



## **Practices Relating to Dietary Intake of Pregnant Women Attending Antenatal Clinic at Primary Healthcare Centres in Ile-Ife, Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Authors MOO, AOO and OSO designed the study and were involved in writing of the protocol and data collection. Authors AOO, MOO, OSO, IT and OSA contributed to data analysis and interpretation. Authors OSO and IT managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Background:** Inadequate dietary intake during pregnancy is a primary proximate determinant of poor maternal and child health. Maternal dietary practices related information is useful for designing appropriate interventions. This study was therefore designed to document dietary intake-related practices of pregnant women attending Antenatal Clinics (ANCs) in Ile-Ife, Nigeria.

**Design and Methods:** The cross-sectional study involved a total of 530 consenting women attending ANCs in 35 primary health care centers. A pre-tested questionnaire which included participants' socio-demographic information and dietary practices measures were used to collect data. Data were analysed using descriptive statistics and Chi-square.

**Results:** Respondents' mean age was 27.0±5.3 years, 44.5% had tertiary education, 70.7%

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earned below ₦30,000 (about \$83) monthly. A majority (97.2%) always take dinner, 96.8% take lunch, and the least taken food was breakfast (95.1%). Pap with beans-cake, Rice with beef stew, and 'amala' (yam or cassava flour meal) with 'ewedu' (Jute leaf soup) topped the list of foods that were mostly taken for breakfast, lunch and dinner respectively. Most (77.7%) respondents eat more than three times daily and pastries (60.9%) topped the list of snacks they consumed. Significantly, a higher proportion (30.2%) of participants aged 14 - 24 years eat 3 times or less compared with those aged 25- 34 years (18.6%) and 35 and above years (21.6%).

**Conclusions:** Participants especially older persons eat more than three times per day. However, breakfast was the most skipped meal. Diets often taken as dinner were 'heavy meals' and snacks often taken in between meals were pastries. Nutrition education interventions are required to address the phenomenon.

*Keywords: Pregnant women; dietary intake; maternal nutrition.*

## 1. INTRODUCTION

Pregnancy is a critical stage of development during which maternal nutrition can strongly influence obstetric and neonatal outcomes [1,2]. Optimal maternal nutrition is necessary to maintain the health of a pregnant woman, proper fetal development, contribute to the prevention of pregnancy complications [3,4] and the occurrence of diseases in adulthood [5]. An appropriate diet helps recovery from childbirth and favours breastfeeding [6].

Dietary factors such as unhealthy feeding habits, poor quality of food, food restrictions due to superstitious beliefs have been well documented as variables associated with undesirable maternal and child health indices [7]. Food consumption practices of pregnant women in developing countries like Nigeria are highly influenced by seasonal food variation, physical activities, family food distribution [8]. Other factors that may influence dietary intake are the geography of the land, the agricultural practice by the people, food marketing practices and tradition [9]. Several studies conducted in Nigeria [8,10,11] have noted that food taboos and avoidance have been reported among pregnant women in many communities, with the consequent inadequate nutrient intake. For instance, a study carried out in Imo State in Nigeria documented that 15% of the pregnant women studied held on to superstitious traditional food taboos which in turn influenced their dietary practices [8].

In many communities, pregnant women are restricted or forbidden from eating some foods that are common sources of essential nutrients such as snails, snakes, bush meats, egg and beans due to beliefs that some of the foods can have negative effects on them and their unborn children [8,10,12]. Several factors have been

associated with adherence to food taboos including primigravidity, teenage pregnancy, lack of formal education, low household income, signifying low socio-economic status and a low body mass index [13]. Poor socio-economic condition and food insecurity could make pregnant women refrain from some nutrient-dense foods including protein-rich meat group and make them favour starchy foods above more than food groups [11].

