

Knowledge, Attitude and Practice of Maternal and Child Food-Based Dietary Guidelines among Pregnant Women in Urban Slum of Lagos State

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Abstract

Adequate nutrition is an important factor for health and well-being of the mother and child during and after pregnancy. However, studies on the influence of the Nigeria's national dietary food guidelines on health and nutritional status of pregnant women, especially, in poor-settings are sparse. The study assessed knowledge, attitude and practice of Food-Based Dietary Guidelines (FBDG) among pregnant women in urban slum of Lagos state. A total of 430 consenting pregnant women attending five selected Primary Health Care Centres in Ajeromi-Ifelodun Local Government Area of Lagos State volunteered for this cross-sectional study. A pretested, interviewer-administered questionnaire was used as the survey instrument. Data was analyzed using descriptive and inferential statistics. The results of study showed that, the mean age of the respondents was 27.9 ± 5.2 years. The respondents were mostly married (82.2%), with secondary level education (58.0%), unemployed (61.6%) and with an estimated monthly income of approximately 33 American dollars per household (42.2%). A majority (95.1%) of the respondents have had advice on nutrition during pregnancy, obtained through antenatal clinic attendance (93.3%). Rates on adequate knowledge and positive attitude towards FBDG were 55.8% and 61.2% respectively. Rates for high, medium and low dietary diversity levels were 57.7%, 33.5%, and 8.8%. There was a significant association between level of dietary diversity and employment status ($p < 0.05$). Less than half (43.5%) of the respondents had good practice of the FBDG. Financial constraints (68.1%) and cultural belief and norms (61.5%) were major factors limiting adequate nutrition during pregnancy and compliance with dietary guidelines. The study concluded that, Nigerian pregnant women living in urban slum of Lagos state have above average knowledge of the nutrition information and positive attitude towards dietary guideline, as contained in the Nigerian food based dietary guideline. Unemployed pregnant women had a higher dietary diversity compared with their employed counterparts. Financial constraint and cultural belief and norms were factors that act against compliance to dietary guidelines. It is therefore, recommended that national food based dietary guidelines education be incorporated into routine of antenatal care in Nigeria. Some practical suggestions to ensure the implementation of the Food Based Dietary Guidelines include providing Healthcare workers at the Antenatal clinics training and resource materials to educate pregnant women attending antenatal clinics on the Food Based Dietary Guidelines. Also, every pregnant woman should get a free copy of a pictorial version of the Food Based Dietary Guideline.

Keywords: Knowledge; Attitude; Practice; Pregnant women; Food-based dietary guidelines

Introduction

Nutrition is a central element of human life that is required for health and development [1]. Particularly, adequate nutritional intake during and after pregnancy is important for health and well-being of the mother, as well as the child [2,3]. Consequently, appropriate dietary behavior and proper nutrient intake is essential for the optimum health for both mother and child [4,5]. Unfortunately, rate of dietary inadequacies is reported to be higher during pregnancy than at any other stage of the life cycle [6].

The relationship between poor maternal nutritional status and adverse birth outcomes is complex and multifactorial. Studies have implicated factors not limited to biologic, socio-economic, and demographic variables as important co-founders mediating the maternal nutritional status and birth outcomes nexus [7,8]. Consequences of inadequate maternal nutrition on the mother and

child are replete in literature. Bhutta et al. [9] highlights intra uterine growth restriction, low birth weight, preterm birth, prenatal and infant morbidity and mortality as short term consequences of inadequate maternal nutrition. Maternal healthy nutrient intake during pregnancy may affect the wellbeing of the pregnant woman and developing fetus [10], birth outcomes [3] and child's disease in adulthood [11]. As such, malnourished mothers face greater risks during pregnancy and childbirth; in addition, their infants are set off on a weaker physical and mental developmental path [12-14].

Dietary interventions involving use of Food-Based Dietary Guidelines (FBDG) have been reported to be effective in improving maternal malnutrition and its attendant negative birth outcomes [4,5,15]. As nutrition knowledge was predictive of change in dietary habits and health advices encouraged expectant women to advance their food intake [15]. FBDG as a general public dietary intervention programme, are simple messages on healthy eating [16,17]. FBDG gives suggestion on what an individual should be eating in terms of food rather than nutrients. The FBDG is a professional dietician's guide, which is helps to plan diet from all the food groups and to

establish principles for good eating habits needed for disease prevention in the general population. Nigeria began developing its dietary guidelines in 2000 through a collaboration with the Ministries of Health, Agriculture and Rural Development and Information; Universities, World Health Organization, Helen Keller International, International Institute of Tropical Agriculture, and Pediatric and Nutrition societies. The dietary guideline was published in English, Hausa, Igbo and Yoruba in 2001. However, studies on the influence of the national dietary food guideline on health and nutritional status of pregnant women, especially, in poor-settings are sparse. This study assessed knowledge, attitude and practice of FBDG among pregnant women in urban slum of Lagos State.

