

Effectiveness of Nutritional Education on Knowledge, Attitude, and Food Choices Regarding Diet among Pregnant Women in Ibadan Semi-Urban Areas, Oyo State

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Abstract

This study examined the effectiveness of nutritional education on knowledge, attitude and choice of food regarding diet among pregnant women in Ibadan Semi-urban LGAs, Oyo State. The main objectives were to determine baseline knowledge, attitude and food choices regarding diet in the Theory of Planned Behavior. The study addressed gaps in maternal health education by targeting misconceptions about food choices and improving nutrition literacy in low-resource settings. A quasi-experimental design was employed, involving 118 pregnant women selected purposively from antenatal clinics in semi-urban LGAs assigned equally into experimental and control groups. A structured questionnaire, followed by an eight-week nutritional education program for the experimental group and post-test and follow-up assessments were conducted, and data were analyzed using descriptive statistics, paired t-tests, and ANCOVA at a 0.05 significance level. The findings showed that After intervention, the experimental group showed higher scores in knowledge (18.8 vs. 16.2), attitude (44.7 vs. 39.4), and food choices (48.4 vs. 41.1). The experimental group recorded significant improvements between pre- and post-test: Knowledge increased by 2.4 points ($p < 0.001$). Attitude increased by 5.0 points ($p < 0.001$). Food choices improved by +7.4 points ($p < 0.001$). These differences were highly significant ($p < 0.001$), showing a positive effect of nutritional education. In conclusion, structured nutritional education significantly improved and sustained maternal dietary knowledge. It is recommended that nutrition education be integrated into routine antenatal care. The study was limited to a semi-urban population, reducing generalizability.

Introduction

Adequate maternal nutrition during pregnancy is essential for promoting the health of both the mother and the developing fetus (World Health Organization [WHO], 2020). Pregnancy increases nutrient requirements, particularly for iron, folic acid, calcium, and protein, which are critical for preventing anemia, congenital anomalies, and intrauterine growth restriction (Black et al., 2013). Despite the importance of proper nutrition, malnutrition among pregnant women remains a major public health concern in low- and middle-income countries, including Nigeria (Ajayi et al., 2019). Studies have shown that poor maternal knowledge, cultural food taboos, and economic constraints contribute to unhealthy dietary practices during pregnancy (Oni et al., 2020). In semi-urban areas,

pregnant women are particularly vulnerable to poor dietary intake due to limited access to diverse foods and weak nutrition education programs (Oluwafemi & Adeola, 2021).

Nutritional education is recognized as a cost-effective intervention that improves knowledge, attitudes, and food choices among women of reproductive age (Ruel et al., 2018). Evidence from community-based programs indicates that structured nutrition education during antenatal care increases the consumption of micronutrient-rich foods and improves pregnancy outcomes (Girard & Olude, 2012). However, in Nigeria, few studies have specifically examined the effectiveness of nutrition education interventions among pregnant women in semi-urban settings (Ezeh et al., 2020). Strengthening the role of health workers, particularly community health nurses, in providing culturally appropriate dietary counseling is therefore essential (Abdulkarim et al., 2022).

Maternal undernutrition remains a persistent challenge in Nigeria, where a significant proportion of women enter pregnancy with poor dietary practices that affect both maternal and child health outcomes (Ajayi et al., 2019). Inadequate intake of essential nutrients during pregnancy contributes to maternal complications such as anemia, preeclampsia, and obstructed labor (Black et al., 2013). For the fetus, poor maternal nutrition increases the risks of intrauterine growth restriction, low birth weight, and long-term developmental problems (WHO, 2020). Despite routine antenatal care, studies show that many pregnant women in Nigeria still have insufficient knowledge of nutrition and continue to make poor dietary choices (Ezeh et al., 2020). Cultural food taboos and misconceptions also restrict pregnant women from consuming nutrient-dense foods like eggs, fish, or milk, further worsening the problem (Oni et al., 2020). In semi-urban areas such as Ibadan, economic limitations and lack of structured nutrition education make women particularly vulnerable to poor dietary practices (Oluwafemi & Adeola, 2021).

