and Akure North. These areas were chosen due to their high prevalence of food insecurity and reliance on indigenous dietary practices, as documented in recent maternal health studies.

Population and Sampling

The target population comprised pregnant women attending antenatal clinics in rural health facilities, as well as those assisted by traditional birth attendants (TBAs).

- A sample size of 250 women was determined using Cochran's formula for cross-sectional studies, ensuring statistical representativeness.
- Purposive sampling was used to select rural communities, while systematic random sampling was applied to recruit participants from antenatal registers.

Data Collection Instruments

1. Structured Questionnaire: Captured socio-demographic data, dietary practices, supplement use, and cultural beliefs.
2. 24-Hour Dietary Recall Form: Assessed actual food consumption patterns.

3. Anthropometric Measurements: Weight, height, and mid-upper arm circumference (MUAC) were recorded to evaluate nutritional status.
4. Haemoglobin Test: Conducted using portable hemoglobinometers to assess anaemia prevalence.
5. Semi-Structured Interview Guide: Used with health workers and TBAs to explore challenges in nutrition counselling and cultural influences.

Data Collection Procedure

- Trained research assistants administered questionnaires orally to accommodate low literacy levels.
- Dietary recall was conducted through guided interviews, with participants asked to recount all foods and drinks consumed in the previous 24 hours.
- Anthropometric and haemoglobin measurements were taken at antenatal clinics under standardized procedures.
- Interviews with health workers and TBAs were conducted in Yoruba and English, depending on participant preference, and later transcribed for analysis.

Data Analysis

- Quantitative Data: Entered into SPSS (version 26). Descriptive statistics (frequencies, percentages, means) were used to summarize dietary patterns and supplement use. Inferential statistics (Chi-square tests and logistic regression) examined associations between dietary practices and pregnancy outcomes.
- Qualitative Data: Transcribed interviews were analysed thematically, identifying recurring cultural beliefs and barriers to nutrition.
- Triangulation: Findings from surveys, dietary recall, and interviews were compared to strengthen validity and reliability.

Ethical Considerations

Ethical approval was obtained from the Ondo State Ministry of Health Research Ethics Committee. Informed consent was secured from all participants, with assurances of confidentiality and voluntary participation. Pregnant women found to have severe anaemia were referred immediately to health facilities for treatment.

Analysis

RQ1: What are the predominant dietary patterns among pregnant women in rural Ondo

State, including protein sources such as fish, snails, seafoods, and bush meats?

1. Food Type	2. Daily (%)	3. Occasional (%)	4. None (%)
5. Yam /Beans/ Garri	6. 72	7. 20	8. 8
9. Vegetables	10. 68	11. 25	12. 7
13. Fish	14. 58	15. 30	16. 12
17. Snails	18. 42	19. 43	20. 15
21. Bush Meats	22. 22	23. 68	24. 10
25. Seafoods	26. 18	27. 60	28. 22

Source: Field work 2026

Survey data revealed that maternal diets in rural Ondo State are dominated by carbohydrate-rich staples, with 72% of women consuming yam, garri and eba daily and 68% regularly eating leafy vegetables. Protein-rich foods were moderately consumed, with 58% reporting regular intake of fish and 42% of snails, while bush meats (22%) and seafoods (18%) were less frequently eaten due to seasonal availability and cost. The statistical table confirmed these trends, showing that although indigenous protein sources are available, they are underutilized compared to staples. These findings align with Adedayo et al. (2024), who documented reliance on indigenous staples in Ondo State; Gbayisemore et al. (2025), who linked food insecurity to

limited dietary diversity; and Bodunrin & Ariyo (2026), who noted cultural influences restricting protein intake. Internationally, Smith et al. (2024) and WHO (2025) emphasize that dietary diversity, particularly protein sources, is essential for maternal nutrition and pregnancy outcomes.

Deductive inference: Despite the abundance of indigenous protein sources such as fish, snails, seafoods, and bush meats, cultural taboos and economic barriers limit their full utilization, leaving maternal diets heavily carbohydrate-based and nutritionally imbalanced.

RQ2: How do indigenous protein-rich foods (fish, snails, seafoods, bush meats) compare with imported supplements in improving maternal nutritional status?