The problem of malnutrition among pregnant women poses a great challenge to the health of pregnant women [10,14]. Malnutrition does not just affect the pregnant women only but also has a devastating effect on the foetus. It is ranked as one of the major causes of maternal mortality, and it is a significant determinant of a successful pregnancy and a healthy well-nourished baby [8]. Most congenital cardiovascular diseases among children and adulthood originate at the embryonic developmental stages where essential nutrient required for healthy foetus development are deficient or lacking inadequate or not transferred at all through the placental of the woman to the unborn baby due to consumption of poor quality diet [15]. On the other hand, excessive consumption of food items such as carbohydrates, fatty and protein diet has resulted in overweight and obesity among some pregnant women. Excessive weight in pregnancy is associated with many disease conditions such as hypertension in pregnancy, diabetes mellitus, giving birth to big babies (macrosomic babies), who may later in life have health challenges and cardiovascular diseases. These medical conditions may continue to the post-partum period [16]. It is on this background that this study was designed to investigate practices relating to dietary intake of pregnant women attending an antenatal clinic at Primary Health Centres (PHCs) in Ile-Ife Osun State; Nigeria.

## **2. MATERIALS AND METHODS**

### **2.1 Study Design**

The study was a descriptive cross-sectional survey. It investigated practices relating to dietary intake as well as adverse effects experienced when some foods are taken during pregnancy in pregnant women attending antenatal clinics in Ile-Ife, Nigeria.

### **2.2 Study Population**

The study population comprised of pregnant women attending antenatal clinics in the 35 PHC facilities in the three Local Government Areas (LGAs) of Ile-Ife (Ife Central, Ife East, and Ife East Area Office). Records reviewed showed that 557 pregnant women were attending antenatal clinics at PHC centers in the three LGAs in Ile-Ife as at the time the study was conducted. Hence, the total population was used to get optimal insight into the study, make wide coverage of population of interest and increase the chance of harvesting potential insight from all eligible respondents. However, only 530 consented to participate in the study of the 557 pregnant women. The study was conducted between February and April 2014.

### **2.3 Instrumentation**

A validated semi-structured questionnaire was used to facilitate the process of data collection for the study. The design of this research instrument was based on the research objectives, relevant literature and related conceptual frameworks. The instrument was subjected to the scrutiny and constructive criticism of five experienced researchers in the fields of public health and nutrition. The instrument was pre-tested among fifty-nine pregnant women (10% of the study sample) attending an antenatal clinic at PHC Okoko in Ipetumodu, which shares similar characteristics with the study area. The reliability of the instrument was ascertained with the use of Cronbach's Alpha coefficient technique in Statistical Package for Social Sciences (SPSS), which yielded a coefficient value of 0.6. The findings of the pretest were used to make necessary modification on the instruments.

The pre-tested semi-structured questionnaire captured respondents' socio-demographic characteristics of the respondents, dietary practice in pregnancy and, 24-hours nutritional recall of respondents. The questionnaire was

constructed in the English language and translated into Yoruba by a linguistic expert that was vast in both languages for easy communication with respondents who were illiterates and semi-illiterate. 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 thoroughly trained and involved in various phases of the data collection including the pre-test of the instrument as well as community entry processes (establishing necessary contact, rapport and seeking cooperation for the purpose of executing the study) that were carried out to ensure collection of quality data. The support and permission were sought from appropriate authorities including PHC coordinators and heads of health facilities facilitated the process of data collection. The pregnant women attending the clinics were approached, and their consents were sought prior to the commencement of the interviews. Only participants who provided written informed consent were interviewed.

The respondents were interviewed with copies of the questionnaire either in the Yoruba or English language depending on respondents' preference and language spoke or understood. The participants were interviewed on the one-on-one basis and under situations that guaranteed their privacy. Most interviews were conducted after the respondents were done with their antenatal care. Safe and comfortable places which paved the way for privacy during the interview were used for the purpose of interviewing the respondents. The interviews of the respondents lasted between 15 – 25 minutes. Participation was voluntary and participants who did not want to take part in the study were excused from observing the principle of autonomy. Participants were assured of confidentiality, privacy and anonymity of information provided.