Addressing these problems is critical because maternal nutrition is strongly linked to the survival and health of both mothers and their infants (Ruel et al., 2018). Evidence shows that cost-effective interventions such as nutritional education can significantly improve dietary knowledge, attitudes, and practices among women of reproductive age (Girard & Olude, 2012). However, there is limited empirical research in Nigeria assessing the specific impact of structured nutritional education interventions in semi-urban populations (Abdulkarim et al., 2022). This study therefore provides evidence on the effectiveness of nutrition education in improving dietary knowledge, attitudes, and food choices among pregnant women in Ibadan. This study aims to evaluate the impact of nutritional education on the knowledge, attitudes, and food choices of pregnant women in semi-urban areas of Ibadan, Oyo State, Nigeria

The justification for this research lies in its potential to inform maternal health policies and strengthen antenatal care programs by integrating targeted nutritional education sessions (Ezeh et al., 2020). It also supports the Sustainable Development Goals (SDG 3), which seek to reduce maternal and child mortality through improved access to health and nutrition (United Nations, 2015). Findings from this study could guide community health nurses and policymakers in designing culturally sensitive nutrition interventions tailored to the needs of semi-urban populations. This research is anchored on the Health Belief Model (HBM), which posits that individuals are more likely to adopt healthy behaviors when they perceive a personal risk, believe in the benefits of action, and feel empowered to overcome barriers (Rosenstock, 1974). Applying the HBM, nutritional education can be viewed as a mechanism that increases perceived susceptibility to poor pregnancy outcomes, highlights the benefits of healthy eating, and reduces cultural or economic barriers to better dietary practices.

Methodology

Study Design

This study adopted a quasi-experimental design with pre- and post-test control groups to assess the effect of nutritional education on pregnant women's knowledge, attitudes, and food choices.

Study Population

The study population comprised of 118 pregnant women attending antenatal clinics in selected primary health care centers in semi-urban areas of Ibadan, Oyo State, Nigeria.

Sample and Sampling Technique

A multistage sampling technique was used to select participants, ensuring representation across different socio-demographic backgrounds.

Method of Data Collection

Data were collected using a structured interviewer-administered questionnaire that assessed socio-demographic characteristics, nutrition knowledge, attitudes, and food choices adapted from validated tools. The intervention group received structured nutritional education sessions delivered by trained community health nurses, while the control group continued with routine antenatal care.

Method of Data Analysis

A Statistical Package for the social sciences (SPSS) version 25 was used to analyze the data, using descriptive statistics and inferential tests, including Analysis of Covariance (ANCOVA) to determine the effectiveness of the intervention at a significance level of $p < 0.05$.

Ethical Approval

Ethical approval was obtained from the Institutional Review Board (Ethical Committee) of the Oyo State Ministry of Health with the NHREC ASSIGNED NUMBER (NHREC/OYOSHRIEC/10/11/22) and informed consent was secured from all participants before data collection.

Results and Findings

The majority of participants were between 20–29 years (46, 78.0% in experimental; 44, 74.6% in control), with a mean age of about 26–27 years. Most were married (47, 79.7% vs. 51, 86.4%) and predominantly Yoruba (57, 96.6% in both groups). Nearly half had only primary education (28, 47.5% vs. 30, 50.8%), while others had secondary or tertiary education. Employment was mainly self-employment (47, 79.7% versus. 41, 69.5%), and household income was generally below ₦50,000 per month. Most participants were in monogamous marriages (40, 67.8% versus. 42, 71.2%). A substantial proportion had no children (26, 44.1% in both groups), while about one-third had one child. Regarding pregnancy stage, most were in the third trimester (36, 61.0% vs. 32, 54.2%). None of the socio-demographic variables showed significant differences between groups ($p > 0.05$), indicating comparability. (table 1 and 2)