Group	MUAC (cm)	Normal Hb (%)	Anaemia (%)
Indigenous Diet Users (fish, snails, seafoods, bush meats)	27.1	68	11
Supplement Users	24.1	42	25

Source: Field work 2026

Anthropometric and hematological data revealed that women consuming indigenous protein sources—particularly fish and snails—had significantly better nutritional outcomes, with higher mean MUAC (27.1 cm) and normal hemoglobin levels in 68% of cases, compared to supplement users who recorded lower MUAC (24.1 cm) and only 42% with normal hemoglobin. The statistical table confirmed these differences, underscoring the superior impact of indigenous diets on maternal health. These findings support Adedayo et al. (2024), Gbayisemore et al. (2025), and Bodunrin & Ariyo (2026), who all reported improved maternal outcomes with indigenous food consumption in Ondo State. Gbayisemore

et al. (2025) further highlighted that food insecurity often drives reliance on supplements, which are less effective. In the same vein, Black et al. (2024) and UNICEF (2025) affirm that food-based interventions consistently outperform supplement-only strategies in resource-limited settings.

Deductive inference: Indigenous protein-rich foods provide more consistent nutritional adequacy than imported supplements, reinforcing the need for maternal health programs to prioritize food-based interventions—especially fish, snails, seafoods, and bush meats—over supplement distribution alone

RQ3: What cultural beliefs influence food choices during pregnancy in rural Ondo State?

Food Item	% Avoiding	Belief
Eggs	12	“Eggs make children thieves”
Snails	15	“Snails cause sluggish babies”
Bush Meat	10	“Bush meats prolong labour”
Seafoods	8	“Seafoods cause pregnancy complications”

Source: Field work 2026

Interviews revealed persistent cultural taboos against protein-rich indigenous foods,

with 15% of pregnant women avoiding snails due to beliefs that they cause “sluggish babies” and constant saliva dripping, as expressed in local sayings such as “*Alaboyun iyi o ba je*

Ugben ninon Oyun, oma a ka polotun, a pefa...” (interpreted as: mothers who eat snails during conception will have babies with poor psychomotor development). Similarly, 10% avoided bush meats, believing they prolong labour, while 12% avoided eggs, fearing they would make children thieves. The statistical data confirmed these patterns, showing significant avoidance of snails, bush meats, and eggs due to cultural myths. These findings mirror Bodunrin & Ariyo (2026), who documented cultural myths in Ondo antenatal care; Adedayo et al. (2024), who noted egg avoidance among rural mothers; and Gbayisemore et al. (2025), who linked food insecurity with cultural restrictions. This

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Source: Field work 2026.

Health workers in rural Ondo State reported systemic barriers to promoting maternal nutrition, with cultural taboos (40%), economic constraints (35%), and seasonal availability (25%) emerging as the most significant challenges. These findings mirror Bodunrin & Ariyo (2026), who documented similar obstacles in antenatal nutrition counselling, while Adedayo et al. (2024) emphasized that low literacy levels further limit comprehension

finding is in agreement with Pelto & Armar-Klemesu (2024) and WHO (2025) who affirmed and highlight that cultural taboos are widespread barriers to maternal dietary adequacy in low-resource settings.

Deductive inference: Cultural beliefs significantly undermine dietary diversity, particularly protein intake from snails, bush meats, and eggs, perpetuating maternal malnutrition despite the availability of nutrient-rich indigenous foods.

RQ4: What challenges do health workers face in promoting protein-rich indigenous diets?

of nutrition advice. Gbayisemore et al. (2025) linked poverty to poor diet quality, underscoring the economic dimension of the problem. Globally, authorities including FAO (2025) and Black et al. (2024), confirm that socio-economic and cultural barriers consistently hinder maternal nutrition interventions across low-resource settings.

Deductive inference: Health workers face entrenched cultural myths, financial limitations, and seasonal food scarcity that collectively

reduce the effectiveness of nutrition education. This underscores the urgent need for culturally sensitive, economically feasible, and context-specific interventions that integrate indigenous foods—such as fish, snails, seafoods and bush meats—into antenatal care strategies.

Group	Anaemia (%)	Low Birth Weight (%)	Normal Outcomes (%)
Indigenous Diet Users (fish, snails, seafoods, bush meats)	11	7	82
Supplement Users	25	15	60

Source: Field work 2026.

Clinic records and statistical analysis consistently indicated that women consuming indigenous protein sources—particularly fish and snails—had markedly better pregnancy outcomes, with lower anaemia rates (11%) and fewer low-birth-weight deliveries (7%) compared to supplement-reliant mothers (25% anaemia, 15% low birth weight). These findings are consistent with Adedayo et al. (2024), Gbayisemore et al. (2025), and Bodunrin & Ariyo (2026), who all reported improved maternal outcomes among women relying on indigenous diets in Ondo State. Globally authorities, including UNICEF (2025) and WHO (2025), emphasize that food-based nutrition interventions reduce maternal anaemia and improve neonatal outcomes across low-resource settings. Deductively, the evidence demonstrates that indigenous protein consumption directly enhances maternal health

RQ5: What are the implications of indigenous protein consumption for pregnancy outcomes?

and pregnancy outcomes, reinforcing the argument that maternal health interventions in rural Ondo State should integrate indigenous food promotion—especially fish, snails, seafoods, and bush meats—into antenatal care while simultaneously addressing cultural taboos and economic barriers.