### **2.5 Data Analysis**

The copies of the questionnaire were checked for completeness and a serial number was given to each for easy identification and recall. A manual coding guide was developed to facilitate data entry into the computer. Each questionnaire was coded and entered into a computer-facilitated by

the developed coding guide. An analysis was done by using statistical package for social sciences (SPSS) software version 20.0. Descriptive statistics including mean, frequency distribution, percentages and charts were used to present data. Chi-square statistics was used to test the association between dependent and independents variables at a level of significance set at 0.05.

### 3. RESULTS AND DISCUSSION

#### 3.1 Results

The socio-demographic characteristics of the participants are contained in Table 1. Their ages ranged from between 14 to 63 years while the mean age was  $27 \pm 5.3$  years. A few (7.0%) of the study participants were older than 35 years. Most (90.8%) of the pregnant women were married and 91.1% were in monogamous marriage. Three-quarter (75.0%) of the participants were Christians and 24.0% were adherents of Islamic faith. Majority (88.0%) of the participants belong to Yoruba ethnicity. A higher proportion (44.5%) of the respondents had tertiary education and 31.4% were civil servants. Regarding their monthly income, only 11.1% earned above 50,000 naira. Majority (80%) of the pregnant women had at least a child and the mean number of their children was  $2 \pm 1.3$ .

Information on daily meals taken by respondents is presented on Fig. 1. The least taken food was breakfast (95.1%) while dinner was the most taken meal (97.2%). Highlights of foods usually taken by the respondents for breakfast, lunch and dinner are presented on Table 2. The most

commonly food consumed by the respondents for breakfast was pap and *moinmoin/lakara* (57.0%), followed by rice with beef/fish stew (19.0%). Rice and stew (26.0%) was the major food reported for lunch, followed by *Amala* and *ewedu* (18.5%) and pap and *moinmoin* (16.2%). Yam and egg (11.9%), beans (11.7%), garri (5.3%) and pounded yam (4.9%) were also mentioned as food eaten for lunch. For dinner, a higher proportion of the respondents preferred *amala* with *ewedu* (41.7%), followed by beans (13.8%) and *eba* (13.4%).

Information on body building foods eaten by the respondents is contained in Table 3. The assessment of dietary habit of pregnant women showed respondents consumed various body building foods. Cow beef (97.0%), followed by fish (96.0%), egg (96.0%) topped the list of the building foods consumed by the respondents (see Table 3 for detailed information).

Respondents mentioned various food items that they often take between meals. Out of food taken between meals by the respondents, pastries were mostly eaten (60.9%), followed by nut (19.3%) and savory (11.3%). Detailed information about food taken between meals is presented in Fig. 2.

The number of times respondents often eat in a day ranged from 2 to 8 times while the mean number of times respondents often eat in a day was  $4.5 \pm 2.0$  times. Most (77.7%) of the respondents often eat more than three times in a day (detailed information about number of times respondents eat in a day is contained in Fig. 3).