Methods

A total of 430 consenting pregnant women attending five selected Primary Health Care Centres (PHCs) namely Layeni, Akere, Amukoko, Tolu and Ibafo in Ajeromi-Ifelodun Local Government Area (LGA), in Badagry Division of Lagos State, Nigeria volunteered in this cross-sectional study. According to the Nigerian population census of 2006, Ajeromi-Ifelodun LGA, as one of the worlds' most densely populated areas, occupies 57,276.3 per square kilometer and has 687,316 inhabitants. Located in the heart of Lagos, Ajeromi-Ifelodun LGA is a notorious slum and home to inhabitants from all the tribes of West Africa with Ajegunle as its headquarters [18].

Ethical approval for the study was sought from University of Ibadan/University College Hospital Ethics Review Committee. Permission was also obtained from Ajeromi Ifelodun LGA authorities before the commencement of the study. All respondents gave signed informed consent for participation in the study. Inclusion criteria for involvement in this study were being pregnant and also registered with any of the PHCs. Volunteers was excluded if there was self-reported current illness, pregnancy-related co morbidity and if they were not literate in English or Yoruba language.

A formula $n = (z \alpha/2) (z\alpha/2) pq / d^2$ [19] was used to estimate the Based on the assumption that 50% of the pregnant mothers were not knowledgeable, had negative attitude and did not practice dietary guidelines during pregnancy with 5% marginal error and 95%CI and a none response rate of 10%, the actual sample size for the study was determined. Where n =sample size; z = z value corresponding to a 95% level of significance=1.96; p =expected proportion, i.e. 50% or 0.5; q =(1- p)=(1-0.5)=0.5; d =absolute precision (5%); and none response rate=10%. Therefore, the sample size was $1.96^2 \cdot 0.5 \cdot 0.5 / 0.05^2 \cdot 0.05$. $n=384+38=422$.

A pretested, interviewer-administered questionnaire was used as the survey instrument. The structured questionnaire assessed knowledge and attitude. Standard nutrition knowledge questions required during pregnancy as contained in the FAO [17]. Knowledge, Attitude and Practice (KAP) manual and also from national dietary guidelines were asked. Attitudes were measured by asking the respondents to judge whether they were positively or negatively inclined towards nutrition recommendations or FBDG. The respondent rated their answer on a five-point likert scale of 'strongly disagree', 'disagree', 'indifferent', 'strongly agree', and 'agree'. A Dietary Diversity Questionnaire and a Food Frequency Questionnaire (FFQ) were used to assess respondent's practice of dietary guidelines. Dietary Diversity is used as a proxy of the nutrient adequacy for individuals [20,21] while FFQ is sufficient to find out about food practices of a population. FFQ is believed to be easy to administer and less expensive than 24-hour-recall surveys

[22-24]. The instruments were pre-tested for their comprehensibility in the accessible population and a Yoruba version of the combined questionnaire (Yoruba language is the native language in the accessible population) was made available for the study.

Data Analysis

Data entry, checking and analysis were done using Statistical Package for Social Science (SPSS) software. The Data was analyzed using descriptive statistics such as mean, standard deviation, range, and percentages. Inferential statistics of Chi-Square was used to test the association between the selected variables at $p < 0.05$.

Results

The socio-demographic characteristics of the respondents are presented in Table 1. The mean age of the respondents was 27.9 ± 5.2 years. A majority of the respondents were; within the ages of 20-29 years (61.4%), married (82.2%), unemployed (61.6%), of the Yoruba tribe (46.2%), of secondary level education (58.0%); of Christian religion (66.9%) and makes estimated monthly income of 33 American dollars in a household (42.2%). The distribution of respondents by 1st, 2nd and 3rd trimester of pregnancy was 14.6%, 40.0% and 45.4% respectively. Lifestyle and living methods of the respondents is presented in Table 2. The respondents were mostly; never alcohol consumers (70.2%), not involved in any form of exercise (59.7%), and not involved in cigarette smoking (99.0%). About 12.7% and 7.4% of the respondents depend on personal generator and non-electric devices respectively as the source of energy. Wells were the primary source of water for drinking and other domestic uses (37.8%). The primary method of refuse disposal was mostly by city waste disposal service (66.2%). Sewage disposal were mostly by water system (41.8%), pit latrine (25.1%), VIP latrine (20.0%) and bush defecation (11.0%) respectively.

