

RESEARCH ARTICLE

Dietary intake knowledge and reasons for food restriction during pregnancy among pregnant women attending primary health care centers in Ile-Ife, Nigeria

Matthew O. Oluleke¹, Akintayo O. Ogunwale², Oyedunni S. Arulogun³, and Ademola L. Adelekan⁴

¹ Department of Community Health Nursing, Obafemi Awolowo University Teaching Hospital, Ile-Ife, Osun State, Nigeria

² Department of General Studies, Oyo State College of Agriculture and Technology, Igboora, Oyo State, Nigeria

³ Department of Health Promotion & Education, College of Medicine, University of Ibadan, Ibadan, Nigeria

⁴ THRIVES Project, Department of Medicine, University College Hospital, Ibadan, Nigeria

Abstract: The study investigated dietary intake knowledge and reasons for food restriction during pregnancy among pregnant women attending antenatal clinics in Ile-Ife, Nigeria. This cross-sectional survey involved 530 pregnant women visiting 35 primary health care (PHC) centers in Ile-Ife. Interviewer-administered questionnaire used to collect data included a 30-point knowledge scale and food restriction related questions. Data were analyzed using descriptive statistics and chi-square at $P = 0.05$. Mean age was 27.0 ± 5.3 years, 44.5% had tertiary education and 11.1% earned above ₦50,000 monthly (approximately US\$315). Mean knowledge score was 23.6 ± 4.2 and 75.5% had good knowledge. Higher education was significantly associated with good knowledge of dietary intake. Reasons for food restriction during pregnancy included cultural taboos (36.5%) and religious beliefs (12.1%). Major foods that were restricted or avoided for cultural reasons were protein and vitamin-rich foods such as snail (97.5%) and walnut (84.0%). Foods avoided based on religious beliefs included pork (87.4%) and dog (76.9%). A higher proportion (94.8%) of respondents who earn more than ₦50,000 avoided foods due to cultural taboos (94.8%) compared with those without monthly income (58.3%) ($P \leq 0.05$). The proportions of respondents who avoided foods due to cultural taboos with no formal, primary, secondary, and tertiary education were 95.5%, 93.8%, 79.8%, and 86.4% respectively ($P \leq 0.05$). Overall, respondents were knowledgeable about dietary intake. However, cultural taboos and religious beliefs were major reasons for food restriction among pregnant women and were more pronounced among women with low education and low monthly income. Nutrition education interventions are needed to address the phenomenon.

Keywords: pregnant women, food restriction, dietary intake, cultural taboos

*Correspondence to: Akintayo O. Ogunwale, Department of General Studies, Oyo State College of Agriculture and Technology, Igboora, Oyo State, Nigeria; Email: tayoogunwale@yahoo.com

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1. Introduction

The problem of malnutrition among women is of serious public health concern (Maduforo, 2010). The well-being of mother and the newborn infant is greatly determined by the nutrition of the expectant mother during pregnancy and it further influences the health of the child during childhood and adulthood (Bhargava, 2000; Scholl and Johnson, 2000). According to a previous study (Harding, 2001), spontaneous abortion, impaired fetal growth, poor pregnancy weight gain, learning impairment, and behavioral problems of the offspring are caused by inadequate nutrition during pregnancy. According to Ramakrishnan (2004), a majority of low birth weight (LBW) infants in developing countries are due to intrauterine growth retardation (i.e., less than the 10th percentile weight for gestational age). In developing countries, the most important determinants of intrauterine growth retardation stem primarily from the mother's poor health and nutritional status (Wardlaw, Blanc, Zupan *et al.*, 2004).

Malnutrition is ranked as one of the major causes of maternal mortality and it is a major determinant of a successful pregnancy and a healthy well-nourished baby (Sholeye, Badejo, and Jeminusi, 2014; Maduforo, 2010). Developing nations account for 99% of all maternal deaths in the world (World Health Organization, 2015). Nigeria has one of the highest maternal death rates in the world with the current rate of 576 deaths per 100,000 live births (National Population Commission, 2013). These staggering statistics show that while it is important that the major avoidable causes of maternal mortality and adverse pregnancy outcome are eliminated by looking into the feeding practices of women due to their traditional beliefs and taboos, and also to determine its effect on their nutritional status.

In Nigeria, improper dietary practices of pregnant women have apparently led to increased rates of stillbirths, premature births, low birth weight, maternal and prenatal deaths (Bhargava, 2000; Ramakrishnan, 2004). Food consumption practices of pregnant women in Nigeria are highly influenced by many socio-cultural factors such as food taboos, family food distribution, food beliefs, and food restriction practices (Sholeye, Badejo, and Jeminusi, 2014; Ojofeitimi, Ogunjuyigbe, Sanusi *et al.*, 2008; Ogunjuyigbe and Maduforo, 2010). In a study conducted by Maduforo (2010) in Nwangele Local Government Area (LGA) of Imo State, southeastern Nigeria, it revealed that 15.0% of the respondents mentioned some foods as taboos in the study area and 38.0% of the pregnant women were malnourished. Maduforo (2010) observed that pregnant women held onto the food taboos handed down from generation to generation, including prohibition of grasscutter meat, cassava meals (*fufu*), spaghetti (pasta), noodles, cocoa beverages, eggs, and snails. Some of the prohibited or avoided foods are common sources of essential nutrients that are essential for improving maternal and child health (Ojofeitimi, Ogunjuyigbe, Sanusi *et al.*, 2008).

