Nutrition Knowledge and Practice among Pregnant Women in Igbo-Eze South Local Government Area, Enugu State

[1]Ezeh C.J.;*[1]Maduforo A. N.;[1]NwamarahJ.U.;[1]Chikwendu J.N.;[2]Okoro C.E.

[1]Department of Nutrition and Dietetics, Faculty of Agriculture, University of Nigeria, Nsukka, Enugu State, Nigeria.
[2]Nutrition Section, Federal Capital Territory Primary Health Care Board, Abuja, Nigeria

*Corresponding author's email address: aloysius.maduforo@unn.edu.ng

ABSTRACT

Background:
Objective: The study assessed nutrition knowledge and practice among pregnant women in Igbo-Eze South Local Government Area, Enugu State.
Methods: Cross-sectional survey design and multistage sampling technique was used to select respondents. Structured questionnaire was used to obtain information on the socio-demographic characteristics, dietary knowledge and practices of the respondents. A total of 159 respondents completed the study. Descriptive statistics was used to present the result. Chi-Square was used to test the association between the categorical variables. Pearson correlation was used to correlate numerical variables. Significance level was accepted at $p < 0.05$.
Results: A total of 12.0% were adolescents (10-19 years old). Nutrition knowledge assessment showed that 45.2% were knowledgeable on pregnancy nutrition. Dietary practices showed that 40.9% of the subjects ate three meals daily, 81.1% ate pastries, 61% took soft drinks, 15.1% took hot drinks (alcohol), 81% do not take stout and 70.4% do not eat bitter cola. About 62.3% of the subject had food aversion while about 37% had food related cultural taboos. Some (45.3%) of the respondents had a high dietary diversity while 43.4% and 3.1% had a medium and low dietary diversity respectively. Significant association ($p = 0.025$) was found between dietary diversity and gestational age of the respondents.
Conclusion: Nutrition knowledge of the pregnant women is poor but had no significant effect on the dietary practices of pregnant women attending antenatal clinics in Igbo-Eze South Local Government Area, Enugu state.

Keywords: Maternal Nutrition, Nutrition Knowledge, Practices, Pregnancy

INTRODUCTION

Adequate nutrition is a vital necessity needed by humans for good health and development throughout life (1). Nutrition during preconception as well as throughout pregnancy has a major impact on the outcome of pregnancy (1). Women who are malnourished before and during pregnancy are more likely to experience adverse pregnancy outcomes (2). Nutrition before, during and after pregnancy is of extreme importance to both the mother and child because the expectant mother needs adequate energy and nutrients to support the foetus, supply energy needed for milk formation during lactation and for growth of other related tissues (3). Due to the recognition of the increased physiologic, metabolic and nutritional demand placed on the woman by her pregnancy, nutritionists, prenatal care providers and public policymakers all accept that it is the quality of the diet, not its quantity that is most important (4). Regrettably, the rate of dietary inadequacies is higher during pregnancy than at any other stage of the life cycle (3,5).

Implication of malnutrition on the mother and child are abundant in literature - Intra Uterine Growth Restriction (IUGR), low birth weight (LBW), preterm birth, maternal depletion, prenatal and infant mortality and morbidity are

short term consequences of inadequate nutrition (6,7). Long term consequences of poor maternal nutrition have metabolic or pathophysiologic effects which manifest as disorders of child growth and development as well as adult chronic diseases (such as cardiovascular diseases) after a long time period (6,8). Adequate maternal nutrition knowledge and dietary practices before and during pregnancy is therefore necessary to ensure positive pregnancy outcomes (2).

There is scarcity of data on the nutrition knowledge and dietary practices of pregnant women in the study area, hence, this study assessed the nutrition knowledge and practices among pregnant women in Igbo-Eze South Local Government Area, Enugu State.

The study adopted a cross-sectional health clinic based survey design which was carried out in Igbo-Eze South Local Government Area of Enugu State. Health centres were randomly selected using 30% of the total (23) health facilities in Igbo-Eze South Local Government Area, and convenience sampling was used to select respondents.

Methods of data collection
Ethical clearance was obtained from the Health Research Ethical Committee University of Nigeria Teaching Hospital (UNTH) Ituku/Ozalla, Enugu State before the study commenced. The Head Nurse in charge of each selected health facility and care providers were informed prior to the study and their consent obtained before the onset of data collection. Furthermore, all the study participants were informed about the purpose of the study, their right to withdraw and assurance of confidentiality

Materials and Methods
Strict confidentiality was assured through anonymous recording and coding of questionnaire.