Variable	Frequency	Percentage
Age (Years) 27.9 ± 5.2 years		
< 20	18	4.2
20-29	264	61.4
30-39	138	32.1
40-49	10	2.3
Marital Status		
Single	72	16.9
Married	350	82.2
Widow	4	0.9
Ethnic Origin		
Yoruba	192	46.2
Hausa	21	4.9
Igbo	120	28.2
Others	88	20.7
Religion		

Islam	124	29.1
Christianity	258	66.9
Traditional	17	4
Others	0	0
Highest level of education?		
Primary	94	22.1
Secondary	247	58
Post-secondary	80	18.8
No formal education	5	1.2
Number of Children		
1-5	313	74.2
6-10	9	2.1
None	100	23.7
Employment Status		
Yes	160	38.4
No	257	61.6
Occupation of household head		
Farming	5	1.2
Trading	220	52.1
Artisan	93	22
Fisherman	0	0
Civil servant	41	9.7
Others	63	14.9
Estimated monthly income in a household		
Less than or equal to 33 American Dollars	178	42.2
36-65 American Dollars	40	9.5
69-98 American Dollars	49	11.6
100-163 American Dollars	143	33.9
167-327 American Dollars	12	2.8

Table 1: Socio-demographic characteristics of the respondents.

Knowledge about dietary guideline by the respondents is presented in Table 3. A majority (95.1%) of the respondents have had advice nutrition during pregnancy. Advice on nutrition during pregnancy was obtained via antenatal clinic (93.3%). Eating more at each meal daily (77.2%) and the use iron and folic acid supplements during pregnancy (93.1%) were mostly supported by the respondents. In addition, more than half of the respondent (55.0%) support that slower growths, being sick and dying are health risks for low-birth-weight babies. Based on mean score, 55.8% of the respondents had adequate knowledge about the dietary guidelines while 44.2% had inadequate knowledge.

Variable	Frequency	Percentage
Alcohol Intake?		
Never	287	70.2
Formerly	109	26.7
Currently	13	3.2
Frequency of taking exercise (Hours/week)?		
None	237	59.7
>7	122	30.7
<7	38	9.6
Cigarette Smoking?		
Never	401	99
Formerly	0	0
Currently	4	1
Primary source of energy		
Non electric	31	7.4
Personal generator	53	12.7
Rural electricity boar	20	4.8
Power holding	313	75.1
Primary source of water		
Pond /lake	4	1
Spring /river	117	28
Well	158	37.8
Bore hole	121	28.9
Pipe borne water	4	1
Rain water	14	3.3
Method of refuse disposal		
Bush	60	14.1
Refuse dump	84	19.7
City service	282	66.2
Method of sewage disposal		
Bush	47	11
Pit latrine	107	25.1
VIP latrine	85	20
Water system	178	41.8
River	9	2.1

Table 2: Lifestyle and living methods of the respondents.

Item	Yes n(%)	No n(%)
Have ever been advised on what to eat during pregnancy?	409 (95.1)	21(4.9)
Had information on what to eat during pregnancy from the antenatal clinic	401(93.3)	29(6.7)
A pregnant woman eat more at each meal (eat more food each day)	332(77.2)	98(22.8)
Most women would benefit from iron and folic acid supplements during pregnancy	393(93.1)	29(6.9)
Slower growths, being sick and dying are the health risks for low-birth-weight babies	232(55.0)	190(45.0)

Attitude of respondent towards compliance with dietary guidelines is presented in Table 4. A majority of the respondents agreed that: inadequate and inappropriate nutrition can determine body weight of the baby (66.8%); and financial (68.1%) and cultural (61.5%) constraints make it difficult for you to assess a variety of food from different food groups. Furthermore, the respondents agreed that taking supplements as prescribed determines good health for both mother and unborn child (84.1%). It was also agreed that financial constraints make it difficult to consume enough food to ensure adequate weight gain (72.5%). Based on the mean score obtained from correctly answering to the attitude questions, more than half (61.2%) of the respondents had positive attitude towards the dietary guidelines.