As a result of the well-entrenched traditional food taboos and socio-cultural beliefs relating to dietary intake during pregnancy, many pregnant women have misinformation about the harmful effects of these taboo foods (Kavle, Mehanna, Saleh *et al.*, 2014). In some sub-Saharan African countries including Nigeria, it is commonly believed that sexually transmitted diseases or complications during childbirth are the result of the violation of food taboos (King, 2000; Maimbolwa, Yamba, Diwan *et al.*, 2003; Maduforo, 2010). An earlier study conducted in Nigeria by Odebiyi (1989) observed that Yoruba traditional healers in Nigeria often interpreted the occurrence or persistence of illness as a punishment for the violation of food taboos. It will therefore not be surprising if some pregnant Yoruba women have inadequate knowledge and misperceptions relating to necessary diets. Issues relating to knowledge and socio-cultural factors influencing dietary intake among pregnant women especially in south-western parts of Nigeria have not been well documented. These issues have the potential of facilitating the design and implementation of interventions and policies that would address the problem of malnutrition among pregnant women. This study therefore investigates dietary intake knowledge and reasons for food restriction during pregnancy among pregnant women attending antenatal clinics in Ile-Ife, Nigeria.

2. Data AND Methods

2.1 Study Area

The study investigated dietary intake knowledge and reasons for food restriction during pregnancy among pregnant women attending antenatal clinics in Ile-Ife, Nigeria based on a cross-sectional survey. Ile-Ife is the headquarters of the ancient Ife Kingdom situated in the southwest of Nigeria stretching over 200 km from the Niger River in the north to the borders of Benin in the west. It is believed to be the cradle of modern civilization and has a special place in the Yoruba culture. Major religions in Ile-Ife are Christianity, Islam, and Traditional African Religion (TAR). Ile-Ife is well-known for several TAR practices, doctrines, cultural beliefs, and festivals. Apart from the Yoruba language, the native language and widely spoken in Ile-Ife, many residents of Ile-Ife, especially the literate population, can communicate in English. Ile-Ife is made up of Ife Central LGA, Ife East LGA, and Ife East Area Office Modakeke Ife. Ile-Ife has many government-owned and private educational institutions including Obafemi Awolowo University, one of the foremost and first-generation universities in Nigeria, and Odojuwa University (a private-owned university). Ile-Ife has a teaching hospital named Obafemi Awolowo University Teaching Hospital Complex with an arm as Comprehensive Health Centre at Eleyele area of the town, a General Hospital at Oke-Ogbo, and thirty-five primary health care (PHC) facilities in the LGAs. Ife Central LGA, Ife East, and Ife East Area Office Modakeke Ife have 10, 15, and 10 primary health care facilities respectively. The study was carried out at 35 PHC facilities in the three LGAs in Ile-Ife.

2.2 Study Population and Sample Size

The study population comprised of pregnant women attending antenatal clinics in the PHC facilities in the three (Ife Central, Ife East, and Ife East Area Office) LGAs of Ile-Ife.

Records reviewed showed that there were 557 pregnant women attending antenatal clinics at PHC centers in the three LGAs in Ile-Ife at the time the study was conducted. The study therefore employed the use of total sampling so as to get optimal insight into the study, make wide coverage of population of interest, and increase the chances of harvesting potential insight from all eligible respondents. However, only 530 pregnant women who consented to participate in all the PHC facilities in the local government areas of Ile-Ife were involved in the study.

2.3 Instrumentation

A semi-structured questionnaire was used for data collection. The design of the questionnaire was based on the research objectives and review of related literatures. The instrument was also guided by relevant conceptual frameworks and benefited from the scrutiny and constructive criticism of five experienced researchers in the fields of public health and nutrition. A pre-testing of the instrument was carried out among 59 pregnant women (10% of the study sample) attending the antenatal clinic at Okoko PHC in Ipetumodu, which shares similar characteristics with the study area. This was necessary to determine length of time required to administer the questionnaire, check logical sequence of questions, and to ascertain whether the questions were clear and simple enough for respondents to understand. The internal consistency of the instrument was evaluated with the use of measures of Cronbach's alpha coefficient technique with the Statistical Package for Social Sciences (SPSS) that yielded a coefficient value of 0.6. Few revisions were made on the instrument before it was finally used. Revisions made included use of simpler and local terms for food items and some variables to improve respondents' understanding of questions, the inclusion of some pertinent variables such as respondents' average monthly income as well as skipping mechanism in the questionnaire.