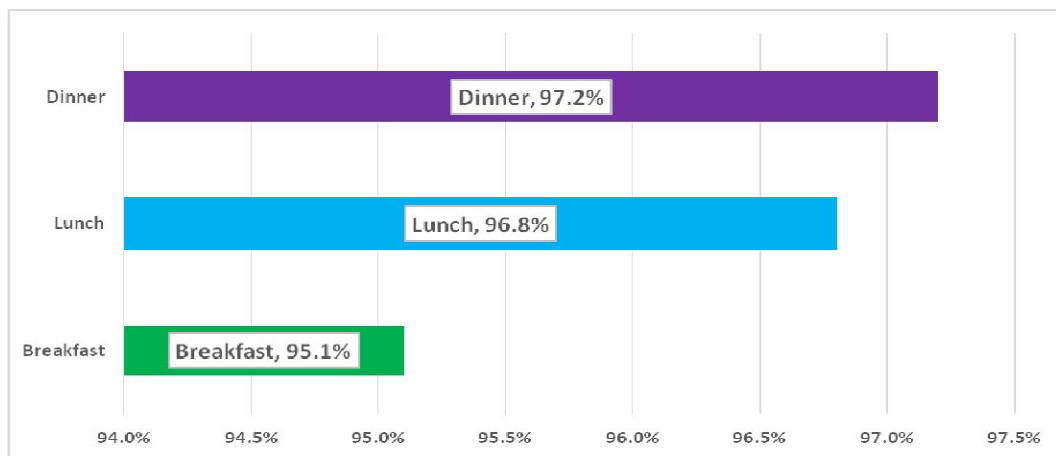


Fig. 1. Daily meals taken by respondents (N=530)

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

<b>Characteristics</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Age<sup>†</sup></b>		
14-24 years	160	30.2
25-34 years	333	62.8
≥35 years	37	7.0
<b>Marital status (n=521)*</b>		
Married	474	90.8
Single	41	7.9
Widowed	6	1.1
Divorced	1	0.2
<b>Family structure</b>		
Monogamy	483	91.1
Polygamy	47	8.9
<b>Religion (n=528)*</b>		
Christianity	396	75.0
Islam	127	24.0
Traditional	4	0.8
Others	1	0.2
<b>Ethnicity (n=527)*</b>		
Yoruba	464	88.0
Igbo	53	10.1
Hausa	10	1.9
<b>Level of education (n=521)*</b>		
No formal education	22	4.2
Primary	48	9.1
Secondary	223	42.2
Tertiary	235	44.5
<b>Occupation (n=523)*</b>		
Civil servant	164	31.4
Petty trader	146	27.9
Artisans	90	17.2
Students	44	8.4
Unemployed	79	15.1
<b>Monthly income (n=523)*<sup>β</sup></b>		
None	24	4.6
≤10,000 Naira	146	28.0
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
<b>Number of children<sup>**</sup></b>		
0	106	20.0
1-2	275	51.9
3-4	136	25.7
≥5	13	2.4

- *\*Non responses were excluded*
- *\*Mean age of respondents = 27±5.3 years*
- *\*\*Mean number of children=2±1.3*
- *β 1 dollar = 360 naira*

**Table 2. Food taken by the respondents for breakfast, lunch and dinner**

Type of food taken*	No	%
<b>Breakfast</b>		
Pap+moinmoin/beans cake	302	57.0
Rice+stew+fish/beef	101	19.0
Rice+beans+fish/beef	38	7.2
Bread +beans	24	4.5
Yam+egg/fish stew	21	4.0
Yam flour+vegetable+fish	17	3.2
Bread+milk+beverage	16	3.0
Beans	11	2.1
<b>Lunch</b>		
Rice +stew+beef	138	26.0
Amala+ewedu+beef/fish	98	18.5
Pap/ekko+moinmoin/akara	86	16.2
Yam +egg	63	11.9
Beans	62	11.7
Bread+beans	29	5.5
Garri + groundnut	28	5.3
Poundedyam+melonsoup	26	4.9
<b>Dinner</b>		
Amala+ewedu+beef/fish	221	41.7
Beans	73	13.8
Eba + vegetable/melon+fish	71	13.4
Poundedyam+vegetablesoup	56	10.6
Rice +stew+beef	49	9.2
Yam +egg	26	4.9
Pap/eko+moinmoin/akara	18	3.4
Bread+beans	16	3.0