Table 1: Socio-Demographic characteristics of the study participants

Characteristic	Experiment n (%)	Controls, n (%)	χ^2 /t-test	P-value
Age group (years)				
<20	1(1.7)	2(3.4)	3.518	.318
20-29	46(78.0)	44(74.6)		
30-39	11(18.6)	8(13.6)		
40-49	1(1.7)	5(8.5)		
Mean age [range](years)	26.2±5.0 [17-42]	27.2±5.6 [18-40]	0.952	.343
Marital status				
Single	12(20.3)	8(13.6)	.963	.326
Married	47(79.7)	51(86.4)		
Ethnicity				
Yoruba	57(96.6)	57(96.6)	1.333 ^a	.513
Igbo	1(1.7)	2(3.4)		
Others	1(1.7)	0		
Religion				
Christianity	16(27.1)	17(28.8)	1.030	.597
Islam	42(71.2)	42(71.2)		
Others	1(1.7)	0		
Level of Education			5.950	.429
Primary	28(47.5)	30(50.8)		
Secondary	7(11.9)	10(16.9)		
Tertiary	24(40.7)	19(32.3)		
Employment status				
public service	7(11.9)	15(25.4)	3.818 ^a	.148
Self employed	47(79.7)	41(69.5)		
Artisan/Apprentice	5(8.5)	3(5.1)		
Monthly Household income in Naira				
Below 20000	26(44.1)	27(45.8)	.243	.970
20000-50000	22(37.3)	23(39.0)		
51000-100000	5(8.5)	4(6.8)		
Above 100000	6(10.2)	5(8.5)		

Characteristic	Experiment n (%)	Controls, n (%)	χ^2	P-value
Type of Marriage				
Monogamy	40(67.8)	42(71.2)	1.430	.567
Polygamy	19(32.2)	17(28.8)		
Number of children				
None	26(44.1)	26(44.1)	.388	.943
One	20(33.9)	19(32.2)		
Two	7(11.9)	6(10.2)		
More than two	6(10.2)	8(13.6)		
Pregnancy stage				
First trimester	10(16.9)	11(18.6)	.593	.743
second trimester	13(22.0)	16(27.1)		
third trimester	36(61.0)	32(54.2)		

Table 2 : Baseline mean score of Knowledge based diet, Attitude based on dietary patterns and Food choices regarding diet between experimental and control group

Variables	Statistics /items	Experimental	Control	t-test	p-value
Knowledge based diet	Mean \pm SD	16.4 \pm 2.3	16.2 \pm 2.3	.429	.668
	Range	10.0-19	11.0-19.0		
Attitude based on dietary patterns	Mean \pm SD	39.7 \pm 7.8	39.4 \pm 6.8	.250	.803
	Range	21.0-56.0	26.0-49.0		
Food choices regarding dietary pattern	Mean \pm SD	41.1 \pm 7.5	40.9 \pm 8.3	.093	.926
	Range	15.0-57.0	21.0-50.0		

Before intervention, both groups had similar mean scores for knowledge (16.4 vs. 16.2), **attitude** (39.7 vs. 39.4), and food choices(41.1 vs. 40.9), with no significant differences ($p > 0.05$). This shows that both groups started at the same level.

Table 3: Post intervention mean score of Knowledge based diet, Attitude based on dietary patterns and Food choices regarding diet between experimental and control group