The pre-tested semi-structured questionnaire captured respondents' socio-demographic characte-

istics which included respondents' age, marital status, level of education, occupation, family structure (whether monogamy or polygamy), average monthly income (given in naira [₦], which is the Nigerian currency), and number of children. The instrument contained a 30-point knowledge scale that covered 10 knowledge items, focusing on various dietary related issues that included how to eat during pregnancy, classes of food (with examples) supposed to be taken during pregnancy, and the roles of each of the classes of food. The instrument also contained items or questions relating to reasons or factors responsible for food avoidance or restriction during pregnancy as well as lists of foods that were restricted or avoided based on each specific factor or reason. The questionnaire was constructed in the English language and translated into Yoruba by a linguistic expert who was vast in both languages for easy communication with respondents consisting of illiterate and semi-illiterate population. The Yoruba version of the instrument was back-translated into English by another language expert to ascertain the accuracy of the translation.

2.4 Data Collection Process

Copies of the semi-structured questionnaire were administered with the help of four female research assistants who were trained thoroughly to ensure that they had adequate understanding of the instrument prior to commencement of data collection. Permission was sought from appropriate authorities including PHC coordinators and heads of health facilities. Pregnant women attending the clinics were approached and their consents were sought prior to the commencement of the interviews. The respondents were interviewed with copies of the questionnaire either in Yoruba or English, depending on respondents' preference and language spoken or understood.

All copies of the questionnaires were checked for completeness and a serial number was given to each for easy identification and recall. A coding guide was developed based on the variables and responses teased out from the questionnaires. This coding code was used to facilitate data entry into a computer. Based on the 30-point knowledge scale, scores of ≤ 10 , $>10-20$, and >20 were categorized as poor, fair, and good knowledge respectively. Data collection was carried out in all the 35 PHC centers in the study sites over a period of eight weeks.

2.5 Analytical Strategies

SPSS software version 20 was used to facilitate data analysis. Descriptive statistics, frequency counts, and percentages were used for analysis of univariate data. Bivariate analyses of test of associations between independent and dependent variables were subjected to chi-square tests at 0.05 level of significance. For this purpose, dependent and independent variables were presented as categorical data. Dependent variables that were considered were dietary intake knowledge and practice of restriction or avoidance of food based on cultural taboos. Each of these dependent variables was calculated and tabulated by relevant independent variables such as respondents' age, level of education, occupation, monthly income, religion, and number of children. Results obtained from the data were summarized in text and where necessary, tables and charts were also presented.

3. Results

3.1 Socio-demographic Characteristics of Respondents

The socio-demographic characteristics of the respondents are presented in [Table 1](#). The respondents' ages ranged from 14–53 years old with a mean of 27 ± 5.3 years. The respondents also had a mean of 2.0 ± 1.3 children. Most (90.8%) women were married and 91.1% of them have a monogamous family. A large proportion (44.5%) of the respondents had tertiary education. Three-quarter (75.0%) of the respondents' were Christians and 88.0% were Yorubas. Very few (4.6%) of the respondents' had no income and only 11.1% earned above ₦50,000 (approximately US\$315).

Table 1. Socio-demographic characteristics of respondents (N = 530)

Characteristics	Frequency	Percentage (%)
Age[†]		
14–24 years	160	30.2
25–34 years	333	62.8
≥35 years	37	7.0
Marital status (N = 521)*		
Married	474	90.8
Single	41	7.9
Widowed	6	1.1
Divorced	1	0.2
Level of education (N = 521)*		
No formal education	22	4.2
Primary	48	9.1
Secondary	223	42.2
Tertiary	235	44.5
Occupation (N = 523)*		
Civil servant	164	31.4
Petty trader	146	27.9
Artisans	90	17.2
Housewife	45	8.6
Student	44	8.4
Unemployed	34	6.5
Monthly income (N = 523) *		
None	24	4.6
<10,000 Naira	146	28.8
11,000–20,000 Naira	157	30.1
21,000–30,000 Naira	66	12.6
31,000–40,000 Naira	23	4.4
41,000–50,000 Naira	48	9.2
>50,000 Naira	58	11.1
Number of children^{††}		
0	106	20.0
1–2	275	51.9
3–4	136	25.7
≥5	13	2.4
Religion (N = 528)*		
Christianity	396	75.0
Islam	127	24.0
Traditional	4	0.8
Others	1	0.2
Ethnicity (N = 527)*		
Yoruba	464	88.0
Igbo	53	10.1
Hausa	10	1.9
Family structure		
Monogamy	483	91.1
Polygamy	47	8.9

*Non responses were excluded

[†]Mean age of respondents = 27 ± 5.3 years

^{††}Mean number of children=2 ± 1.3 years

3.2 Dietary Knowledge of Respondents

Respondents' level of knowledge relating to dietary intake in pregnancy is shown in Figure 1. Participants had a mean knowledge score of 23.6 ± 4.2 years and about three-quarter (75.5%) of them had good knowledge of dietary intake during pregnancy. Respondents with fair and poor knowledge of dietary intake were 21.5% and 3.0%, respectively.

