

Prevalence and Determinants of Nutritional Knowledge among Pregnant Women Attending Public Maternity Units in Parakou, Benin, 2025

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Abstract

Introduction: Nutrition during pregnancy influences maternal and fetal outcomes, with nutritional deficiencies contributing to anemia and its associated consequences. Nutritional knowledge among pregnant women remains poorly documented in Benin. This study assessed their level of nutritional knowledge in Parakou in 2025. **Study method:** This was a descriptive cross-sectional study conducted from July 7 to September 1, 2025, in two public maternity units in Parakou. Pregnant women aged 18 years and over, attending antenatal care (ANC) and who gave consent, were recruited through proportional stratified sampling; 397 were included. Data were collected face-to-face using a structured questionnaire on KoboToolbox. The knowledge level was based on a 25-point composite score covering five domains, classified according to the Essi grid. Analyses were performed with MedCalc 19.4.1 and Epi Info 7. **Results:** The mean age was 28.4 ± 5 years, and 94.5% of the women lived in urban areas. Nutritional counseling had reached only 25.7% of them, and just 46.6% were taking iron and folic acid supplementation. Health workers were the leading source of information (60.2%). Fruits and vegetables were the most identified food group (82.9%), but only 23.7% mentioned moringa. More than a third (33.5%) could not name any micronutrient-rich food. Overall lack of knowledge concerned 45.4% of the women (95% CI: 40.6 - 50.3), and 28.7% had an insufficient level. **Conclusion:** Nearly one in two pregnant women in Parakou lack

adequate knowledge of their nutritional needs. Strengthening counseling during ANC is urgent.

Keywords

Nutritional Knowledge, Pregnant Women, Antenatal Care, Benin

1. Introduction

Nutrition during pregnancy directly influences maternal and fetal outcomes. Energy and micronutrient requirements increase during pregnancy, and any deficiency is associated with an increased risk of intrauterine growth restriction, pre-term birth, and low birth weight [1]. Maternal undernutrition contributes to approximately 3.5 million maternal deaths worldwide each year [2]. Iron-deficiency anemia, the most common nutritional deficiency during pregnancy, is responsible for approximately 120,000 additional deaths, with a substantial proportion occurring in sub-Saharan Africa, where more than 46% of pregnant women are anemic [3]. Owais *et al.* in 2021 [4] showed that reducing this prevalence remains slow in low- and middle-income countries because of the multifactorial and context-specific nature of the determinants involved. Pregnant women's level of nutritional knowledge has a substantial influence on their dietary practices. In a review of eleven studies, Oladebo *et al.* in 2025 [5] reported an overall low level of nutritional knowledge and identified education, income, and occupation as the main associated factors. Several studies from Africa have confirmed this knowledge gap. Demisew *et al.* in 2024 [6] reported that 69.2% of pregnant women in the Minjar Shenkora district of Ethiopia had inadequate nutritional knowledge. In Lebanon, despite a higher educational level, Rizk *et al.* in 2024 [7] found low knowledge scores regarding iodine, omega-3 fatty acids, and listeriosis. These knowledge gaps have tangible consequences: poor knowledge of essential nutrition messages increases the risk of poor dietary practices by 3.36-fold [8], whereas structured nutritional counseling improves nutritional knowledge, dietary diversity, and dietary behaviors among pregnant women [9]. Cultural factors also play an important role: food taboos, fear that a "large baby" may lead to difficult delivery, and religious fasting frequently result in the avoidance of animal-source foods that are nevertheless essential [10] [11]. Data remain scarce in West Africa, particularly in Benin, although the determinants of nutritional knowledge vary considerably across contexts [4] [5]. In Parakou, public maternity facilities provide antenatal care to a substantial proportion of pregnant women, making them an appropriate setting for assessing nutritional knowledge before designing context-specific interventions. The present study therefore assessed the prevalence and level of knowledge regarding nutritional requirements among pregnant women receiving antenatal care in public maternity facilities in Parakou in 2025, focusing on their general nutritional knowledge, knowledge of food groups, foods to consume or avoid, the risks associated with malnutrition, and local dietary practices.