**\*Description of food**

**Akara:** Deep fried bean paste

**Moinmoin:** Steamed bean paste

**Amala-**Staple food prepared from yam flour or fermented cassava flour- cooked to paste with 'hot water

**Eba:** Garri cooked to a paste with hot water

**Ewedu:** Jute leaf (*Cochorusolitorus*) soup

**Fufu:** Fermented grated cassava, cooked in hot water

**Egu:** vegetable garnished with melon

**Semovita:** Meal made from coarsely ground durum wheat

**Pap/Eko:** Cereal-based meal (made either from maize, sorghum or millet) in form of soft porridge or firm porridge

**Garri:** Cassava flakes – soaked with water

Table 4 shows analysis of association between number of times respondents eat in a day and some socio-demographic variables. A higher proportion (30.2%) of young pregnant women aged 14- 24 years eat 3 times or less compared with those aged 25- 34 years (18.6%) and 35 and above years (21.6%). Overall, there was a significant association between age of

respondents and number of times that the pregnant women eat. However, no significant association was found between the number of times respondents eat in a day was compared with some socio-demographic variables such as marital status, level of education and monthly income.

**Table 3. Body building foods eaten by the respondents (N=530)**

Food	No	%
<b>Beef</b>		
Yes	514	97.0
No	16	3.0
<b>Fish</b>		
Yes	509	96.0
No	21	4.0
<b>Egg</b>		
Yes	509	96.0
No	21	4.0
<b>Snail</b>		
Yes	384	72.5
No	145	27.5
<b>Bush meat</b>		
Yes	375	70.8
No	155	29.2
<b>Milk</b>		
Yes	476	89.8
No	54	10.2
<b>Cowpea</b>		
Yes	391	73.8
No	139	26.2

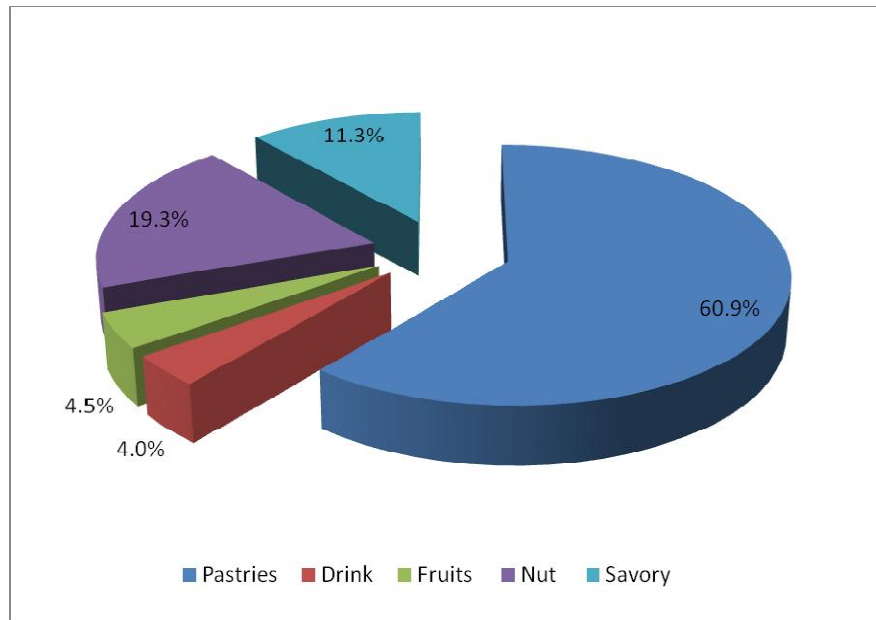
Information obtained from the 24-hour dietary recall of respondents is contained on Table 5. The 24-hour dietary recall for breakfast showed that majority (46.2%) of the respondents took pap and moinmoin/akara as breakfast while 34.7% took rice and beans. The 24-hour dietary recall for lunch showed that a higher proportion of the pregnant women reported eating rice (20.9%), while 18.1% took amala and 12.3% ate garri/pap with moinmoin/akara. For dinner, the 24-hour dietary recall showed that a higher proportion of the women ate amala (37.2%), while 16.0% ate beans and 13.6% took pap and moinmoin/akara.