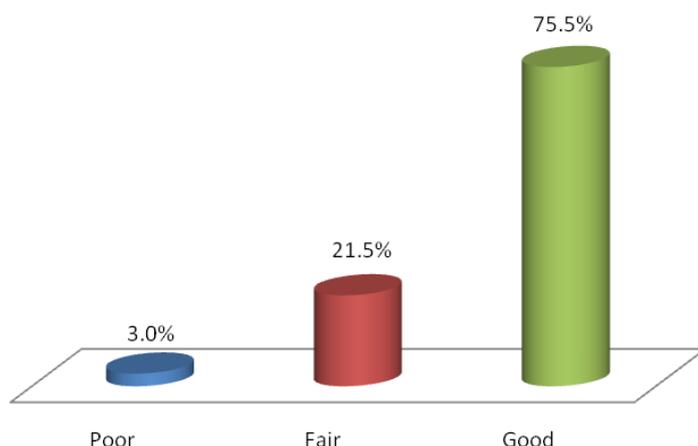


Figure 1. Dietary intake knowledge of respondents during pregnancy

Note: Mean knowledge score = 23.6 ± 4.2 .

The proportions of respondents with correct responses about statements relating to food issues during pregnancy are presented in Table 2. Majority (88.3%) of the respondents were knowledgeable about the fact that food intake is supposed to increase during pregnancy. Almost three-quarter (73.4%) of the respondents understood that there is a need to take more protein during pregnancy. Nearly all (96.2%) respondents had the knowledge that food rich in proteins such as beef, fish, egg, and beans are essential for body growth and repair. Majority (88.5%) of the respondents were knowledgeable about the fact that food rich in fat and oil such as palm oil, groundnut oil, butter, and margarine are essential for tissues and organ protection. A large proportion of the respondents (87.7%) had a good understanding that food rich in vitamins and minerals such as fruits and vegetables are essential for good health. Many (44.7%) respondents incorrectly mentioned specifically that carbohydrate should be taken more during pregnancy. Slightly above one-third (36.0%) of the respondents mentioned specifically that there is a need to take more minerals and vitamins during pregnancy. Only 28.9% of the respondents mentioned fats and oil as a type of essential food that should be taken during pregnancy.

Table 2. Proportion with correct responses about statements relating to food issues during pregnancy

Statement	No. responded	% correct
Food intake is supposed to increase during pregnancy	468	88.3
There is a need to take more protein during pregnancy	389	73.4
Food rich in proteins such as beef, fish, egg, and beans are essential for body growth and repair	510	96.2
Food rich in fat and oil such as palm oil, groundnut oil, butter, margarine are essential for tissues and organ protection	469	88.5
Food rich in vitamin and minerals such as fruits and vegetables are essential for good health	465	87.7
Carbohydrate should be taken more during pregnancy	293	55.3
There is a need to take more minerals and vitamins during pregnancy	191	36.0
Food rich in fat and oil such as palm oil, groundnut oil, butter, margarine are essential during pregnancy for tissue and organ protection, and conservation of body heat	153	28.9

Table 3 shows the association between dietary intake knowledge and socio-demographic characteristics of the pregnant women. A higher proportion (86.5%) of respondents aged 35 years or older had good knowledge of dietary intake when compared to those aged 25–34 years old (77.5%) and 14–24 years old (68.8%) and this association was significant at $P = 0.012$. The proportion of respondents who had good knowledge of dietary intake was highest among those with tertiary education (81.7%), followed by primary (70.8%), secondary (70.4%), and those with no formal education (68.2%). Overall, there was a significant relationship between the level of education and knowledge of dietary intake ($P = 0.002$). The proportions of respondents who had good knowledge of dietary intake were lower among the unemployed women and petty traders compared with other categories of women including those who were civil servants and students.

Table 3. Association between dietary intake knowledge of respondent and socio demographic characteristics