A structured questionnaire was developed based on the research's specific objectives and validated by lecturers in the Department of Nutrition and Dietetics, University of Nigeria. The questionnaire was administered directly to the study subjects by the researcher and trained research assistants using interviewer-administered method. The data obtained

included; socio-demographic characteristics of respondents, dietary knowledge and practices including their likes and dislikes, beliefs and cultural values related to nutrition in pregnancy. Knowledge was assessed by awarding one mark for each correct answer and zero mark for a wrong answer. The total sum was obtained and the percentage of the score taken. The percentage scores were classified as follows: < 40%= poor, 40-49% = fair, 50-69% = good, 70-90% = very good and > 90% =excellent.

A 24-hour dietary recall was used to collect information on the food intake of the respondents. The information obtained was then used to assess the dietary diversity, diet adequacy and dietary practice of the respondents. Using the information obtained from the 24-hour dietary recall, dietary diversity score (DDS) was computed based on the 2010 FAO guideline for measuring household and individual dietary diversity for women of reproductive age. A single point was awarded to each food group consumed over the reference period and a sum total of all points calculated. The low dietary category was classified as ≤3 food group; medium diversity category as 4-5 food groups and high diversity as ≥6 food groups (9,10).

Diet adequacy was assessed using respondent's consumption of four-star diet. The four-star diet is a meal plan where the servings at each meal (breakfast, lunch, dinner or in-between) must contain nutrients from the four major food groups to ensure adequacy. The meal plan includes the staples, legumes, vitamin A rich fruits and vegetables and animal source foods. Half mark was assigned if respondent ate only one food from a food group and one mark if respondent consumed two or more foods from a particular food group. The total sum was then used to classify the adequacy of the diet. A score of ≤ 2 was recorded as inadequate while a score of ≥ 3 was recorded as adequate.

Statistical Analysis
The data was checked, cleared and entered into IBM SPSS Statistics software version 22. Descriptive analysis such as proportions, frequency distribution and measures of central tendency were performed. Chi-Square was used to test the association between the categorical variables. Significance level will be accepted at p

< 0.05.

Results

The socio-demographic characteristics of the respondents are presented in Table 1. It shows that 40.9% of the respondents were aged 20-25 years while 1.9% were 10-15 years old; 56.6% were in their third trimester, 91.8% were married, and 98.1% were Christians. About 73% of the respondents attained secondary education as their highest level of education while 0.6% had a postgraduate degree; 47.4% of the respondents earn below N 15,000 while 1.9% earn above N 45,000.

The nutrition knowledge of the respondents is shown in Table 2. About 12% had excellent knowledge of the importance of good nutrition, 76.1%, 9.4%, 23.3% and 0% had excellent knowledge of components of an adequate diet, carbohydrate, proteins and sodium rich food sources respectively.

Respondents' source of information on pregnancy nutrition is presented in Table 3. Majority (79.9%) of the respondents had received advice on pregnancy nutrition and 10.1% had never received any advice. About 80% obtained the information from the hospital/health center, 6.9% from family/mother-in-law while 1.3% obtained the information from the church.

The dietary practices of the respondents' summarized in Table 4 shows that 40.9% of the subjects ate three meals daily, about 38% consumed animal protein 2-3 times weekly, 52.2% of the respondents consumed plant protein 2-3 times weekly and 49.1% ate vegetables daily.

Table 5 shows the type and intake of snacks consumed by pregnant women. About 87% of the respondents ate groundnut, 81.1% ate pastries, 61% took soft drinks, while 79.8% and 70.4% do not take alcohol and bitter cola respectively.

Table 6 shows the Dietary pattern and dietary diversity of the respondents. Less than half (45.9%) of subjects do not skip meals; 28.9% skipped meals due to anorexia and 54.7% of the respondents had food cravings. Majority (72.6%) of the respondents had a medium dietary diversity and 1.4% had a high dietary diversity.

Four star diet adequacy showed that 86.3% of the respondents consumed an adequate diet.

Table 7 shows the relationship between the nutrition knowledge and dietary practices of the respondents. No significant (p > 0.05) relationship existed between the nutrition knowledge and dietary practices of the respondents.

Table 8 presents the correlation between gestational age, nutrition knowledge score and dietary practice of the respondents. It shows that gestational age had a negative significant relationship with dietary diversity score (p = 0.025). This relationship shows that as the respondents gestation age increases, their dietary diversity decreases. It further showed that as respondents' knowledge of importance of good nutrition increased, their knowledge of food sources of vitamins and minerals as well as knowledge of effects of maternal under-nutrition also increased. Knowledge score of carbohydrate rich foods increased with knowledge score of foods sources of protein (p = 0.000), vitamins and minerals (p = 0.000), fats/oil and sodium (p = 0.001) as well as knowledge score on effects of maternal under-nutrition (p = 0.00).