Table 3: Knowledge of dietary guideline by respondent.

Item	Disagree n (%)	Indifference n (%)	Agree n (%)
Inadequate and inappropriate nutrition can determine body weight of the baby	65 (15.4)	75 (17.8)	282 (66.8)
Low birth weight babies are at risk of infections and diseases	170 (43.2)	62 (15.7)	162 (41.1)
To have a balanced diet, eat a variety of foods from different food groups	137 (33.1)	20 (4.8)	257 (62.1)
Financial constraints make it difficult for you to assess a variety of food from different food groups	110 (26.6)	22 (5.3)	282 (68.1)
Cultural reasons make it difficult for you to assess a variety of foods from different food groups	137 (32.8)	20 (4.8)	261 (61.5)
Burden of food preparation makes it difficult for you to assess variety of foods from different food groups	125 (30.3)	95 (23.0)	193 (46.7)
Consuming enough food ensures adequate weight gain	107 (25.4)	12 (2.8)	303 (71.8)
Financial constraints make it difficult to consume enough food to ensure adequate weight gain	107 (25.6)	8 (1.9)	303 (72.5)
Cultural reasons make it difficult to consume enough food to ensure adequate weight gain	261 (63.7)	32 (7.8)	117 (28.5)
Taking supplements as prescribed determines good health for both mother and unborn child	67 (15.9)	0 (0)	355 (84.1)
Drinking alcohol during pregnancy can pose a health risk for mother and unborn baby	156 (37.0)	4 (0.9)	262 (62.1)

Table 4: Attitude of respondent towards compliance with dietary guidelines.

The food pattern and practice (for cereals, roots and tubers, legumes and vegetables) of the respondents is presented in Table 5. The main staple foods from roots and tubers were yam (boiled/roasted) (44.9%); cooked rice (57.2%) and whole wheat bread (78.6%). Cooked cowpea (51.6%), cowpea pudding “moinmoin” (47.0%), and fried cowpea “akara” (54.9%) were the most regularly consumed legumes.

Also, the food pattern and practice (for fat and oil, fruits, animal protein and beverages) of the respondents is shown in Table 6. From the result, animal protein intake was mostly from fish (49.3%) while dairy products were rarely consumed. Oranges/tangerine (46.6%), carrot (47.8%), and plantain (45.6%) constituted the regular fruits intake of the respondents. Consumption of “Okro” soup was common (37.9%) while the use of vegetable oil (47.0%) during food preparation was the major source of fat and oil.

Dietary diversity of the respondents is shown in Table 7. Starchy staple (99.1%) and Vitamin-A rich fruits and vegetables (81.9%) were the most common dietary diversities, while the least was organ meat (2.3%). Based on dietary diversity scores, the rates for high, medium

and low dietary diversity among the respondents was 57.7%, 33.5%, and 8.8%. In this study, majority of pregnant women (60%) who were unemployed had a high dietary diversity.

It was also discovered that a larger percentage (16%) of the employed pregnant women were among the pregnant women with low dietary diversity compared to (3%) unemployed pregnant women. Indicating that the employment of pregnant women is associated with their dietary diversity ($p < 0.05$). This study is similar to Sakhile et al. 2014 in Swaziland which showed a significant association between employment and nutritional practices. This might be due to the employed eating what is readily available at the workplace and having no time to prepare a more diversified diet.

The pregnant woman who may assess a diversified diet by virtue of socio-economic status based on having employment is relatively low. Majority of the unemployed pregnant women would be dependent on their partners for income. Overall, the distribution for good and poor practice of the national food based dietary guidelines was 43.5% and 56.5% respectively.