2. Methods

The study was conducted in two public hospital maternity facilities in Parakou, the second-largest city in Benin and the administrative capital of the Borgou-Alibori region in northern Benin. A descriptive cross-sectional study with prospective data collection was conducted from July 7 to September 1, 2025. The target population consisted of all pregnant women receiving antenatal care at public maternity facilities in Parakou, regardless of gestational age. The source population comprised pregnant women attending antenatal care services at CHUD/BA and HIA-CHU in Parakou during the data collection period. Eligible participants were pregnant women aged 18 years or older who were receiving antenatal care at one of the two selected maternity facilities, regardless of gestational age, and who provided free and informed consent to participate. Pregnant women with documented or established cognitive disorders that could interfere with their understanding of the questions were excluded. Pregnant women who did not provide consent to participate or who were absent on scheduled data collection days at their facility were not included in the study. The minimum sample size was calculated using the Schwartz formula, assuming a reference prevalence of $p = 55.4\%$ (the proportion of pregnant women with inadequate nutritional knowledge reported by Demisew *et al.* in 2024), a 5% alpha risk, and a 5% margin of error, resulting in a minimum sample size of 379 participants. This number was increased by 10% to account for potential losses, yielding a target sample size of 417 pregnant women. A proportional stratified sampling technique was used, with stratification by study center. The weight assigned to each maternity facility was calculated based on the number of antenatal care visits recorded in 2024. CHUD/BA accounted for 28.1% of the total and was assigned a quota of 117 pregnant women, whereas HIA-CHU accounted for 71.9% and was assigned a quota of 300 pregnant women. Within each center, eligible pregnant women were recruited consecutively until the assigned quota was reached (Table 1).

Table 1. Distribution of surveyed pregnant women by study center according to antenatal care attendance data at Parakou in 2025.

Center	2024 ANC* visits	Weight (%)	Planned quota	Number recruite
CHUD/Borgou-Alibori	450	28.1	117	117
HIA-CHU Parakou	1151	71.9	300	280
Total	1601	100.0	417	397

*ANC = Antenatal Care.

Nutritional knowledge level was the main dependent variable. It was operationalized using a composite score out of 25 points, based on 14 criteria distributed across five thematic domains:

- **General knowledge of nutritional requirements during pregnancy** (maximum score: 5 points);
- **Knowledge of food groups and key nutrients** (8 points);

- **Knowledge of foods to consume or avoid** (4 points);
- **Knowledge of the risks associated with malnutrition** (4 points);
- **Practical and local cultural knowledge** (4 points).

The weighting of each item was determined according to its nutritional importance, based on the model developed by Essi *et al.*, with values ranging from 1 to 3 points per criterion (**Table 2**).

Table 2. Classification of nutritional knowledge level used in the study [12].

Score obtained	Proportion	Level of knowledge	Clinical interpretation
<12.5	<50%	Mauvais	Lack of knowledge of nutritional requirements
12.5 - 16.24	50% - 64.9%	Insufficient	Partial or poorly structured knowledge
16.25 - 21.24	65% - 84.9%	Moderate	Generally acceptable knowledge
≥21.25	≥85%	Good	Good understanding of nutritional recommendations

For epidemiological analyses, this variable was dichotomized into **low knowledge** (score <12.5/25, corresponding to inadequate knowledge) versus **acceptable knowledge** (score ≥12.5/25).

Data Collection: Tools and Procedures

Data were collected through direct face-to-face interviews conducted by the principal investigator. The data collection instrument was a structured questionnaire digitized and hosted on the KoboToolbox server. The questionnaire was developed in French and pretested among 20 pregnant women outside the study sites. The pretest enabled the wording of ambiguous items to be refined, the administration time to be assessed, and data-entry errors to be corrected. Data collected daily were subjected to real-time completeness and consistency checks using KoboToolbox before being exported weekly to EpiData version 3.2 for duplicate detection and data cleaning.

Data Management and Analysis

Data were analyzed using MedCalc version 19.4.1 (Mariakerke, Belgium) and Epi Info version 7. Descriptive analysis included frequencies and proportions with 95% confidence intervals (95% CIs) for categorical variables, and means with standard deviations (SDs) for continuous variables. Graphs and summary tables were generated using Microsoft Excel 2016. As this was a descriptive study, no inferential statistical analysis was performed.