Characteristics	Knowledge of dietary intake				Chi-square, P value
	Poor (%)	Fair (%)	Good (%)	Total (%)	
Age					
14–24	9 (5.6)	41 (25.6)	110 (68.8)	160 (100.0)	$\chi^2 = 12.95$
25–34	5 (1.5)	70 (21.0)	258 (77.5)	333 (100.0)	$P = 0.012$
≥35	2 (5.4)	3 (8.1)	32 (86.5)	37 (100.0)	
Level of education					
No formal	2 (9.1)	5 (22.7)	15 (68.2)	22 (100.0)	
Primary	5 (10.4)	9 (18.8)	34 (70.8)	48 (100.0)	$\chi^2 = 21.42$
Secondary	6 (2.7)	60 (26.9)	157 (70.4)	223 (100.0)	$P = 0.002$
Tertiary	3 (1.3)	40 (17.0)	192 (81.7)	235 (100.0)	
Occupation					
Unemployed	3 (8.8)	9 (26.5)	22 (64.7)	34 (100.0)	$\chi^2 = 5.08$
Housewife	2 (4.4)	6 (13.3)	37 (82.2)	45 (100.0)	$P = 0.024$
Student	2 (4.5)	9 (20.5)	33 (75.0)	44 (100.0)	
Petty trader	7 (4.8)	38 (26.0)	101 (69.2)	146 (100.0)	
Artisan	0 (0)	20 (22.2)	70 (77.8)	90 (100.0)	
Civil servant	2 (1.2)	30 (18.3)	132 (80.5)	164 (100.0)	
Monthly income					
None	3 (12.5)	2 (8.3)	19 (79.2)	24 (100.0)	$\chi^2 = 7.415$
<10,000	4 (2.7)	38 (26.0)	104 (71.2)	146 (100.0)	$P = 0.006$
11,000–20,000	4 (2.5)	43 (27.4)	110 (70.1)	157 (100.0)	
21,000–30,000	2 (3.0)	12 (18.2)	52 (78.8)	66 (100.0)	
31,000–40,000	0 (0)	9 (39.1)	14 (60.9)	23 (100.0)	
41,000–50,000	0 (0)	6 (12.5)	42 (87.5)	48 (100.0)	
>50,000>50,000	1 (1.7)	3 (5.2)	54 (93.1)	58 (100.0)	
Ethnicity					
Yoruba	14 (3.0)	101 (21.8)	394 (75.2)	464 (100.0)	$\chi^2 = 2.17$
Igbo	1 (1.9)	10 (18.9)	42 (79.2)	53 (100.0)	$P = 0.705$
Hausa	1 (10)	2 (20.0)	7 (70.0)	10 (100.0)	
Number of children					
0	3 (2.8)	23 (21.7)	80 (75.5)	106 (100.0)	$\chi^2 = 0.027$
1–2	6 (2.2)	62 (22.5)	207 (75.3)	275 (100.0)	$P = 0.869$
3–4	7 (5.1)	29 (0)	100 (73.5)	136 (100.0)	
≥5	0 (0)	0 (0)	13 (100)	13 (100.0)	

Overall, there was a significant relationship between the level of education and occupations of respondents ($P = 0.024$). The proportions of respondents with poor knowledge of dietary intake were lower among the respondents with higher monthly income compared with those with no monthly income and this association was found to be significant ($P = 0.006$). However, no significant association was found between knowledge of dietary intake and other socio-demographic variables such as marital status, parity, religion, ethnicity, and number of children.

Reasons for food restriction or avoidance during pregnancy were presented in Table 4. Cultural taboos (36.5%) topped the list of the factors influencing diet during pregnancy mentioned by the respondents, followed by restriction of some food because they cause big babies or make labor and delivery difficult (25.6%), belief relating to negative health effects of foods (13.7%), dislike of food taste during pregnancy (12.1%), and food forbidden on religious grounds (12.1%).

Table 4. Foods avoided by respondents during pregnancy based on cultural taboos/beliefs (N = 530)

*Cultural belief	Food avoided	N	%	
*Depressed fontanelle [^]	Pumpkin	241	45.5	
	Banana	154	29.1	
	Plantain	102	19.2	
*Belching during delivery	<i>Crasscephalum crepidoides</i> ⁺	331	62.5	
	<i>Dioscorea dumetorum</i> ⁺⁺	278	52.5	
	Walnut	14	2.6	
	Odu	13	2.5	
*Animalistic behavior	Snake	187	35.3	
	Antelope	89	16.8	
	Wild rat	68	12.8	
	Dog	13	2.5	
	Donkey	8	1.5	
*Diet against family rites	Okro	102	19.3	
	Pork	56	10.6	
	Dog	53	10.0	
	Antelope	35	6.6	
	Snake	13	2.5	
	Wild rat	12	2.3	
	Bat	4	0.8	
	Snail	1	0.2	
	*Salivate excessively	Snail	269	50.8
		Pork	4	0.8
Dog		3	0.6	
*Animalistic resemblance	Snake	94	17.7	
	Wild rat	8	1.5	
	Pork	7	1.3	
	Snail	6	1.1	
	Dog	5	0.9	
	Antelope	1	0.2	
*Reduced contraction strength	Walnut	315	59.4	
	<i>Dioscorea dumetorum</i>	35	6.6	
	<i>Crasscephalum crepidoides</i>	20	3.8	
	Mushroom	5	0.9	
*Slit on new born	Pumpkin	3	0.6	

*Multiple responses

[^]Depressed fontanelle – a soft spot on a baby's skull with noticeable inward curve

⁺Referred to as Thickhead, Fireweed (English) and Ebolo (Yoruba).

⁺⁺Referred to as Bitter Yam (English), Esuru (Yoruba).