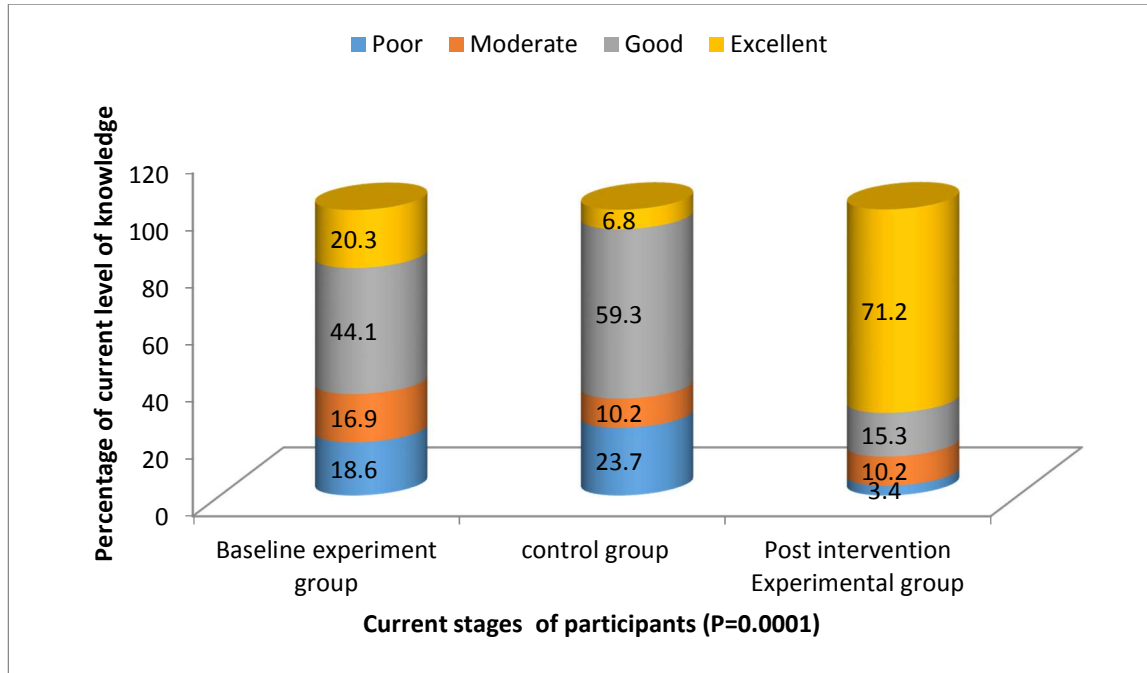
Variables	Statistics /items	Post Experiment	Post Controls	t-test	p-value
Knowledge based diet	Mean ±SD	18.8±1.8	16.2±2.3	6.172	.0001
	Range	13.0-20.0	11.0-19.0		
Attitude based on dietary patterns	Mean ±SD	44.7±6.1	39.4±6.8	3.833	.0001
	Range	27.0-60.0	26.0-49.0		
Food choices regarding dietary pattern	Mean ±SD	48.4±5.1	41.1±8.3	6.263	.0001
	Range	39.0-60.0	21.0-50.0		

After intervention, the experimental group showed higher scores in knowledge (18.8 vs. 16.2), attitude(44.7 vs. 39.4), and food choices (48.4 vs. 41.1). These differences were highly significant ($p < 0.001$), showing a positive effect of nutritional education.

Table 4; Comparison of pre and post mean of Knowledge based diet, Attitude based on dietary patterns and Food choices regarding dietary pattern within the experimental group

Group	Variables	Stage	Mean ± SD	Pair difference		Pair t-test	p-value
				Mean	SD		
Experiment	Knowledge based diet	Pre	16.4±2.3	2.4	2.9	6.333	.0001
		Post	18.8±1.8				
	Attitude based on dietary patterns	Pre	39.7±7.9	5.0	9.9	3.851	.0001
		Post	44.7±6.1				
	Food choices regarding dietary pattern	Pre	41.1±7.5	7.4	9.7	5.864	.0001
		Post	48.4±5.1				

The experimental group recorded significant improvements between pre- and post-test: Knowledge increased by +2.4 points ($p < 0.001$). Attitude increased by +5.0 points** ($p < 0.001$). Food choices improved by 7.4 points ($p < 0.001$). This demonstrates the effectiveness of the intervention within the same group.