Ethical and Regulatory Considerations

The study adhered to the ethical principles of the Declaration of Helsinki. Before enrollment, each participant received comprehensive information about the study objectives, data collection procedures, and the voluntary nature of participation. Informed consent was obtained verbally and documented in writing, in accordance with Law No. 2010-40 of December 8, 2010, establishing the Code of Ethics and Professional Conduct for Health Research in the Republic of Benin. Data were anonymized at the time of collection, securely stored, and made accessible only to authorized members of the research team, in accordance with Law

No. 2009-09 of May 22, 2009, on the protection of personal data in the Republic of Benin. Each participant was free to withdraw from the study at any time without any consequences for the quality of healthcare received.

3. Results

3.1. Sociodemographic Characteristics

A total of 397 pregnant women were included in the study. The mean age was 28.4 ± 5 years (range: 17 - 44 years). Women aged 20 - 30 years accounted for 62.5% of the participants. The vast majority were married (74.5%) and lived in urban areas (94.5%). Secondary education was the most common educational level (44.6%), followed by primary education (24.7%) and higher education (21.6%). Trading was the main occupation for 33.0% of the women, followed by handicrafts (19.6%) and civil service employment (18.9%) (**Table 3**).

Table 3. Sociodemographic characteristics of the surveyed pregnant women at Parakou in 2025.

	Number (N = 397)	%
Marital status		
Married	296	74.5
Single	67	16.9
Cohabiting/In a consensual union	34	8.6
Educational level		
Secondary	177	44.6
Primary	98	24.7
Higher	86	21.6
No education	36	9.1
Main occupation		
Trader	131	33.0
Artisane	78	19.6
Civil servant	75	18.9
Homemaker	55	13.9
Students	28	7.1
Unemployed	21	5.3
Place of residence		
Urban	375	94.5
Rural	22	5.5

3.2. Obstetric History and Antenatal Care

Paucigravidae accounted for 46.4% of the participants, followed by multigravidae (29.5%) and primigravidae (24.2%). A similar pattern was observed for parity, with a predominance of pauciparous women (46.1%). The mean number of antenatal care (ANC) visits was 4.75 ± 2.5 : 65.0% of pregnant women had attended 4 to 9 ANC visits, whereas only 32.7% had attended 1 to 3 visits. One-quarter of the women (25.7%) had received nutritional counseling during antenatal care, and 46.6% were taking iron and folic acid supplementation at the time of the survey. Healthcare workers were the main source of nutritional information (60.2%), followed by social media and the internet (48.4%), and family members (37.8%) (**Table 4**).

Table 4. Antenatal care and access to nutritional information among the pregnant women surveyed at Parakou in 2025.

	Number (N = 397)	%
Number of ANC visits		
1 - 3	130	32.7
4 - 9	258	65.0
10 - 14	09	2.3
Nutritional counseling received		
No	295	74.3
Yes	102	25.7
Iron and folic acid supplementation		
No	212	53.4
Yes	185	46.6
Level of access to nutritional information		
Easy	134	33.8
Moderate	197	49.6
Difficult	20	05.0
No access	46	11.6

3.3. General Knowledge of Nutritional Requirements

Regarding the first domain, 77.8% of pregnant women recognized that nutritional requirements increase during pregnancy. The main objectives of a balanced diet identified by the participants were fetal development (78.8%) and maintenance of maternal health (78.6%), whereas prevention of anemia and congenital anomalies was mentioned by only 33.3% of women. Regarding meal frequency, 39.3% recommended four to five meals or food intakes per day, while 35.3% recommended

three meals with a snack, corresponding to a total of 74.6% of adequate responses. The recommendation for daily fluid intake (1.5 - 2 liters of water) was known by 76.1% of participants.

3.4. Knowledge of Food Groups and Key Nutrients

Fruits and vegetables were the most frequently identified food group (82.9%), followed by cereals and tubers (66.8%), dairy products (47.6%), and meat, fish, and eggs (46.9%). Fats and oils were mentioned by only 12.6% of women. Regarding foods that are sources of micronutrients, 42.1% identified poultry liver as an iron-rich food, 32.0% identified legumes, and only 23.7% identified moringa, a local food particularly rich in iron, calcium, and vitamins. More than one-third of pregnant women (33.5%) reported that they did not know of any food specifically rich in iron, calcium, or folic acid (**Table 5**).