**3.2 Discussion**

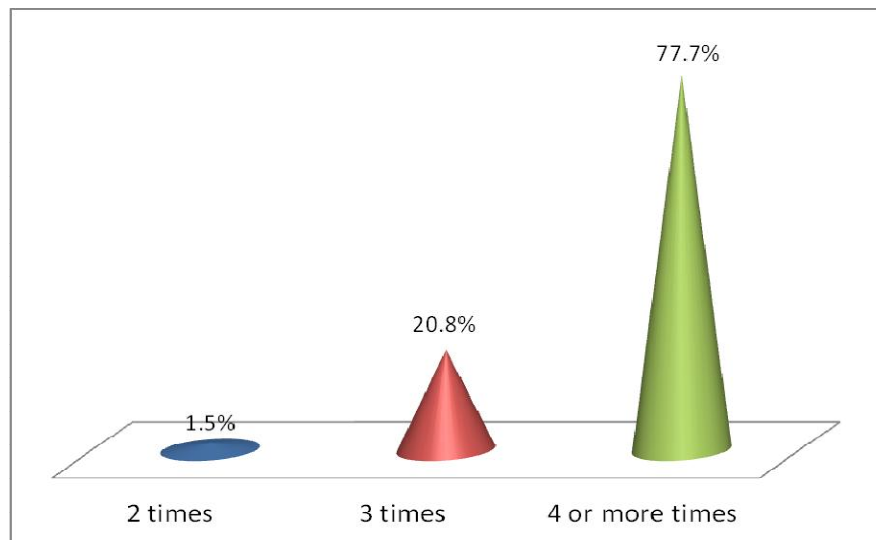
The mean age of the pregnant women in the current study is similar to that of a previous study conducted among pregnant women visiting PHCs for Antenatal care in Ile-Ife which revealed a mean age of 26 years [17]. The study evidently showed that some of the pregnant women

involved in the study were young female adolescents. This finding corroborates the report of the recent National Demographic Health Survey which noted that 28.2% of women aged 15 – 19 and 61.3% of women aged 20 – 24 years are married in Nigeria [18]. Community-based interventions which aim at preventing teenage pregnancy among women are essential and

should be duly encouraged. The finding that nearly all the respondents were married might be due to the fact that the Nigerian culture frowns at pregnancy out of wedlock [19]. It was also noted that in the Nigerian context especially in the rural settings, being pregnant is usually translated into being married to the person responsible for the pregnancy [19].



**Fig. 2. Food items eaten in between meals**  
 Pastries (meat pie, fish pie/roll, puffpuf, buns, sausage)  
 Savory- (biscuit and pop-corn)



**Fig. 3. Number of times respondents often eat in a day**  
 \*Mean number of times respondents eat in a day = 4.5 ± 2.0 times, Range 2 – 8 times

**Table 4. Number of times respondents eats per day by socio-demographic variables**

Variable	Number of times respondents eats per day			Chi-square
	≤ 3 times	≥ 3 times	Total	
<b>Age group</b>				$\chi^2=8.3$
14-24 years	48 (30.2)	111 (69.8)	159 (30.1)	P = 0.02 <sup>++</sup>
25-34 years	62 (18.6)	271 (81.4)	333 (62.9)	df= 2
≥35 years	8 (21.6)	29 (78.4)	37 (7.0)	
<b>Marital status</b>				$\chi^2=1.5$
Married	101 (21.4)	372 (78.6)	473 (90.8)	P = 0.15
*Unmarried	14 (29.2)	34 (70.8)	48 (9.2)	df= 1
<b>Level of education</b>				$\chi^2=4.6$
No formal Education	8 (36.4)	14 (63.6)	22 (4.2)	P = 0.20
Primary	13 (27.1)	35 (72.9)	48 (9.1)	df= 3
Secondary	52 (23.4)	170 (76.6)	222 (44.6)	
Tertiary	45 (19.1)	190 (80.9)	235 (44.6)	
<b>Monthly income (NGN)</b>				$\chi^2=2.6$
≤ 10, 000	39 (23.1)	130 (76.9)	169 (32.4)	P = 0.20
10, 000 – 20, 000	40 (25.5)	117 (74.5)	157 (30.1)	df= 2
>20, 000	36 (18.5)	159 (81.5)	195 (37.4)	