Discussion

This study provides insight on the nutrition knowledge and dietary practices of pregnant women in Igbo-Eze South Local Government Area, Enugu State. This study showed that the respondents were within the age range of 10-40 years while a greater percentage of the respondents were between 20-30 years of age. This is in accordance with other studies (6,11) which reported that majority of the respondents were within age group of 15-24 and 21-25 years respectively. Ideally pregnancy within the age range of 20 - 34 years is associated with fewer complications and lower risk in pregnancy (12). It is also worthy of note that the incidence of teenage pregnancy in the study area was low. This is contrary to a study which reported the prevalence of teenage pregnancy to be 27% in a study carried out in Nwangele Local Government Area, Imo State (13). Majority of the respondents were in their second and third trimester similar to that reported in other studies (6,13,14). Educational level is a key determinant of the type of occupation which one engages in and this in

turn is likely to influence the income of that person. The findings from this study showed that most of the respondents' attained secondary education as their highest educational qualification, were mostly traders and earned below N 15,000 monthly. This reveals the level of poverty in the study area as most of the respondents earned below the minimum wage of N 18,000. This is similar to a study on knowledge and attitudes of pregnant mothers towards maternal dietary practices during pregnancy (2, 13) but in contrast to another study where majority of the respondents (63.27%) were illiterate and about 67%, house wives (14).

In general, the present study revealed that 45.2% of the respondents had a poor knowledge of nutrition. The poor nutrition knowledge of the respondents may be due to the low educational status, low income and lack of information about nutrition during pregnancy. Education plays an important role in improving nutrition knowledge. When people are educated, they could read food labels, nutrition information and even nutrition books which could enlighten them on some common issues relating to their health and nutrition. The present study showed higher knowledge scores than those reported in another study where 21% of the respondents had good knowledge of carbohydrate food sources (14). However, consonant to this finding is a study carried out in Alexandria, Egypt where 61.7% of the respondents were found to have poor knowledge of dietary practices in pregnancy (15). Poor nutrition knowledge can negatively influence dietary practices (16).

Studies by two other authors showed that majority claimed that they have been advised on good dietary practices in pregnancy of which most of the respondents reported that they obtained the information from the antenatal clinic and health professionals (14,17). The findings from these studies are consistent with the present findings. This implies that most respondents that have access to reliable information on nutrition during pregnancy are more likely to have healthy dietary practices.

Dietary practice is influenced by nutrition knowledge. Individuals who have good knowledge of nutrition are more likely to have better dietary practices. This finding revealed that

respondents had low intake of animal protein, plant protein, fruits and vegetables but high intake of energy dense staples and pastries. Fruits and vegetables supply cheap micronutrients for rural dwellers who could easily harvest these from their farms, but poor nutrition knowledge affected their intake of foods from these food groups during pregnancy. The finding is in discordance with a study which revealed that respondents maintained good dietary practices during pregnancy despite high level of illiteracy (14). This disparity might be as a result of the differences in socio-cultural values of the study population with respect to food and exposure to nutrition information during pregnancy. Inadequate consumption of animal and plant proteins as well as fruits and vegetables during pregnancy results in nutritional deficiencies such as anemia, protein and micronutrient deficiencies (18).

Furthermore, the meal skipping pattern of the respondents revealed that more than half (51.6%) skipped meals and this was mostly attributed to loss of appetite and unavailability of food. Food insecurity is one of the highest causes of malnutrition in developing country like Nigeria especially in a rural setting where this study was carried out. However, it was reported by Maduforo (2010) (13) that only 35% of the subjects skipped meals and this was attributed to their lifestyle, fear of vomiting and macrosomalfeotus(19). This practice of meal skipping can cause keto-acidosis which occur as a result of depriving the fetal brain of needed glucose and may impair cognitive development (13).