Table 5. Knowledge of food groups and key nutrients during pregnancy at Parakou in 2025.

Item	Number (N = 397)	%
Food groups recognized as essential		
Fruits and vegetables	329	82.9
Cereals and tubers	265	66.8
Dairy products	189	47.6
Meat, fish, and eggs	186	46.9
Fats and oils	50	12.6
Do not know	52	13.1
Cited food sources of iron, calcium, and folic acid		
Poultry liver	167	42.1
Legumes (beans, peas, lentils)	127	32.0
Milk and cheese	123	31.0
Moringa	94	23.7
Eggs	80	20.2
Do not know	133	33.5

3.5. Knowledge of Foods to Consume or Avoid

Among foods recommended during pregnancy, leafy green vegetables (73.8%) and fresh fruits (68.8%) were the most commonly identified, whereas animal protein sources were less frequently mentioned: fish or lean meat (38.3%), eggs (33.3%), and milk (27.7%). Regarding foods to avoid, alcohol (83.4%) and excessive coffee consumption (81.4%) were widely recognized, whereas the risks associated with raw or unpasteurized products were considerably less well known: raw meat (32.5%), unpasteurized milk (26.2%), and raw or smoked fish (22.9%).

3.6. Knowledge of the Risks of Malnutrition and Local Dietary Practices

The maternal consequences of malnutrition most commonly recognized were anemia (74.3%) and fatigue (42.8%), whereas difficult labor was mentioned by only 37.0% of women. Regarding fetal consequences, low birth weight (64.0%) and congenital anomalies (62.0%) were frequently mentioned, but intrauterine growth restriction was recognized by only 28.7% of pregnant women. With regard to local dietary practices, 38.0% of women reported that they did not know of any local nutrient-rich food. Knowledge of the consequences of fasting and dietary restrictions during pregnancy was incomplete in nearly one-third of participants.

3.7. Knowledge Level by Domain and Overall Assessment

Assessment by domain showed contrasting results. Pregnant women demonstrated an acceptable level of knowledge regarding general nutritional requirements (86.7% with an acceptable level) and the risks of malnutrition (85.9%). Conversely, knowledge of local dietary practices (53.9% with a low level) and foods to consume or avoid (53.4% with a low level) showed the most substantial deficits (**Table 6**).

Table 6. Distribution of knowledge level by thematic domain at Parakou in 2025.

Thematic domain	Acceptable level (%)	Low level (%)
General knowledge of nutritional requirements	86.7	13.3
Risks associated with maternal and fetal malnutrition	85.9	14.1
Food groups and key nutrients	63.2	36.8
Foods to consume or avoid during pregnancy	46.6	53.4
Local dietary practices and knowledge	46.1	53.9

Overall assessment of nutritional knowledge showed that 45.4% of pregnant women had poor knowledge (lack of knowledge), while 28.7% had an inadequate level of knowledge. The overall prevalence of inadequate knowledge of nutritional requirements was therefore 45.4% (95% CI: 40.6% - 50.3%). In other words, nearly one in two pregnant women in Parakou did not have adequate knowledge of pregnancy-specific nutritional recommendations (**Table 7**).

Table 7. Overall distribution of nutritional knowledge levels among pregnant women at Parakou in 2025.

Knowledge level	Number	%	IC 95%
Poor (lack of knowledge)	180	45.4	40.6 - 50.3
Inadequate	114	28.7	24.3 - 33.5
Moderate	85	21.4	17.4 - 25.9
Good	18	4.5	2.7 - 7.1

4. Discussion

4.1. Sociodemographic Characteristics and Obstetric Profile

The sociodemographic profile of the pregnant women included in our study indicates a predominantly young population (mean age: 28.4 ± 5 years), mostly married (74.5%) and living in urban areas (94.5%), with secondary education being the most common educational level (44.6%). This profile is consistent with that described by Demisew *et al.* in 2024 [6] in the Minjar Shenkora district of Ethiopia, identified education as a major determinant of nutritional knowledge. Similarly, Seif in 2025 [12], in a study conducted in Tanzania, reported that the predominant age group was 25 - 34 years (46.4%), which was comparable to our cohort. However, the educational profile observed in our study remains concerning: nearly one-third of pregnant women (33.8%) had only primary education or no formal education, which is consistent with the profile of low-income populations described by Marian *et al.* in 2025 [13] in the cities of Oaxaca, Mexico, where maternal education strongly influences dietary practices during pregnancy.