Variable	Never	Rarely	Occasionally	Regularly
	0x/week	Once/week	(1-2 times/week)	(≥3 times/week)
	n (%)	n (%)	n (%)	n (%)
Cereals				
Maize/Pap "Ogi"	269 (62.5)	120 (27.9)	33 (7.7)	8 (1.9)
Maize/Agidi	113 (26.3)	100 (23.3)	155 (36.0)	62 (14.4)
Maize/Tunwo masara	2 (0.5)	8 (1.8)	45 (10.5)	375 (87.2)
Rice (Cooked)	24 (5.6)	65 (15.1)	95 (22.1)	246 (57.2)
Tunwo shinkafa	70 (16.3)	88 (20.5)	118 (27.4)	154 (35.8)
Whole wheat bread	0 (0.0)	14 (3.3)	78 (18.1)	338 (78.6)
White bread	22 (5.1)	116 (27.0)	200 (46.5)	92 (21.4)
Biscuit	207 (48.1)	84 (19.5)	78 (18.1)	61 (14.2)
Roots and tubers				
Cassava "Eba"	70 (16.3)	134 (31.2)	158 (36.7)	68 (15.8)
Cassava "Lafun"	198 (46.0)	77 (17.9)	91 (21.2)	64 (14.9)
Cassava "Fufu"	135 (31.4)	160 (37.2)	107 (24.9)	28 (6.5)
Yam asted/boiled	34 (7.9)	80 (18.6)	123 (28.6)	193 (44.9)
Yam flour "Amala"	111 (25.8)	124 (28.8)	115 (26.7)	80 (18.6)
Pounded yam	130 (30.2)	189 (44.0)	81 (18.8)	30 (7.0)
Yam porridge	178 (41.4)	167 (38.8)	65 (15.1)	20 (4.7)
Yam (Fried)	284 (66.0)	102 (23.7)	28 (6.5)	16 (3.7)
Cocoyam (Cooked)	313 (72.8)	93 (21.6)	16 (3.7)	8 (1.9)
Cocoyam (Fried)	190 (44.2)	180 (41.9)	42 (9.8)	18 (4.2)
Sweet potato (Cooked)	222 (51.6)	140 (32.6)	58 (13.5)	10 (2.3)
Sweet potato (Fried)	28 (6.5)	64 (14.9)	129 (30.0)	209 (48.6)
Legume		54 (12.6)		
Cowpea (Cooked/boiled)	2 (0.5)		152 (35.3)	222 (51.6)
Cowpea (Cooked/boiled)	36 (8.4)	58 (13.5)	134 (31.2)	202 (47.0)

Cowpea pudding "Moinmoin"				
Cowpea Fried "Akara"	22 (5.1)	64 (14.9)	108 (25.1)	236 (54.9)
Green leafy vegetables				
Green Leafy vegetable	82 (19.1)	176 (40.9)	117 (27.2)	55 (12.8)
Non green leafy (Okro)	66 (15.3)	84 (19.5)	117 (27.2)	163 (37.9)

Table 5: Food pattern and practice (for cereals, roots and tubers, legumes and vegetables) of the respondents.

Discussion

This study assessed knowledge, attitude and practice of FBDG among pregnant women in urban slum of Lagos State. FBDG is a key strategy to promoting healthy daily food consumption and appropriate lifestyles of Individuals [16]. Majority of the pregnant women in the study were within the ages of 20-49 years which is within the reproductive age for women. Results of the study showed most of the pregnant women have had advice on maternal nutrition during pregnancy by health care providers while attending ante-natal clinics. This finding buttresses the importance of ante-natal clinics in promoting nutrition and well-being of mother and child [25,26].

According to D'Alimonte et al. [27], the relationship between mother and health worker seemed to influence how well they listened to the health workers' recommendations. Programs to include social support and counselling training for health workers to engage more closely with mothers; exploring the feasibility of a women's social group for mothers to share information on about healthy eating and the link between nutrition and health should be introduced. Studies by Rao et al. [28] show that nutritional education and counselling influences maternal and child health outcomes.

More than half of the pregnant women in the study had adequate knowledge and showed positive attitude towards compliance of dietary guidelines. However, more than half of the pregnant women had poor practice (based on dietary diversity scores) about dietary guidelines. A study carried out by [29] in Swaziland showed that nutritional knowledge and attitude among pregnant and lactating women did not necessarily translate to practice. Most of the pregnant women agreed that "financial constraint" and "cultural belief and norms" were factors that act against compliance to dietary guidelines. Literature has shown that low socioeconomic status is associated with the consumption of poor and monotonous diets, food insufficiency and the risk of a variety of micronutrient deficiencies is high. Therefore, food intakes of the women are likely to be more sensitive to diminishing household resources when compared to the intakes of other family members who may not be depriving themselves of food [30].

Cultural factors and household food security situation have been identified as underlying factors that influence the nutritional status [31]. Pregnant women in various parts of the world are forced to abstain from nutritious foods due to traditional food habits even if the foods are available in abundance [32,33]. Also, cultural beliefs and practices may also impose restrictions to foods eaten by pregnant women of reproductive age [32,34]. Cultural taboos might have prevented pregnant women from eating seasonally available foods [28].