Food craving a special desire for food and non-food substance is common among pregnant women (20). Findings of a previous study showed that majority of the subject had cravings for potential harmful substances which should be avoided during pregnancy and also avoided some nutritious foods (2). In Sudan, 93% of pregnant women had various food cravings (14). Also, a study on maternal dietary intake during pregnancy in Riydah, Saudi Arabia showed that the percentage of pregnant women with pica and food aversion were 28.1%, 13.2% and 47.4% respectively (21). A study on prevalence of pica among pregnant women in Bauchi State, Nigeria reported that respondents ingested non-food

substances such as sand (14.8%) and ice (18.8%) (22). Also, a study conducted in Rivers State, Nigeria reported the ingestion of clay among pregnant women to be 50% (23). These findings are in concordance with the present study where more than half (54.7%) of the respondents practiced food craving and pica. There is no scientific proven evidence why women crave for some food or non-food substances during pregnancy except clay which is related to aneamia(20,24). These unhealthy cravings and aversions if not controlled can result in nutritional deficiencies because it will replace times for eating healthy foods and some of the non-food substances like clay have shown to contain microorganisms from the soil which could result to ill health (24).

Socio-economic and cultural factors are major predictors of health and nutritional status among women (25). Culture can influence food/nutrient intake of pregnant mothers through food prohibition, restriction or taboo. In a study on determinant of health and nutritional status among rural Nigerian women, 63.5% of the subject reported to have no cultural taboo while 38.5% accept and practiced one or more cultural food restriction. Some of the foods avoided were grass-cutter, dika nut (ogbono), bush meat, egg and cassava foofoo(25). A lower percentage (15%) of existence and practice of cultural taboo was reported in another study (13) while similar findings were reported by other authors (14,15,26).

In a study on determinants of dietary diversity among Pregnant women in Laikipia County, Kenya most of the respondents (61%) were in the high dietary diversity (≥ 6 food groups) category, 37% were in the medium (4-5 food groups) dietary diversity while 2% of the participants were in the low diversity category (≤ 3 food groups) (27). The findings of this study conducted in Kenya is contrary to the findings of the present study where 94.4% and 1.2% of the respondents had a medium and high dietary diversity respectively (28). A high dietary diversity during pregnancy has been associated with healthier birth outcomes as well as a reduced risk of aneamia (29, 30). The four-star diet adequacy of respondents revealed that majority had an adequate diet contrary to a study which reported high levels of dietary inadequacies during pregnancy (6). Significant associations were found between dietary diversity and gestational age. Dietary diversity was found to decrease as gestational age increases.

Table 1: Socio-demographic characteristics of Pregnant Women in Igbo-Eze South Local Government Area, Enugu State

Variable	Frequency	Percentage
Age (Years)		
10-15	3	1.9
16-19	16	10.0
20-25	65	40.9
26-30	54	34.0
31-35	17	10.7
36-40	4	2.5
Total	**159**	**100**
Gestational Age (Trimester)		
First	4	2.5
Second	65	40.9
Third	90	56.6
Total	**159**	**100**
Marital Status		
Single	10	6.3
Married	146	91.8
Divorced	2	1.3
Separated	1	0.6
Total	**159**	**100**
Religion		
Christianity	156	98.1
Traditional worshipper	3	1.9
Total	**159**	**100**
Educational status of Respondents		
No formal education	1	0.6
Primary level	21	13.2
Secondary level	116	73.0
Diploma (ND)	10	6.3
HND/Degree	5	3.1
Postgraduate	1	0.6
No Response	5	3.1
Total	**159**	**100**
Monthly Income		
Below ₦ 15,000	75	47.2
₦ 15,001 - ₦ 25,000	36	22.6
₦ 25,001- ₦ 35,000	19	11.9
₦ 35,001- ₦ 45,000	12	7.5
₦ 45,001 and above	3	1.9
No response	14	8.8
Total	**159**	**100**

Table 2: Nutrition knowledge of pregnant women in Igbo-Eze South Local Government Area, Enugu State

Variable	Nutrition knowledge scores					
	Poor F (%)	Fair F (%)	Good F (%)	Very good F (%)	Excellent F (%)	Total F (%)
Importance of good nutrition	9 (5.7)	15 (9.4)	77 (48.4)	39 (24.5)	19 (12.0)	**159 (100)**
Knowledge of carbohydrate rich foods	11 (6.9)	16 (10.1)	56 (35.2)	61 (38.4)	15 (9.4)	**159 (100)**
Knowledge of protein rich foods	11 (6.9)	31 (19.5)	44 (27.7)	36 (22.6)	37 (23.3)	**159 (100)**
Sources of vitamins and minerals	21 (13.2)	3 (1.9)	62 (39.0)	40 (25.2)	33 (20.8)	**159 (100)**
Knowledge on sources of fats and oil	17 (10.7)	19 (11.9)	34 (21.4)	55 (34.6)	31 (21.4)	**159 (100)**
Knowledge of Sodium rich foods	36 (22.6)	3 (1.9)	51 (32.1)	37 (23.3)	0 (0.0)	**159 (100)**
Knowledge on importance of protein rich foods	29 (18.2)	12 (7.5)	50 (31.4)	49 (30.8)	19 (11.9)	**159 (100)**
Knowledge on effects of maternal Under nutrition	27 (17.0)	29 (18.2)	56 (35.2)	38 (23.9)	9 (5.7)	**159 (100)**
Knowledge on examples of snacks	24 (15.1)	7 (4.4)	51 (32.1)	41 (25.8)	36 (22.6)	**159 (100)**