The obstetric profile, characterized predominantly by paucigravidas (46.4%) and pauciparas (46.1%), is consistent with profiles observed in comparable African settings, particularly in the study by Mudasir *et al.* in 2024 [8] in southwestern Ethiopia. The mean number of antenatal care (ANC) visits was 4.75 ± 2.5 , with 65.0% of pregnant women attending 4 - 9 ANC visits. This finding reflects a relative improvement in access to antenatal care, in accordance with current WHO recommendations, but remains insufficient given that nearly one-third of women (32.7%) attended only 1 - 3 ANC visits. Merga *et al.* in 2025 [14], in a case-control study conducted in Bule Hora, Ethiopia, demonstrated that having ≥ 4 ANC visits increased the likelihood of adherence to iron and folic acid supplementation by 7.84-fold (95% CI: 3.34 - 18.41), highlighting the critical importance of optimal use of antenatal care services.

4.2. Antenatal Care, Supplementation, and Sources of Nutritional Information

A concerning finding emerged from our study: only 25.7% of pregnant women had received nutritional counseling, and only 46.6% were actually taking iron and folic acid supplements. These figures are similar to those reported by Mabuza *et al.* in 2021 [15] in Eswatini, where optimal iron-folic acid consumption during the first trimester was only 10.3%, increasing to 37% - 40% during subsequent trimesters. The low proportion of pregnant women receiving nutritional counseling is also consistent with findings reported by Jackson *et al.* in 2025 [16] in the United States, where only 49.8% of women surveyed recalled receiving nutritional advice during pregnancy. This gap in nutritional counseling has direct consequences: Olloqui-Mundet *et al.* in 2024 [17], in a systematic review of 68 original articles, identified the lack of structured nutrition education as the main barrier to adopting healthy dietary practices during pregnancy, largely attributing this gap to inadequate planning of nutrition education by healthcare providers. The main

sources of nutritional information in our study-healthcare providers (60.2%), followed by social media and the internet (48.4%), and family members (37.8%)-reflect a pattern documented globally. Zhang *et al.* in 2024 [18] [19], in Tianjin, China, reported a similar proportion of pregnant women (72.11%) who preferred to obtain nutritional information from healthcare professionals. Jamal *et al.* in 2025 [20] found in Lebanon that 73.5% of pregnant women used the internet, particularly Google, to obtain information about nutrition and recommended dietary supplements. However, Marian *et al.* in 2025 [13] emphasized in their qualitative study in Mexico that female family members often constitute a primary source of nutritional knowledge, which may transmit information that is sometimes inadequate or inconsistent with clinical recommendations. The gap between easy access to information (33.8%) and difficult or no access (16.6%) in our cohort reflects a concerning inequality in access to educational resources.

4.3. General Knowledge of Nutritional Requirements

With 77.8% of pregnant women recognizing that nutritional requirements increase during pregnancy and 86.7% achieving an acceptable knowledge level in this domain, our participants demonstrated a relatively satisfactory foundation of general nutritional knowledge. This finding is consistent with that reported by Nawabi *et al.* in 2022 [21] [22], in which more than 85% of pregnant women correctly answered most general questions regarding lifestyle during pregnancy. Similarly, Olloqui-Mundet *et al.* in 2024 [17] concluded that most pregnant women are aware of the importance of nutrition during pregnancy, although this awareness does not always translate into appropriate behaviors.

However, this apparently satisfactory level of general knowledge masks substantial gaps. Although 78.8% of pregnant women identified fetal development as an objective of a balanced diet, only 33.3% mentioned the prevention of anemia and congenital anomalies. Kostecka *et al.* in 2022 [23], in a Polish study involving 325 respondents, also identified major gaps regarding the relationship between maternal weight and fetal development. Estrada *et al.* in 2026 [24], in an assessment of 894 students, reported a mean pregnancy nutrition knowledge score of only 34/100, with particularly important gaps regarding energy requirements during the first trimester, for which only 6% of participants provided correct answers. This discrepancy between general awareness and specific knowledge represents a major challenge for educational interventions.