Table 4 presents the details of the food avoided by the respondents based on cultural taboos/beliefs. Pumpkin (45.5%), banana (29.1%), and plantain (19.2%) were avoided because they were believed to cause depressed fontanelle in babies. *Crasscephalum crepidoides* (62.5%) and *Dioscorea dumetorum* (52.5%) were mentioned as major foods believed to cause belching during delivery. Diets believed to reduce contraction strength during labor included walnut (59.4%), *Dioscorea dumetorum* (6.6%), and *Crasscephalum crepidoides* (3.8%). Pumpkin (0.6%) was believed to cause slits on newborns.

Table 5 highlights other reasons for avoiding food. Food avoided based on religious beliefs were pork (87.4%), dogs (76.9%), and snakes (66.5%) while beverages including ‘bournvita’ — a brand of tea (91.3%), and ‘milo’ beverage (67.5%) were avoided mainly because it causes pregnant women to have big fetuses causing difficulty during delivery. Food avoided based on health reasons included

Table 5. Foods avoided by respondents during pregnancy based on reasons other than cultural beliefs

Reasons Avoiding Food	Food Type	N	%
Religious beliefs*	Pork	159	87.4
	Dog	140	76.9
	Snake	121	66.5
	Snail	24	13.2
	Bush meat	23	12.6
	Crayfish	9	4.9
	Fish	5	2.7
Causing fetus to be too big*	Bournvita	306	91.3
	Milo	226	67.5
	Ovaltine	205	61.2
	Coke	110	32.8
	Fanta	72	21.5
	Wine	50	14.9
Health reasons*	Sugary foods	44	32.1
	Salted food	32	23.4
	Eba	15	7.3
	Egg	10	5.8
	Bitter leaf	8	3.6
	Spices	7	5.1
	Yam	5	3.6
	Okro	5	3.6
	Crayfish	4	2.9
	Ugu	4	2.9
	Meat	3	2.2
†Cannot afford the food*	Fruits	142	35.0
	Protein	122	30.0
	Beverages	61	15.0
	Carbohydrates	52	12.8
	Vegetables	29	7.2

*Multiple responses

†Protein (egg, bushmeat, crayfish, milk, chicken)

Vegetables (Spinach- commonly called ‘Green vegetable’ or ‘Tete’ in Yoruba Language and Fluted Pumpkin- popularly known as ‘Ugu’ in Igbo Language), Fruits (apple, tangerine, pineapple, pawpaw)

Carbohydrates (pounded yam, rice, bread)

Beverages (bournvita, milo, juices)

sugary food (32.1%), salted food (23.4%), and 'eba' — a staple Nigerian food made from cassava flour (10.9%). Another major reason for avoiding food was because some of the pregnant women could not afford some food due to high costs. These foods were fruits (35.0%); 'proteinous' foods (30.0%) including eggs, 'bushmeat' (refers to meats from non-domestic or wild animals), crayfish, chicken; vegetables (7.2%); beverages (15.0%); and carbohydrates (12.8%).

In Table 6, the association between cultural taboos and socio-demographic characteristics of the respondents was assessed. A higher proportion of respondents with no formal education (95.5%)

Table 6. Association between avoidance of food based on cultural taboos and socio demographic characteristics of respondents

Characteristics	Avoidance of food based on cultural taboos			Chi-square P value
	Yes (%)	No (%)	Total (%)	
Age				
14–24	130 (81.3)	30 (18.8)	160 (100.0)	$\chi^2 = 3.151$ P = 0.207
25–34	285 (85.6)	48 (14.4)	333 (100.0)	
≥45	34 (91.9)	3 (8.1)	37 (100.0)	
Marital status				
Married	402 (84.8)	72 (15.2)	474 (100.0)	$\chi^2 = 0.249$ P = 0.969
Single	34 (82.9)	7 (17.1)	41 (100.0)	
Widowed	6 (100)	0 (0)	6 (100.0)	
Divorced	1 (100)	0 (0)	6 (100.0)	
Education				
No formal	21 (95.5)	1 (4.5)	22 (100.0)	$\chi^2 = 9.59$ P = 0.022
Primary	45 (93.8)	3 (6.3)	48 (100.0)	
Secondary	178 (79.8)	45 (20.2)	223 (100.0)	
Tertiary	203 (86.4)	32 (13.6)	235 (100.0)	
Occupation				
Unemployed	33 (97.1)	1 (2.9)	34 (100.0)	$\chi^2 = 16.28$ P = 0.006
Housewife	37 (82.2)	8 (17.8)	45 (100.0)	
Student	31 (70.5)	13 (29.5)	44 (100.0)	
Petty trader	119 (81.5)	27 (18.5)	146 (100.0)	
Artisan	75 (83.3)	15 (16.7)	90 (100.0)	
Civil servant	148 (90.2)	16 (9.8)	164 (100.0)	
Monthly income				
None	14 (58.3)	10 (41.7)	24 (100.0)	$\chi^2 = 19.87$ P = 0.003
<10,000	124 (84.9)	22 (15.1)	146 (100.0)	
11,000–20,000	133 (84.7)	24 (15.3)	157 (100.0)	
21,000–30,000	58 (87.9)	8 (12.1)	66 (100.0)	
31,000–40,000	17 (73.9)	6 (26.1)	23 (100.0)	
41,000–50,000	40 (83.3)	8 (16.7)	48 (100.0)	
>50,000	55 (94.8)	3 (5.2)	58 (100.0)	
Religion				
Christianity	336 (84.8)	60 (15.2)	396 (100.0)	$\chi^2 = 0.055$ P = 0.996
Islam	107 (84.3)	20 (15.7)	127 (100.0)	
Traditional	4 (100.0)	0 (0)	4 (100.0)	
Others	1 (100.0)	0 (0)	1 (100.0)	
Number of children				
0	85 (80.2)	21 (19.8)	106 (100.0)	$\chi^2 = 3.58$ P = 0.310
1–2	232 (84.4)	43 (15.6)	275 (100.0)	
3–4	120 (88.2)	16 (11.8)	136 (100.0)	
≥5	12 (92.3)	1 (7.7)	13 (100.0)	