Table 3: Source of nutrition information during pregnancy among pregnant women in Igbo-Eze South Local Government Area, Enugu State

Variable	Frequency	Percentage
Received advice on what to eat during pregnancy		
Yes	143	89.9
No	16	10.1
Total	**159**	**100**
Source of information		
Hospital/health center	127	79.9
Church	2	1.3
Family/mother-in-law	11	6.9
Friends	3	1.9
Never been advised	16	10.0
Total	**159**	**100**

Table 4: Dietary practices of pregnant women in Igbo-Eze South Local Government Area, Enugu State

Variable	Frequency	Percentage
Number of meals respondents eat in a day		
One	5	3.1
Two	9	5.7
Three	65	40.9
Based on appetite	45	28.3
Based on food availability	10	6.3
More than 3	25	15.7
Total	**159**	**100**
Consumption frequency of animal protein		
Daily	23	14.5
4-5 times weekly	29	18.2
2-3 times weekly	61	38.4
Once a week	32	20.1
Once in two weeks	7	4.4
Once a month	7	4.4
Total	**159**	**100**
Consumption frequency of plant protein		
Daily	20	12.6
4-5 times weekly	26	16.4
2-3 times weekly	83	52.2
Once a week	21	13.2
Once in two weeks	6	3.8
Once a month	3	1.9
Total	**159**	**100**
Consumption frequency of fruits and vegetables		
Daily	78	49.1
4-5 times weekly	37	23.3
2-3 times weekly	33	20.8
Once a week	9	5.7
Once in two weeks	2	1.3
Total	**159**	**100**
Consumption frequency of pastries		
Daily	20	12.6
4-5 times weekly	13	8.2
2-3 times weekly	45	28.3
Once a week	32	20.1
Once in two weeks	22	13.8
Once a month	8	5.0
No response	19	11.9
Total	**159**	**100**

Table 5: Type and intake of snacks consumed by pregnant women in Igbo-Eze South Local Government Area, Enugu State

Variable	Yes F (%)	No F (%)	Total F (%)
Consume the following			
Groundnut	139 (87.4)	20 (12.6)	**159 (100)**
Garden egg	129 (81.1)	30 (18.9)	**159 (100)**
Cucumber	113 (71.1)	46 (28.9)	**159 (100)**
Watermelon	124 (78.0)	35 (22.0)	**159 (100)**
Pastries	129 (81.1)	30 (18.9)	**159 (100)**
Soft drinks	97(61.0)	62 (40)	**159 (100)**
Alcohol	32 20.1)	127 (79.8)	**159 (100)**
Bitter cola	47 (29.6)	112 (70.4)	**159 (100)**

Table 5: Type and intake of snacks consumed by pregnant women in Igbo-Eze South Local Government Area, Enugu State

	Frequency	Percentage
Skip meals		
Yes	86	54.1
No	73	45.9
Total	**159**	**100**
Frequency of skipping meals		
Everyday	16	10.1
Once a week	13	8.2
Twice a week	14	8.8
Irregular	43	27.0
Do not skip meals	73	45.9
Total	**159**	**100**
Reasons for skipping meals		
Loss of appetite	46	28.9
Time constraint	10	6.3
Tired/weak to cook	1	0.6
No food available	20	12.6
Religion (fasting)	3	1.9
Health	3	1.9
Others	3	1.9
Do not skip meals	73	45.9
Total	**159**	**100**
Crave for a particular food or substance		
Yes	87	54.7
No	72	45.3
Total	**159**	**100**
Food aversion		
Yes	60	37.7
No	99	62.3
Total	**159**	**100**
Cultural taboo		
Yes	60	37.7
No	99	62.3
Total	**159**	**100**
Low diversity	38	26.0
Medium diversity	106	72.6
High diversity	2	1.4
Total	**146**	**100**
Diet Adequacy using Four Star Diet		
Adequate	126	86.3
Inadequate	20	13.7
Total	**146**	**100**

Table 6: Dietary pattern and dietary diversity of pregnant women in Igbo-Eze South Local Government Area, Enugu State