4.4. Knowledge of Food Groups and Key Nutrients

Although 82.9% of pregnant women identified fruits and vegetables as an essential food group, substantial gaps were observed regarding critical micronutrient sources. Only 42.1% identified poultry liver as an iron-rich food, 32.0% identified legumes, and, particularly concerning, only 23.7% identified moringa, a local food in Benin recognized for its high content of iron, calcium, and vitamins. Even more concerning, 33.5% of pregnant women reported that they did not know of any food

rich in iron, calcium, or folic acid.

This lack of knowledge regarding micronutrients is consistent with several previous studies. Rizk *et al.* in 2024 [7], in Lebanon, showed that among five domains of nutritional knowledge assessed in 410 pregnant women, the lowest scores concerned the importance of iodine and omega-3 fatty acids (28.4%), as well as listeriosis contamination (45.9%). Similarly, Estrada *et al.* in 2026 [24] reported that only 9% of respondents correctly identified iodine recommendations. Nakkeeran *et al.* in 2025 [25], in a questionnaire-based study conducted in India, reported an even more striking finding: only 11% of pregnant women surveyed were aware of the benefits of folic acid, and 52% were not taking supplements during the first two trimesters. This lack of knowledge regarding locally available micronutrient-rich foods, particularly moringa in the Beninese context, is consistent with observations by Uwase *et al.* in 2024 [26] in Rwanda, where despite the availability of nutritious local foods, only 44.1% of pregnant women achieved adequate dietary diversity, with nutritional knowledge score being an independent predictor (adjusted OR = 1.45; 95% CI: 1.21 - 1.74).

4.5. Knowledge of Foods to Consume or Avoid

This domain represents one of the major weaknesses identified in our study, with 53.4% of pregnant women having a low level of knowledge. Although foods to avoid during pregnancy were relatively well identified in relation to alcohol (83.4%) and excessive coffee consumption (81.4%), the risks associated with raw or unpasteurized products remained largely unknown: raw meat (32.5%), unpasteurized milk (26.2%), and raw or smoked fish (22.9%). This finding is not isolated. Rizk *et al.* in 2024 [7] reported in Lebanon that fewer than half of pregnant women (47.8%) were able to identify the types of fish considered safest to consume during pregnancy. Similarly, Estrada *et al.* in 2026 [24] in California reported that knowledge of recommendations concerning alcohol was relatively well established, whereas knowledge of other dietary recommendations remained limited. This asymmetry in knowledge suggests that public health messages addressing certain topics, such as alcohol and tobacco, may have been more effectively disseminated, whereas other dietary recommendations remain insufficiently communicated. Regarding recommended animal protein sources, these were insufficiently identified in our study: fish or lean meat (38.3%), eggs (33.3%), and milk (27.7%). This finding is consistent with that reported by Uwase *et al.* in 2024 [26] in Rwanda, where eggs (16.4%) and dairy products (18.5%) were among the least frequently consumed food groups. Similar findings were reported by Seif in 2025 [12] in Tanzania, who identified substantial barriers related to the availability and cost of iron-rich foods such as eggs and dairy products.

4.6. Knowledge of the Risks of Malnutrition and Local Dietary Practices

Assessment of knowledge regarding the risks of malnutrition revealed an overall

acceptable level (85.9%), with anemia (74.3%) and low birth weight (64.0%) being the most frequently cited consequences. However, intrauterine growth restriction was recognized by only 28.7% of pregnant women, and difficult labor by only 37.0%. Dutta *et al.* in 2023 [27], in their review of anemia during pregnancy in India, emphasized that inadequate intake of essential nutrients remains common among pregnant women in low- and middle-income countries, contributing to high maternal and infant mortality rates and underscoring the importance of raising awareness among pregnant women about the consequences of malnutrition. The domain of local dietary practices showed the greatest deficit, with 53.9% of women having a low level of knowledge and 38.0% reporting that they did not know of any local nutrient-rich food. This limited recognition of nutritious local foods represents an important educational opportunity. Eyasu *et al.* in 2022 [10], in a qualitative study conducted in rural areas of Ofla Woreda in northern Ethiopia, identified multiple misconceptions about foods during pregnancy, including avoidance of animal-source foods such as eggs, which were perceived as causing “large babies” and consequently difficult deliveries. Kumsa *et al.* in 2026 [11], in Jimma, southwestern Ethiopia, confirmed that pregnant women do not necessarily modify their diets to meet nutritional requirements but instead adjust their food intake according to cultural taboos, aversions, and cravings. These taboos are perpetuated through intergenerational transmission and social learning. Alamirew *et al.* in 2023 [28], in the Amhara region of Ethiopia, reported that only 26.8% of women of reproductive age consumed five or more food groups per day (MDD-W), with cultural beliefs representing a significant community-level determinant. Although our study did not qualitatively investigate these taboos, the low level of knowledge regarding nutritious local foods suggests their possible presence and warrants further investigation.