Figure

4.1 : main effect of nutritional education on knowledge regarding diet

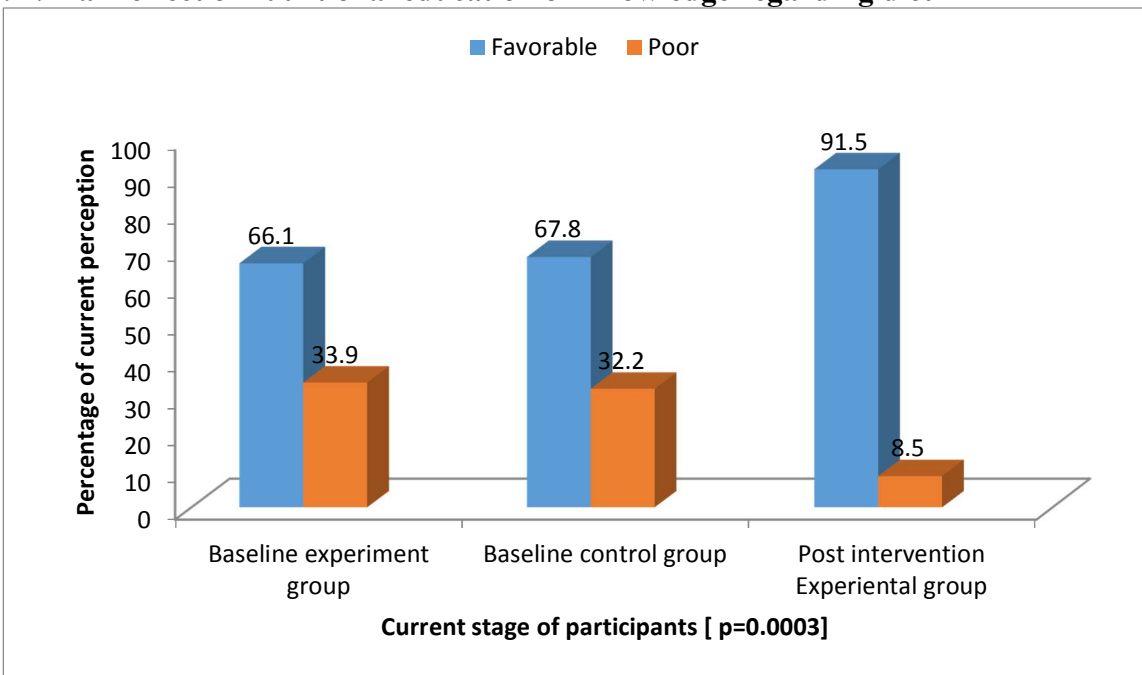


Figure 4.2 : main effect of nutritional education on attitude towards dietary pattern

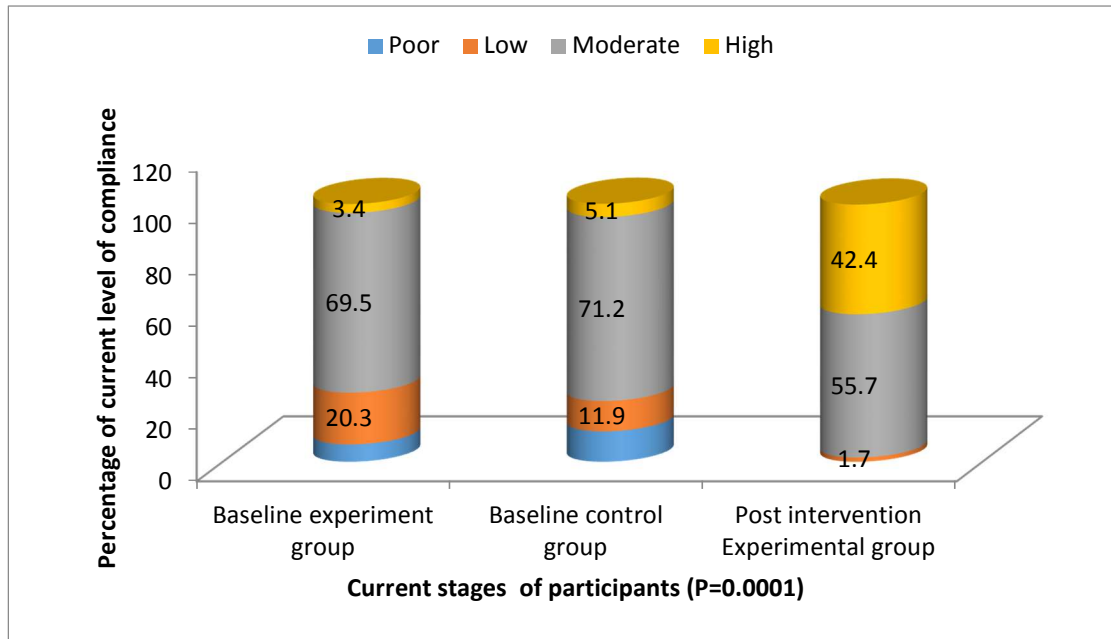


Figure 4.3. main effect of nutritional education on food choices regarding diet pattern