\*Unmarried: Single, widowed, divorced

++ p&lt;0.05

The result of this study which showed that many of the respondents were working as civil servants and petty traders is not surprising. This is because governments are the highest employers of labour in Nigeria and many people prefer to do white collar jobs. The reason why many of the respondents were into petty trading may be due to the fact that petty trading usually do not require huge amount of capital and resources to establish. The finding of this study that revealed that some (15.0%) women were unemployed is a real reflection of the high rate of unemployment in the country. Most of the respondents earned N30,000 (about \$83) or less monthly. This is expected because remuneration is general poor especially for those in civil service in Nigeria; where the minimum wage of N18,000 (\$50) are been paid to workers. Poor remuneration could seriously affect the standard of living of women as well as access to necessary foods that could support healthy dietary practices. This study underscores the need for economic empowerment programmes for women to enable them gain them access to good means of livelihood and resources and in turn support appropriate healthy dietary practices. Economic and poverty alleviating programmes as well as provision of food items should be made available by relevant government agencies, non-governmental organizations as well as philanthropic individuals to support appropriate nutrition for pregnant women.

The fact that most of the respondents eat more than three times per day suggests they were

aware of the importance of adequate diet during pregnancy and this could be a reflection of the health education activities carried out by the health workers during the antenatal clinic. Eating small amounts of food more frequently (in the appropriate combinations and containing the needed nutrients) contributes to the well-being of pregnant women and development of their children [20] as well as, has the benefits of helping with some of the uncomfortable side effects of pregnancy including nausea and heartburn. Emphasis should be placed on increasing the consumption of nutrient-dense foods and minimizing empty-calorie foods that may provide the extra energy needed but do not provide micronutrients that are needed in much higher amount compared with the increased calorie needs [21]. Pregnant women with serious nutritional problems should be referred to dieticians for appropriate nutritional interventions.

Age was uncovered in the current study as an important predictor of the dietary practice of eating more than three times per day. Participants aged 24 years and above significantly ate more than 3 times daily. Apart from the fact that pregnancy often demands additional amount of nutrient intake, pregnant adolescents will require increased nutritional needs to meet demand of their ongoing development and at the same time deliver a healthy baby. Additional nutritional needs required during pregnancy is dependent on several factors including preconception Body Mass Index (BMI), physical activity and trimester



period [22,23,24]. The recommended energy intake for pregnant women is: no extra energy requirement in the first trimester [25,26], 1400 kilojoules (kJ) or 340 kilocalories (kcal) extra energy per day for the second trimester [25,26], and 1900 kJ (452 kcal) extra energy per day for the third trimester [26]. The habit of skipping breakfast by some of the pregnant women is not a healthy practice. Breakfast is said to help to maintain normal and steady blood sugar levels. The practice of skipping breakfast could increase risk of preterm labour and morning sickness [27]. This practice should be addressed through appropriate nutritional education interventions with emphasis on the importance of taking breakfast and effects on the mother and the unborn baby.