	Frequency	Percentage
Skip meals		
Yes	86	54.1
No	73	45.9
Total	**159**	**100**
Frequency of skipping meals		
Everyday	16	10.1
Once a week	13	8.2
Twice a week	14	8.8
Irregular	43	27.0
Do not skip meals	73	45.9
Total	**159**	**100**
Reasons for skipping meals		
Loss of appetite	46	28.9
Time constraint	10	6.3
Tired/weak to cook	1	0.6
No food available	20	12.6
Religion (fasting)	3	1.9
Health	3	1.9
Others	3	1.9
Do not skip meals	73	45.9
Total	**159**	**100**
Crave for a particular food or substance		
Yes	87	54.7
No	72	45.3
Total	**159**	**100**
Food aversion		
Yes	60	37.7
No	99	62.3
Total	**159**	**100**
Cultural taboo		
Yes	60	37.7
No	99	62.3
Total	**159**	**100**
Low diversity	38	26.0
Medium diversity	106	72.6
High diversity	2	1.4
Total	**146**	**100**
Diet Adequacy using Four Star Diet		
Adequate	126	86.3
Inadequate	20	13.7
Total	**146**	**100**

Table 7: Relationship between nutrition knowledge and practice of pregnant women in Igbo-Eze South Local Government Area, Enugu State

Variable	Dietary diversity x^2 (p- value)	Diet adequacy using 4-star diet x^2 (p- value)
Importance of good nutrition	7.893^a (0.444)	5.24^a (0.263)
Knowledge of an adequate diet	3.764^a (0.439)	0.590^a (0.745)
Knowledge of carbohydrate rich foods	8.439^a (0.392)	5.644^a (0.227)
Knowledge of protein rich foods	6.055^a (0.641)	3.465a (0.483)
Sources of vitamins and minerals	6.022^a (0.645)	8.938^a (0.063)
Knowledge on sources of fats and oil	6.544^a (0.587)	1.379^a (0.848)
Knowledge of Iron rich foods	1.303^a (0.861)	1.349^a (0.509)
Knowledge of Sodium rich foods	8.761^a (0.363)	1.273^a (0.866)
Knowledge on examples of snacks	12.553^a (0.128)	6.267^a (0.180)
Knowledge on importance of protein rich foods	11.960^a (0.153)	4.016^a (0.404)
Knowledge on effects of maternal Under nutrition	5.182^a (0.738)	3.485^a (0.480)

Table 8: Correlation between gestational age, nutrition knowledge score and dietary practice of pregnant women in Igbo-Eze South Local Government Area, Enugu State

	Gestational Age	Score Knowledge on importance of good nutrition	Score of carbohydrate rich foods	Score of protein rich foods	Score of vitamin and mineral sources of foods	Score on fats and oil	Score on iron rich foods	Score on sodium rich foods	Knowledge score on effects of maternal under nutrition	Dietary diversity score	Four star diet	Score on examples of snacks
	r value (p value)	r value (p value)	r value (p value)	r value (p value)	r value (p value)	r value (p value)	r value (p value)	r value (p value)	r value (p value)	r value (p value)	r value (p value)	r value (p value)
Gestational Age	1											
Knowledge Score on importance of good nutrition	0.050 (0.534)	1										
Knowledge Score On carbohydrate rich foods	0.079 (0.320)	-0.021 (0.791)	1									
Knowledge Score on protein rich foods	0.095 (0.233)	0.103 (0.195)	0.537 (0.000)**	1								
Score on vitamin and mineral sources of foods	0.136 (0.088)	0.240 (0.002)**	0.436 (0.000)**	0.543** (0.000)	1							
Score on fats and oil	0.109 (0.171)	0.021 (0.793)	0.530 (0.000)**	0.415 (0.000)**	0.465 (0.000)**	1						
Score on iron rich foods	-0.004 (0.958)	-0.053 (0.510)	0.254 (0.001)**	0.184 (0.021)*	0.347 (0.000)**	0.366 (0.000)**	1					
Score on sodium rich foods	-0.094 (0.238)	-0.033 (0.683)	0.138 (0.082)	0.177 (0.026)*	0.193 (0.015)*	0.173 (0.029)*	0.259 (0.001)**	1				
Knowledge score on effects of maternal under-nutrition	0.089 (0.267)	0.301 (0.000)**	0.305 (0.000)**	0.234 (0.003)**	0.299 (0.000)**	0.282 (0.000)**	0.202 (0.011)*	0.128 (0.107)	1			
Dietary diversity score	-0.185 (0.025)*	0.122 (0.143)	-0.060 (0.468)	-0.062 (0.457)	-0.038 (0.645)	0.029 (0.728)	0.003 (0.971)	-0.061 (0.467)	-0.118 (0.158)	1		
Four Star Diet	-0.030 (0.723)	0.046 (0.579)	0.035 (0.673)	0.094 (0.457)	0.079 (0.345)	0.066 (0.427)	0.041 (0.626)	0.038 (0.649)	0.037 (0.657)	0.327 (0.000)**	1	
Knowledge score on snacks	-0.018 (0.825)	0.118 (0.140)	0.143 (0.073)	0.015 (0.850)	0.252 (0.001)**	0.191 (0.016)*	0.229 (0.004)**	0.108 (0.174)	0.257 (0.001)**	-0.147 (0.076)	-0.030 (0.722)	1