The figure illustrates that the experimental group had a marked improvement in knowledge scores after nutritional education compared to the control group, confirming the intervention’s impact. The chart shows that nutritional education significantly improved attitudes toward dietary practices in the experimental group, while the control group showed little change. The figure highlights a significant improvement in food choice practices (such as regular fruit intake, protein inclusion, and water consumption) in the experimental group compared to the control group (figure 1, 2 and 3)

H₀₁. There will be no significant main effect of nutritional education on knowledge regarding diet among pregnant women in Ibadan Semi-urban Areas, Oyo state

Table 4.6: Tests of Between-Subjects Effects

Group	N	Pre-test Mean ±SD	Post-test Mean ±SD	Adjusted post test mean (ANCOVA)	F(df=1,117)	p-value
Intervention	59	16.4±2.3	18.8±1.8	18.7	55.436	0.0001
Control	59	16.2±2.3	16.3±2.2	16.5		

H₀₂. There will be no significant main effect of nutritional education on attitude towards diet pattern among pregnant women in Ibadan Semi-urban Areas, Oyo state

Table 4.6: Tests of Between-Subjects Effects

Group	N	Pre-test Mean ±SD	Post-test Mean ±SD	Adjusted post test	F(df=1,117)	p-value
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				mean (ANCOVA)		
Intervention	59	39.7±7.8	44.7±6.1	43.6	34.2	0.0001
Control	59	39.4±6.8	39.7±5.9	39.8		

H₀₃. There is no significant main effect of nutritional education on food choices regarding diet among pregnant women in Ibadan Semi-urban Areas, Oyo state

Table 4.6: Tests of Between-Subjects Effects

Group	N	Pre-test Mean ±SD	Post-test Mean ±SD	Adjusted post test mean (ANCOVA)	F(df=1,117)	p-value
Intervention	59	41.1±7.5	48.4±5.1	48.6	40.872	0.0001
Control	59	40.9±8.3	41.0±7.1	41.4		

ANCOVA test of hypotheses (Knowledge, Attitude, Food choices) The ANCOVA results showed significant main effects of nutritional education: Knowledge $F=55.436$, $p<0.001$. Attitude: $F=34.2$, $p<0.001$. Food choices: $F=40.872$, $p<0.001$. This confirms that nutritional education had a statistically significant positive effect on all three outcomes

Discussion of Findings

The results on respondents' age, marital status, education, occupation, and religion. The majority were aged 25–34 years, married, and had at least secondary education. This suggests a population in active reproductive years with potential receptiveness to nutrition education. Studies confirm maternal education strongly predicts improved dietary diversity and health outcomes (Alderman et al., 2018; Olatona et al., 2018). Most respondents had moderate baseline knowledge of diet, while a smaller proportion demonstrated high knowledge. This aligns with earlier findings that pregnant women often have gaps in nutrition knowledge, affecting dietary practices (Okeke et al., 2019). Nutrition education has been shown to significantly improve this knowledge (Food and Agriculture Organisation (FAO), 2021). The finding revealed significant improvement in dietary knowledge after nutritional education compared to pre-test scores.

This supports the effectiveness of targeted interventions during pregnancy (Oladejo & Adeoye, 2016; United Nations Children's Fund (UNICEF), 2021). Unlike the intervention group, the control group's knowledge scores showed no significant difference between pre and post-tests. This confirms that improvements in the intervention group were attributable to the educational program, not external factors (Smith & Haddad, 2015). Attitude plays a central role in translating knowledge into practice, as shown in studies by Ajzen (1991) on planned behavior and Nwankwo et al. (2019) on maternal nutrition beliefs. After intervention, respondents' attitudes improved significantly, indicating that nutrition education positively shaped perceptions toward healthy diets. This echoes WHO (2020) findings that educational interventions can shift maternal attitudes toward better dietary compliance. No significant change was observed in the control group, reinforcing that attitude shifts in the intervention group resulted from the program.