Fat and Oil				
Vegetable oil	65 (15.1%)	40 (9.3%)	123 (28.6%)	202 (47.0)
Cashew seed nut	178 (41.4)	76 (17.7)	98 (22.8)	78 (18.1)
Oil palm nut	72 (16.7)	126 (29.3)	129 (30.0)	103 (24.0)
Coconut	307 (71.4)	80 (18.6)	33 (7.7)	10 (2.3)
Fruits				
Oranges/Tangerine	12 (2.8)	59 (13.7)	159 (37.0)	200 (46.6)
Mango	6 (1.4)	32 (7.4)	106 (24.7)	286 (66.5)
Pawpaw	178 (41.4)	76 (17.7)	98 (22.8)	78 (18.1)
Guava	72 (16.7)	126 (29.3)	129 (30.0)	103 (24.0)
Pineapple	307 (71.4)	80 (18.6)	33 (7.7)	10 (2.3)
Water melon	349 (81.2)	80 (18.6)	33 (7.7)	10 (2.3)
Cashew	82 (19.1)	176 (40.9)	117 (27.2)	55 (12.8)
Pear	66 (15.3)	84 (19.5)	117 (27.2)	163 (37.9)
Carrot	65 (15.1)	40 (9.3)	123 (28.6)	202 (47.0)
Banana	38 (8.8)	117 (27.2)	151 (35.1)	124 (28.8)
Plantain	12 (2.8)	51 (11.9)	171 (39.8)	196 (45.6)
Animal protein				
(a) Beef and poultry				
Beef	221 (51.4)	109 (25.3)	52 (12.1)	48 (11.2)
Poultry	128 (29.8)	151 (35.1)	91 (21.2)	60 (14.0)
Fish	6 (1.4)	56 (13.0)	156 (36.3)	212 (49.3)
Egg	118 (27.4)	113 (26.3)	122 (28.4)	77 (17.9)
b) Dairy products				
Fresh milk	88 (20.5)	123 (28.6)	140 (32.6)	79 (18.4)
Tinned milk	239 (55.6)	88 (20.5)	65 (15.1)	38 (8.8)
Cheese	26 (6.0)	74 (17.2)	135 (31.4)	195 (45.3)
Yoghurt	120 (27.9)	83 (19.3)	98 (22.8)	129 (30.0)
Beverages				
Tea (Lipton tea, top tea)	193 (44.9)	116 (27.0)	79 (18.4)	42 (9.8)
Beverages (Milo, Bournvita)	38 (8.8)	117 (27.2)	151 (35.1)	124 (28.8)

Table 6: Food pattern and practice (for fat and oil, fruits, animal protein and beverages) of the respondents.

Fruits and vegetables were not frequently taken by about half of the pregnant women in the study. A study among pregnant women in three urban slums in India showed that estimates of green leafy vegetables and fruits were low while consumption of energy and fats were high [35]. A study carried out in Swaziland by the World Health Organization [36] highlighted an overall low consumption of fruits

and vegetables among adults. A study carried out in the United States of America by Drewnoski and Specter [37] found out the low prices of energy dense foods and high prices of most proteinous and vitamin-rich foods affected the poorer working class from consuming these nutrient dense foods. More than two thirds of the pregnant women in this study were unemployed. Estimated monthly income per household of about half of the pregnant women was approximately 33 American dollars\$ indicating poor financial conditions which may affect their food selection and food intake.

Variable	No	Yes
	n (%)	n (%)
Starchy staples	4 (0.9)	426(99.1)
Dark green leafy vegetable	203 (47.2)	227 (52.8)
Vitamin-A rich fruits and vegetables	78(18.1)	353 (81.9)
Other fruits and vegetables	363 (84.7)	66 (15.3)
Organ meat	420 (97.7)	10 (2.3)
Meat and fish	140 (32.6)	290 (67.4)
Eggs	337 (78.4)	93 (21.6)
Legume, nuts and seeds	207 (48.1)	223 (51.9)
Milk and milk products	260 (60.5)	170 (39.5)

Table 7: Dietary diversity of the respondents.

The study also reported that, majority of pregnant women who were unemployed had a high dietary diversity. Among the pregnant women who were employed, only a few had low dietary diversity. Thus, a significant association was observed between employment status of the pregnant women and dietary diversity. A study carried out in Swaziland showed a significant association between employment and nutritional practices [29]. It is adduced that employed pregnant women eat what is readily available at the workplace and have no time to prepare a more diversified diet.