*p < 0.05 **p <0.01

Conclusion and Recommendation

The findings showed that most of the women attending selected antenatal clinics in Igbo-Eze South Local Government Area had poor knowledge of nutrition but this had no significant effect on their dietary practices. There is need for better nutrition education in antenatal clinics in the rural communities as this would help improve nutrition knowledge of pregnant women attending the clinics. Similar studies needs to be carried out among nurses and midwives in the study area to ascertain the quality of information passed on to the public.

Acknowledgment

Conflict of interest

The authors declare that they have no conflict of interest.

Ethical Clearance

Ethical clearance was obtained from the Health Research Ethical Committee, University of Nigeria Teaching Hospital, Ituku/Ozalla.
Ethical approval number: NHREC/05/01/2008B-FWA00002458-1RB00002323

References

1. World Bank (2006). Repositioning Nutrition as central to development: A strategy for large scale action, TheInternational Bank for Reconstruction and Development. Washington DC, USA.

2. Suh, A.N., Nguti, A.K., Nana, P.N., Koki, P.N. (2016). Knowledge and Attitudes of Pregnant Mothers towards Maternal Dietary Practices During Pregnancy at the Etoug-Ebe Baptist Hospital Yaounde. Journal of Health Science Discovery, 17(2).

3. Mudambi, S.R., Rajagopal, M.V. (2007). Meal Planning for Various Age Groups. In: Fundamentals of Foods, Nutrition and Diet Therapy. 5th ed. New Age International Ltd, New Delhi pp. 188–9.

4. Sholeye, O., Badejo, C., Jeminisi, O. (2014). Dietary Habits of Pregnant Women in Ogun-East Senatorial Zone, Ogun state, Nigeria: ACcomparative Study. International Journal of Nutritional Metabolism, 6(4):42–9.

5. Okunaiya, G., Fadupin, G., Oladeji, D. (2016). knowledge, Attitude and Practice of Maternal and Child Food-Based Dietary Guidelines Among Preganant Women in Urban Slum of Lagos. Clinics Mothers Health, 13:240.

6. Daba, G., Beyene, F., Fekadu, H., Garoma, W. (2013). Assessment of Knowledge of Pregnant Mothers on Maternal Nutrition and Associated Factors in Guto Gida Woreda, East Wollega Zone, Ethiopia. Journal of Nutritional Disorders and Therapy, 4(1).

7. Triunfo, S., Lanzone, A. (2014). Impact of maternal undernutritionon obstetric outcomes. Journal of Endocrinological Investigation,38(1):1–18.

8. Vafa, M., Mahmoodianfard, S. (2015). Effects of Maternal Nutrition and Childhood Growth on Later Life. Advances in Obesity, Weight Management Control, 3(3):1–4.

9. F.A.O (2006). Baseline Survey Report Protecting and Improving Household Food Security and Nutrition in HIV/AIDS Affected Areas in Mania and Sofala Province.

10. FANTA (2006). Developing and Validating Simple Indicators of Dietary quality and energy intake of infants and young children in developing countries: summary feeding indicatiors. Washington, D.C.

11. Adesuyi, E.O. (2016). Attitude of Pregnant Women Attending Ante-natal Clinic towards Adequate Diet in the Prevention of Anaemia in Selected Hospitals in Osogbo. British Journal of Medicine and Medical Research,14(12):1–10.

12. Cavazos-Rehg, P., Krauss, M., Spitznagel, E., Bommarito, K., Madden, T., Olsen, M., et al (2015). Maternal age and risk of labor and delivery complications. Maternal and Child Health Journal, 19(6):1202–11. Available from: https://www.ncbi.nlm.nih.gov/pmc/artic les/PMC4418963/pdf/nihms639929.pd f

13. Maduforo, A.N. (2010). Superstition and Nutrition Among Pregnant Women In Nwangele Local Governmeny Area Of Imo State, Nigerian Jounal of Research and Development, 8(2).