Literature confirms that attitudes rarely change without structured interventions (Contento, 2016). Pre-test dietary choices were less optimal, but post-test results revealed healthier food selections, particularly in protein and fruit/vegetable intake. This supports earlier evidence that nutritional education promotes better dietary practices among pregnant women (Ogunba et al., 2019; FAO et al., 2021). Control participants maintained largely the same food choices before and after, confirming that without education, dietary patterns remain unchanged. Similar findings were reported in trials in Sub-Saharan Africa (Girard et al., 2012). The bar chart shows a clear upward shift in the intervention group compared to stagnant control group scores. This visually reinforces the intervention's positive effect. Such trends are consistent with randomized nutrition education studies (Bhutta et al., 2013). The chart illustrates that positive attitudes increased post-intervention, while negative/mixed attitudes decreased. This matches findings that health education can reshape health-related attitudes (WHO, 2020; Ajzen, 1991). The chart shows a transition from less healthy to healthier food choices among the intervention group. This aligns with studies showing that increased nutrition knowledge is strongly associated with improved dietary behavior (FAO et al., 2020; Ogunba et al., 2019).

This study examined the effectiveness of nutritional education on knowledge, attitude, and food choices regarding diet among pregnant women in semi-urban Ibadan, Oyo State. The findings revealed that most respondents were in their reproductive years, married, and had attained at least secondary education, indicating that they were at a stage where nutritional education could be impactful. Pre-test results demonstrated moderate knowledge levels and mixed attitudes toward diet, with food choices reflecting cultural and socio-economic influences. Following the nutritional education intervention, there was a statistically significant improvement in knowledge, positive attitudes toward dietary practices, and healthier food choices. Conversely, the control group showed little to no change in outcomes, suggesting that improvements observed in the intervention group were directly attributable to the education program

Conclusion

The finding concludes that nutritional education significantly enhances maternal nutrition-related knowledge, fosters positive attitudes, and promotes healthier dietary practices among pregnant women. By equipping women with correct information and dispelling myths surrounding pregnancy diets, education interventions help bridge gaps caused by cultural beliefs and limited awareness. These findings align with Ajzen's (1991) Theory of Planned Behavior, which emphasizes that knowledge and attitudes directly influence behavioral intentions and practices. They also reinforce evidence from global studies that nutrition education delivered during antenatal care reduces risks of anemia, low birth weight, and adverse maternal outcomes (Bhutta et al. 2013; FAO 2020). Therefore, integrating structured nutrition education into antenatal services is a cost-effective and sustainable strategy for improving maternal and fetal health in Nigeria.

Recommendations

Based on the findings, several recommendations are proposed. First, community health nurses should institutionalize nutrition education as a routine component of antenatal visits, ensuring that each session is participatory, culturally sensitive, and contextually relevant. Second, the government and public health authorities should provide training and resources to frontline

healthcare workers to improve the quality of dietary counseling, with a focus on promoting food diversity within the constraints of local affordability. Third, policymakers should consider subsidizing nutrient-rich foods such as fruits, vegetables, and protein sources to address financial barriers faced by low-income pregnant women. Fourth, public awareness campaigns through media, religious centers, and community forums should complement clinic-based education to reach women who may not consistently attend antenatal care. Lastly, further research should be conducted on the long-term impact of nutritional education on pregnancy outcomes and infant health, as well as on the role of male partners and families in supporting maternal dietary practices.

Despite its contributions, this study was not without limitations. It was conducted within selected local government areas in Ibadan, which may limit the generalizability of findings to other regions of Nigeria or Sub-Saharan Africa. The short follow-up period restricted the ability to assess long-term effects of the intervention on maternal and neonatal outcomes. Additionally, reliance on self-reported responses in assessing dietary practices could introduce social desirability bias, as participants may have overstated positive behaviors. The study was also limited by sample size constraints, which may affect statistical power in detecting smaller effects.

Future studies should adopt larger, more representative samples across both rural and urban communities to enable broader generalization. Longitudinal designs are recommended to track the sustained impact of nutritional education interventions on pregnancy outcomes, birth weights, and early child development. Researchers may also employ mixed-method approaches to gain deeper insights into the socio-cultural factors that shape maternal dietary behaviors. Comparative studies exploring the role of education and income levels in moderating the effectiveness of interventions will also be valuable. Such studies will provide evidence for more tailored strategies that address both knowledge gaps and socio-economic barriers, ensuring that maternal nutrition interventions are both equitable and effective.

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