Summative Analysis

The results demonstrate that indigenous diets rich in fish, snails, seafoods, and bush meats provide superior maternal outcomes compared to reliance on imported supplements. Women consuming these foods had higher MUAC (27.1 cm), better haemoglobin levels (68% normal), and lower anaemia prevalence (11%). This confirms findings by Adedayo et al. (2024), who reported improved nutritional status among rural women consuming indigenous foods, and Gbayisemore et al. (2025), who linked food insecurity to poor maternal outcomes. Bodunrin & Ariyo (2026)

emphasized that antenatal counselling improves knowledge, but cultural myths persist.

Cultural taboos remain a significant barrier. Snails were avoided by 15% of respondents due to beliefs about “sluggish babies,” bush meats by 10% due to fears of prolonged labour, and seafoods by 8% due to perceived pregnancy complications. These findings mirror Bodunrin & Ariyo (2026) and Adedayo et al. (2024), while Pelto & Armar-Klemesu (2024) and WHO (2025) confirm that food taboos are widespread barriers globally.

Deductively, the evidence shows that indigenous protein sources are nutritionally superior, but their potential is undermined by cultural restrictions and economic constraints. Authorities (Black et al., 2024; UNICEF, 2025) emphasize that food-based interventions outperform supplement-only strategies. Thus, integrating indigenous foods into antenatal care, while addressing taboos and improving food security, is essential for reducing maternal anaemia and improving pregnancy outcomes in Ondo State.

Recommendations

Based on the empirical findings, the following recommendations are proposed:

- **Promote indigenous protein sources:** Health programs should emphasize the nutritional value of fish, snails, seafoods, and bush meats, which were

shown to improve maternal MUAC and haemoglobin levels (Adedayo et al., 2024; Gbayisemore et al., 2025; Bodunrin & Ariyo, 2026; Black et al., 2024; UNICEF, 2025).

- **Challenge cultural taboos:** Community-based education campaigns should directly address myths such as “snails cause sluggish babies” or “bush meats prolong labour,” using culturally sensitive communication strategies (Bodunrin & Ariyo, 2026; Pelto & Armar-Klemesu, 2024; WHO, 2025).
- **Strengthen antenatal nutrition counselling:** Health workers should be equipped with pictorial job aids and local food guides that highlight indigenous protein sources, overcoming literacy barriers and promoting dietary diversity (Bodunrin & Ariyo, 2026; FAO, 2025).
- **Support food security interventions:** Policies should improve rural households’ access to affordable protein-rich foods, addressing economic and seasonal constraints that limit fish, seafood, and bush meat consumption (Gbayisemore et al., 2025; WHO, 2025).
- **Prioritize food-based interventions:** Given the superior outcomes of indigenous diets, maternal health

programs should reduce reliance on imported supplements and instead promote sustainable food-based strategies (Adedayo et al., 2024; Black et al., 2024; UNICEF, 2025).

Conclusion

This study concludes that indigenous food-based nutrition—including fish, snails, seafoods, and bush meats—is more effective than imported supplements in improving maternal outcomes in rural Ondo State. Statistical evidence revealed that women consuming these foods had higher MUAC, better haemoglobin levels, and lower anaemia prevalence compared to supplement users. However, cultural taboos and economic constraints continue to undermine dietary diversity, restricting the full potential of these nutrient-rich foods.

These findings confirm earlier reports by Adedayo et al. (2024), Gbayisemore et al. (2025), and Bodunrin & Ariyo (2026), and resonate with global evidence from Black et al. (2024), UNICEF (2025), and WHO (2025), which emphasize the superiority of food-based interventions in maternal nutrition. Deductively, the study affirms that improving maternal outcomes requires culturally sensitive, locally grounded strategies that integrate indigenous foods into antenatal care, challenge harmful myths, and strengthen food security.

By prioritizing indigenous food-based nutrition—especially fish, snails, seafoods, and bush meats—over supplement dependency, maternal health programs in Ondo State can significantly reduce anaemia, improve pregnancy outcomes, and contribute to achieving national and global targets for maternal and neonatal health.

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