4.7. Overall Assessment of Nutritional Knowledge

The most striking finding of our study was the overall prevalence of inadequate knowledge regarding nutritional requirements, which reached 45.4% (95% CI: 40.6% - 50.3%), corresponding to nearly one in two pregnant women. When the 28.7% of women with an inadequate level of knowledge are also considered, 74.1% of pregnant women in Parakou had an inadequate overall level of nutritional knowledge. This finding is consistent with the conclusions of the scoping review by Oladebo *et al.* in 2025 [5], which, based on 11 included studies, concluded that nutritional knowledge and literacy among pregnant women were generally low, with education and income being the most influential determinants. Demisew *et al.* in 2024 [6] reported an even higher proportion of women with inadequate knowledge (69.2%) in the Minjar Shenkora district of Ethiopia, with a significant association between educational level and access to nutritional information. Beyond the African context, Khair *et al.* in 2023 [29] in the United Arab Emirates also documented substantial gaps among 526 pregnant women regarding appropriate gestational weight gain and complications associated with overweight and

obesity.

The near absence of a good level of knowledge in our cohort (only 4.5%) warrants attention. Several hypotheses may help explain this finding. First, the low proportion of women receiving nutritional counseling (25.7%) deprives the majority of pregnant women of a professional source of information. Olloqui-Mundet *et al.* in 2024 [17] suggested that inadequate nutritional knowledge among pregnant women may be partly related to poorly planned nutrition education by healthcare providers. Second, as demonstrated by Katenga-Kaunda *et al.* in 2021 [9] in Malawi through a randomized controlled trial, additional nutrition education interventions and tailored dietary counseling significantly improve nutritional knowledge, dietary diversity, and nutritional behaviors during pregnancy. Finally, difficult or no access to nutritional information among 16.6% of our participants may further contribute to inequalities in health learning.

4.8. Strengths and Limitations

The main strength of this study lies in the rigor of its design: proportional stratified sampling ensuring representation across study centers, a pretested questionnaire administered face-to-face by the principal investigator, a standardized assessment tool consisting of 14 operational items scored out of 25 points, and double quality checks of the collected data. The use of a multidimensional composite score provides a nuanced assessment of nutritional knowledge beyond simple self-reported knowledge.

The main limitations are as follows. First, the cross-sectional design does not allow temporal relationships between potential determinants and knowledge level to be established. Second, self-reported responses are susceptible to social desirability bias, as participants may tend to provide answers they believe are expected rather than reflecting their actual knowledge. Third, the high proportion of urban residents (94.5%) limits the generalizability of the findings to all pregnant women in the Borgou-Alibori region, where a substantial proportion of the population lives in rural areas. Finally, the use of a single assessor, although ensuring consistency in data collection, did not allow inter-rater reliability to be assessed.

5. Conclusion

Inadequate knowledge of nutritional requirements affects nearly one in two pregnant women receiving antenatal care in public maternity facilities in Parakou, with particularly substantial gaps regarding local dietary practices and foods to avoid during pregnancy. These findings provide an important local baseline for guiding maternal health interventions in the region. They support the systematic and structured integration of culturally appropriate nutrition education into antenatal care, together with strengthened prior training of healthcare providers. Longitudinal studies and intervention trials are needed to assess the impact of these approaches on dietary practices and perinatal outcomes in Parakou.

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Author Contributions

All authors participated in the care of patients and newborns. They were involved in the conception, execution, writing, and revision of the manuscript.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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