14. Kever, R.T., Martins, S.D., Lola, N., Dathini, Habu, Fatima, A.A. (2015). Knowledge and attitude of pregnant Women towards dietary practices in Yerwa Clinic, Maiduguri Metropolitan Council; Borno State. Jounal of Research in Nursing and Midwifery,4(1):12–9.

15. Yassin, S.A., Sobhy, S.I., Ebrahim, W. (2004). Factors Affecting Dietary Dietary Practice Among Adolescent Pregnant Women in Alexandria. Journal Egypt Public Health Association, 79 (3-4)179–96.

16. Zerfu, T., Biadgilign, S. (2018). Pregnant mothers have limited knowledge and poor dietary diversity practices, but favorable attitude towards nutritional recommendations in rural Ethiopia: evidence from community-based study. BMC Nutrition, 4(43).

17. Zelalem, A., Endeshaw, M., Ayenew, M., Shiferaw, S., Yirgu, R. (2017). Effect of Nutrition Education on Pregnancy Specific Nutrition Knowledge and Healthy Dietary Practice among Pregnant Women in Addis Ababa. Clinics in Mother and Child Health, 14(3):265.

18. Sebastiani, G., Barbero, A.H., Casanova, M., Aldecoa-Bilbao, V., Andreu-Fernández, V., Tutusaus, M., et al (2019). The Effects of Vegetarian and Vegan Diet during Pregnancy on the Health of Mothers and Offspring. Nutrients, 11:557.

19. Maduforo, A., Nwosu, O. (2013). Food Superstition, Feeding Practices And Nutritional Antropomerty Of Pregnant Women. Journal of Research in National Development, 11(1).

20. Kariuki, L., Lambert, C., Purwestri, R., Biesalski, H.K. (2016). Trends and consequences of consumption of food and non-food items (pica) by pregnant women in Western Kenya. NFS Journal, 5:1–4. Available from: http://dx.doi.org/10.1016/j.nfs.2016.09.001

21. Khalid, S.A., Ibrahim, A.B., Mohammed, A.A., Mohammed, A.A. (2007). A study of maternal dietary intake during pregnancy in Riyadh, Saudi Arabia. Journal of Family and Community Medicine, 14(1):9–13.

22. Muhammad, B., Alkali, M., Bala, A.M., Toyin, A., Aniobi, C. (2019). Prevalence of pica among pregnant women attending antenatal clinic in a tertiary facility in Nigeria. Annals of African Medicine and Research, 2(89):66–9.

23. Anthonia, P.A. (2019). Pica Practice and Associated Factors among Pregnant Women Receiving Antenatal Care in Obio Cottage Hospital, Port Harcourt, Rivers State. Asian Research Journal of Gynaecology Obstetrics,2(2):1–12.

24. Brown, J.E., Isaacs, J.S., Krinke, U.B., Lechtenberg, E., Murtaugh, M.A., Sharbaugh, C., et al (2011). Nutrition through the Life cycle. 4th ed. Wadsworth Cengage learning

25. Ene-Obong, H.N., Enugu, G., Uwaegbute, G.I. (2001). Determinant of Health and Nutritional Status of Rural Nigerian Women. Journal of Health Population and Nutrition, 19(4) 320–30.

26. Gutierrez, Y.M. (1999). Cultural Factors Affecting Diet and Pregnancy Outcome of Mexican American Adolescent. Journal of Adolescent Health, 25(3):227-37

27. Kiboi, W., Kimiywe, J., Chege, P. (2017). Determinants of dietary diversity among pregnant women in Laikipia County, Kenya: a cross-sectional study. Journal of Biochemical Nutrition, 3(12).

28. World Health Organization (2002). Training course on the management of severe acute malnutrition: Principles of care. Geneva, Switzerland.

29. Romedan, D., Dessalegn, T., Beakal, Z. (2018). Dietary Diversity and Its Association with Anemia among Pregnant Women Attending Public Health Facilities in Hossana Town, South Ethiopia. Ethiopian Journal of Health Science, 28(5):625. doi:http://dx.doi.org/10.4314/ejhs.v28i5.14

30. Ayensu, J., Annan, R., Lutterodt, H., Edusei, A., Peng, L. (2020.) Prevalence of anaemia and low intake of dietary nutrients in pregnant women living in rural and urban areas in the Ashanti region of Ghana. PLoS ONE 15(1): e0226026. https://doi.org/10.1371/journal.pone.0226026