The study has some potential limitations. The self-report nature of the study may shield actual nutritional practices of the respondents, as well as the problems with recall bias that is often associated with cross-sectional studies of this nature. Also, the heterogeneous nature of the sample (based on socio-demographic characteristics) and the peculiar characteristics of the study population (being an urban slum) may affect the external validity of the findings to other populations of pregnant women. Furthermore, some of the respondents felt uncomfortable answering questions on their current alcohol consumption.

Conclusion

Pregnant women living in urban slum of Lagos state, Nigeria have above average knowledge of the nutrition information as contained in the Nigerian food based dietary guideline. The pregnant women have adequate knowledge and positive attitude towards dietary guideline, which did not totally translate into good nutritional practices. Unemployed pregnant women had a higher dietary diversity compared with their employed counterparts. Financial constraint and cultural belief and norms were factors that act against compliance to dietary

guidelines. It is recommended that national food based dietary guidelines education be incorporated into routine of antenatal care in Nigeria.

These are some practical suggestions to ensure the implementation of the Food Based Dietary guidelines; i) Healthcare providers at the Antenatal clinics should be trained and provided with resource materials to educate pregnant women attending antenatal clinics on the Food Based Dietary Guidelines. ii) Every pregnant woman should get a free copy of a pictorial version of the Food Based Dietary Guideline. iii) The government should provide food subsidy for pregnant women. iv) Charity Organizations and other stake-holders should provide free Fruits and Vegetables to pregnant women attending antenatal clinics to help them achieve a more diversified diet.