compared to those with primary education (93.8%), secondary education (79.8%), and tertiary education (86.4%) had food restriction or avoidance behavior due to cultural taboos. Overall, there was a statistically significant association between education and cultural taboo at $P = 0.002$. Respondents' occupation was significantly associated with food restriction or avoidance behavior associated with cultural taboos at $P = 0.006$. A higher proportion (97.1%) of unemployed respondents had food restriction or avoidance behavior due to cultural taboos compared to civil servants (90.2%), artisans (83.3%), petty traders (81.5%), and students (70.5%). A significantly higher proportion (94.8%) of respondents who earned ₦50,000 (approximately US\$315) when compared to those who earn less had cultural taboo-induced food restriction or avoidance behavior. Overall, there was a statistically significant association between respondents' income and food restriction or avoidance behavior because of cultural taboos at $P = 0.003$. However, no significant association was observed between food restriction or avoidance behavior associated with cultural taboos and other variables such as age, marital status, religion, and parity.

4. Discussion

Ages of pregnant women ranged between 14–53 years old and a majority of the respondents were within the age group of 25–34 years old. This age group is similar to that of a previous study conducted among pregnant women visiting PHC centers for antenatal care in Ile-Ife which revealed a mean age of 26 years old (Adeleye, Akoria, Shuaib *et al.*, 2010). This study revealed that a majority of the respondents had good knowledge of dietary intake during pregnancy. However, a few women lacked knowledge about the specific food that should be taken more during pregnancy. Previous studies have indicated a similar trend among pregnant women (Dyer, Fearon, Buckner *et al.*, 2004; Kalesanwo, 2005). From this study, it was discovered that older women had better knowledge of dietary intake during pregnancy compared with younger women. This may be because older women are more experienced over time. It is not surprising that the more educated respondents had good knowledge of dietary intake. This may not be unconnected with the fact that education exposes people to different sources of information which makes them more enlightened (Global Campaign for Education, 2005). Income and occupation were not found to significantly influence knowledge of dietary intake. This underscores the need to provide nutritional education on dietary issues for all categories of women irrespective of their income level and occupations. Although it is interesting to observe that many pregnant women had good knowledge of dietary intake, good knowledge of dietary intake may not necessarily translate into good dietary practices among pregnant women. This concern has been observed in a study in Osun state that assessed food aversion during pregnancy (Ogunjuyigbe, Ojofeitimi, Sanusi *et al.*, 2008). This implies that nutrition knowledge alone may not necessarily be sufficient to initiate behavioral application of healthy diets (Ozdoğan and Ozferzcelik, 2011).

A surprising finding in this study is the avoidance of foods because of the perceived adverse health effect of some healthy foods. This erroneous belief emphasizes the need for intensive nutrition education for pregnant women that could further upgrade their knowledge on dietary related issues during pregnancy. It is also unfortunate that many respondents avoided some body building food based on religious beliefs. This poses more concern as a result of the fact that the women involved were attending antenatal clinics and should be more informed than their counterpart who did not patronize orthodox health facilities. Dietary avoidance of fruits and other proteinous animal sources may result in maternal malnutrition and also deprive the child of sufficient nutrition (Ogunjuyigbe, 2004).

This finding revealed that a low level of education was a predictor of food restriction due to cultural taboos. This shows that women who are well educated are considered to reflect this knowledge to their behaviors/beliefs (Ozdoğan and Ozferzcelik, 2011). Understanding this inter-relationship may provide good information for designing more efficient and effective public policies, and mod-

ification of educational interventions. This study also revealed that earning more income is a determinant of food restriction due to cultural taboos. This finding can be explained by the fact that a higher income subsequently result in access to a variety of food (Ozdođan and Ozferzelik, 2011). Pregnant women of low socioeconomic status in developing countries are noted for insufficient protein and energy food intake (Wright, Hoffman, and Savitz, 2010; Beydoun and Wang, 2008; ADA, 2005). It is quite obvious that most of the items that would have provided all the key nutrients were primarily excluded on the basis that food might be hazardous to the health of the mothers. Contrary to the findings of other investigators (Gittelsohn, Anliker, Sharma *et al.*, 2006; ESFA Panel on Dietetic Products, Nutrition, and Allergies [NDA], 2010), the result of this study indicated that milk, bournvita, and cowpea seeds were exclusively avoided on health grounds and particularly to prevent the development of big babies. The idea of big babies among the women signified referral for cesarean section and also implied difficult labor. Similar findings were reported in literature (Oboro, Tabowei, Jemikolajah *et al.*, 2003). While poverty cannot be totally ruled out as one of the contributing factors to food restriction as a result of cultural taboos in developing countries, food taboos based on health or tradition are a potent factor that demands close attention of obstetricians, nutritionist and other health workers.