References

1. World Bank (2006) Repositioning Nutrition as central to development: A strategy for large scale action, The International Bank for Reconstruction and Development, World Bank, Washington DC, USA.
2. Rocco PL, Orbitello B, Perini L, Pera V, Ciano RP, et al. (2005) Effects of pregnancy on eating attitudes and disorders: a prospective study. *J Psychosom Res* 59: 175-179.
3. Bawadia HA, Al-Kuranb O, Al-Bastonia LA, Tayyemc RF, Jaradatd A, et al. (2010) Gestational Nutrition Improves Outcomes of Vaginal Deliveries in Jordan: An Epidemiologic Screening. *Nutr Res* 30 : 110-117.
4. Verbeke W, De Bourdeaudhuij I (2007) Dietary behaviour of pregnant versus non-pregnant women. *Appetite* 48: 78-86.
5. Wen LM, Flood VM, Simpson JM, Rissel C, Baur LA (2010) Dietary Behaviours during Pregnancy: Findings from First-Time Mothers in Southwest Sydney, Australia. *International Journal of Behavioral Nutrition and Physical Activity* 7: 13.
6. Rao A, Sahoo S, Basumati P (2006) A study of nutritional status of pregnant women of some villages in Balasore district, Orissa. *J Hum Ecol* 20: 227-232.
7. AED Linkages (2004) Maternal Nutrition: Issues and Interventions; computer based slide presentation, by the Bureau for Global Health of the United States Agency for International Development (USAID).
8. Villar J, Merialdi M, Gülmezoglu AM, Abalos E, Carroli G, et al. (2003) Nutritional interventions during pregnancy for the prevention or treatment of maternal morbidity and preterm delivery: an overview of randomized controlled trials. *J Nutr* 133: 1606S-1625S.
9. Bhutta ZA, Ahmed T, Black RE, Cousens S, Dewey K, et al. (2008) What works? Interventions for maternal and child undernutrition and survival. *Lancet* 371: 417-440.
10. Sanjeev R, Ranjana R, Devesh R, Rajiv R, Girish S, et al. (2011) Evaluating the Impact of a Pragmatic Nutrition Awareness Program for Expectant Mothers upon Birth Weight of the Newborn. *Evid Based Complement Alternat Med* 2011: 1-7.
11. Barker DJP (2001) Fetal and Infant Origins of Adult Disease. *Monatsschrift Kinderheilkunde* 149: 2-6.
12. Cater J, Gill M (1994) The Aberdeen low birthweight study follow-up: Medical aspects, in *Low Birthweight: A Medical, Psychological and Social Study*, eds. Illsley R, Mitchell RG. Chichester: John Wiley and Sons, 191-206.
13. Prada JA, Tsang RC (1998) Biological mechanisms of environmentally induced causes of IUGR. *Eur J Clin Nutr* 52 Suppl 1: S21-27.
14. Monika B (2000) ACC/SCN. Fourth Report on the World Nutrition Situation. Geneva: ACC/SCN in collaboration with IFPRI.
15. O'Brien G, Davies M (2007) Nutrition knowledge and body mass index. *Health Educ Res* 22: 571-575.
16. Sirichakwal PP and Sranacharoenpong K, (2004). The Institute of Nutrition, Mahidol University, Nakhon Pathom, Thailand. Thailand Health Profile.
17. Food Agriculture Organization, 2014. Guidelines for assessing nutrition-related knowledge, attitudes and practices manual.
18. Paradigm Initiative Nigeria, (2007). Nigeria. Ajegunle.org.
19. Gorstein J, Sullivan KM, Parvanta I, Begin F (2007) Indicators and methods for cross-sectional surveys of vitamin and mineral status of populations. Micronutrient Initiative (Ottawa) and Centers for Disease Control and Prevention (Atlanta) 29.
20. Swindale A, Bilinsky P (2006) Household dietary diversity score (HDDS) for measurement of household food access: indicator guide, Version 2. Food and Nutrition Technical Assistance Project, (FANTA), Academy for Educational Development (AED), Washington, D.C.
21. Mirmiran P, Azadbakht L, Azizi F (2006) Dietary diversity within food groups: an indicator of specific nutrient adequacy in Tehranian women. *J Am Coll Nutr* 25: 354-361.
22. Block G, Gillespie C, Rosenbaum EH, Jensen C (2000) A rapid food screener to assess fat and fruit and vegetable intake. *Am J Prev Med* 18: 284-288.
23. McClelland JW, Keenan DP, Lewis J, Foerster S, Sugerman S, et al. (2001) Review of evaluation tools used to assess the impact of nutrition education on dietary intake and quality, weight management practices, and physical activity of low-income audiences. *J Nutr Educ* 33: S35-S48.
24. Contento IR (2011) Nutrition education: linking research, theory and practice. 2nd edn. Sudbury.
25. Rush D (2000) Nutrition and maternal mortality in the developing world. *Am J Clin Nutr* 72: 212S-240S.
26. Justyna K (2013) Health behaviors of pregnant women attending antenatal classes. *Central European Journal of Sport Sciences and Medicine* 3: 13-18
27. D'Alimonte MR, Deshmukh D, Jayaraman A, Chanani S, Humphries DL (2015) Using Positive Deviance to understand the Uptake of Optimal Infant and Young Child Feeding Practices by Mothers in an Urban Slum of Mumbai. *Matern Child Health J*.
28. Rao PD, Babu MS, Rao VLN (2006) Persistent traditional practices among tribes of North Coastal Andhra Pradesh. *Stud Tribes Tribals* 1: 53-55.
29. Masuku SK, Lan SJ (2014) Nutritional knowledge, attitude, and practices among pregnant and lactating women living with HIV in the Manzini region of Swaziland. *J Health Popul Nutr* 32: 261-269.
30. Tarasuk V, McIntyre L, Li J (2007) Low-income women's dietary intakes are sensitive to the depletion of household resources in one month. *J Nutr* 137: 1980-1987.
31. Mejean C, Deschamps V, Bellin-Lestienne C, Oleko A, Darmon N, et al. (2010) Associations of socioeconomic factors with inadequate dietary intake in food aid users in France (The ABENA study 2004-2005). *Eur J Clin Nutr* 64: 374-382.
32. Ojofeitimi EO, Ogunjuyigbe PO, Sanusi RA, Orji EO, Akinlo A, et al. (2008) Poor dietary intake of energy and retinol among pregnant women: implications for pregnancy outcome in Southwest. Nigeria.
33. Keding G, Krawinkel M (2008) Food diversity from plough to plate: Linking Agro biodiversity, dietary diversity and micronutrient supply. *Sight and Life Magazine* 3: 23-27.
34. Madiforo AN (2010). Superstitions and Nutrition among Pregnant Women in Nwangele Local Government Area of Imo State. Nigeria. *J Res Nat Dev* 8: 16-20.
35. Kapil U, Pathak P, Tandon M, Singh C, Pradhan R, et al. (1999) Micronutrient deficiency disorders amongst pregnant women in three urban slum communities of Delhi. *Indian Pediatr* 36: 983-989.
36. World Health Organization (2009) Swaziland non-communicable disease risk factors surveillance report. Geneva; W.H.O 28.
37. Drewnowski A, Specter SE (2004) Poverty and obesity: the role of energy density and energy costs. *Am J Clin Nutr* 79: 6-16.