4.1 Implications for Nutrition Education

The findings of this study have several implications for nutrition-related health education interventions on the dietary intake of pregnant women. Several combination of health education strategies which include public enlightenment, training, and counseling of pregnant women as well as advocacy to religious and community leaders have huge potentials in addressing the phenomenon.

Public enlightenment campaigns can be used to create awareness and influence knowledge, behaviors, and cultural beliefs relating to dietary intake. It has the potential to reach large numbers of people including pregnant women and significant others such as spouses and relatives that can influence the dietary intake of pregnant women. Public enlightenment techniques that can be used include handbills, documentaries, and jingles.

Training as well as counseling of pregnant women during antenatal care visits on healthy diet and nutrition-related issues could serve as effective strategies for addressing food restriction practices during pregnancy. Emphasis should be placed on various maternal nutrition-related issues including healthy food selection and the importance of fruits and vegetables consumption for the supply of nutrients and fibers to the body. More attention should be given to young women who have less knowledge of dietary issues during pregnancy. This could be achieved, in part, by increasing their access to relevant youth-friendly training programs and providing opportunities for them to gain experiences from older pregnant women. Older pregnant women who are experienced and knowledgeable could be trained to provide peer-led training and support for young pregnant women on dietary issues during pregnancy. In addition, educational interventions on dietary issues during pregnancy using social media strategies or methods such as text messages can be implemented to target a large population of pregnant women especially the young pregnant women and provide them with robust learning opportunities.

Mobilizing communities to promote a healthy diet may also be very useful in addressing the problem of food restriction or avoidance associated with cultural taboos and religious beliefs facing pregnant women. Community involvement in community nutritional interventions for pregnant women is particularly appealing and holds the potential for success because it is based on the principle that it provides opportunities for community members to participate in the design, implementation, and evaluation of nutritional interventions.

Advocacy interventions that target religious leaders and custodians of tradition and customs have the potential of effectively addressing cultural beliefs and taboos that favor avoidance of healthy foods that could benefit pregnant women. Advocacy interventions can be made more effective when supported with locally generated data from systematically conducted studies.

4.2 Limitations of the Study

Although the study achieved its aims, there were some unavoidable limitations. First, this research was conducted on a small size of pregnant women population who were attending antenatal care in public or government-owned primary health centers. Therefore, to generalize the results for a larger population or all pregnant women in the study area, the study should have included pregnant women who registered with private clinics or hospitals as well as those who did not attend antenatal clinics. However, taking into consideration the scientific steps taken to carry out the study, it could be concluded that the results constitute a fair reflection of the phenomenon among pregnant women in the study area. Second, the simplicity of statistical analyses used in the study may also be considered as a form of limitation of this study. Inclusion of advanced statistical analyses such as multivariate logistic regression would have yielded more robust results relevant to the study. Finally, sole reliance on the information given by the respondents might have created some degree of subjectivity. In order to reduce biases and incorrect responses, trained research assistants were used to interview the research participants. Participants were provided with all the information related to the study and were encouraged to give honest information.

5. Conclusions

Most respondents had good knowledge of dietary intake. However, cultural taboos and religious beliefs were major reasons for food restrictions or avoidance during pregnancy, and were more pronounced among pregnant women with low education and low monthly income. The findings suggest a need for several nutrition education interventions for pregnant women. During antenatal visits, nutrition education should be intensified and emphasis should be placed on healthy eating patterns, healthy food selection, and the importance of fruits and vegetables consumption for the supply of nutrients and fibers to the body. Restriction of some healthy food during pregnancy can also be positively modified by nutritional counseling during antenatal visits. Efforts should be made to design community health education interventions that can target cultural taboos and religious beliefs affecting the dietary intake of pregnant women.

Conflict of Interest and Funding

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Ethical Consideration

Ethical approval to conduct this study was obtained from Obafemi Awolowo University Teaching Hospital Ethical Review Committee. Letters of permission to conduct the study in the PHC centers within the LGAs were received from the Director of PHC in each of the LGAs. The study participants were given adequate information on the study and they were told that their participation in the study was voluntary. They were assured of utmost confidentiality of their responses. There was no identifier on the questionnaire; participants who did not want to take part in the study were excused to observe the principle of autonomy. Only participants who signed or filled the informed consent were interviewed.

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