**Table 5. Respondents' 24-hours dietary recall**

<b>24-hour Dietary Recall*</b>	<b>No</b>	<b>%</b>
<b>Breakfast</b>		
Pap + moinmoin/akara	245	46.2
Rice +beans+fish/meat	184	34.7
Bread +tea/akara	28	5.3
Yam and stew	27	5.1
Amala +ewedu	23	4.3
Beans +bread/garri	13	2.5
Eba and egusi	6	1.1
Porridge	4	0.8
<b>Launch</b>		
Rice+stew/jollof rice/fried rice	111	20.9
Amala +ewedu	96	18.1
Moinmoin+garri/pap	65	12.3
Beans+ bread	57	10.8
Yam	50	9.4
Garri + groundnut	47	8.9
Fufu	26	5.0
Bread +akara	23	4.3
Eba	23	4.3
Pounded yam and egusi	16	3.0
Porridge	8	1.5
Semovita + soup	8	1.5
<b>Dinner</b>		
Amala	197	37.2
Beans	85	16.0
Pap +moinmoin/akara	72	13.6
Pounded yam +vegetable	50	9.4
Rice	53	10.1
Eba	42	7.9
Yam + egg/stew	14	2.6
Bread + moinmoin	9	1.7
Semovita + vegetable	8	1.5

\*Description of food – see table 3 for description of food

The findings of the study indicated that eating 'heavy meals' (meals that are often consumed in large amount and are likely to take a long time before digestion could occur) such as "Amala" (a stable food among Yorubas- which is a solid food taken with soup) and pounded yam (a local favorite meal –often taken with vegetable) was a common practice among the pregnant women. The appropriate dietary practice is to take light meals (with can supply adequate nutrients) as dinners and to refrain from the practice of eating heavy meals when it is evening.

The finding that showed that some pregnant women often consume only 'garri' and groundnut for lunch meal indicates a poor dietary practice. Such a meal does not contain the essential nutrients needed to sustain optimal health and well-being of mothers-to-be and their foetus. Consumption of such food (often considered as one of the cheapest foods) may be connected with poor socio-economic conditions and food insecurity which commonly affect many women in Nigeria. This pattern of finding underscores the need for appropriate social and economic empowerment programmes that could assist pregnant women to overcome the burden of poor maternal nutrition.

The study participants indulged in the dietary practice of eating various kinds of snacks frequently. Mothers-to-be often require additional energy during pregnancy and for most women, the extra energy needs are easily met by adding healthy in-between meal snacks [28]. The study noted that respondents generally had preference for taking pastries as snacks in place of fruit which is a healthier alternative. The observation of this study is similar to that of previous studies [29,30] carried out among pregnant women which earlier documented the practice of low consumption of micronutrient rich food sources such as; green leafy vegetables and seasonal fruits as compared with the high consumption of unhealthy sources of fats and energy. Consumption of fruits which are rich in micronutrient supply the essential nutrients to pregnant women and this contributes immensely to the developmental milestones of the baby even after delivery [30]. Fruits and vegetables provide the best source of many vitamins and minerals, including folate and iron, which are important to prevent pregnant women becoming anaemic during pregnancy [31].

The study revealed that participants often consume protein-rich foods (body building foods)

including meat, fish and eggs. This is a good practice that needs to be reinforced and practiced regularly by pregnant women and intending pregnant women. During pregnancy, a woman must consume adequate protein to meet the needs of her growing foetus in addition to meeting her own increased needs as she physically grows in size to carry her baby [32]. Protein intakes of less than 75 g per day have been associated with low birth-weight and birth length [25], and intakes of less than 50 g per day with increased maternal morbidity [33]. High protein intakes (25 percent of total energy) during the foetal period have been linked to marked increases in congenital abnormalities [34] as well as adverse effects on birth weight [35]. Conversely, a pregnant woman may consume adequate protein but still have a protein deficiency if her calorie intake is low [36]. The quality of the protein taken by pregnant women should be taken into consideration. Low protein diets are associated with adverse outcomes of pregnancy. Pregnant women should be advised to consume high quality sources of protein, meaning sources that include all essential amino acids such as meat, egg, poultry, fish and dairy. Consumption of a variety of plant-based proteins rich-foods also has health benefits on pregnant mother and her foetus [36].

#### 4. CONCLUSION

Participants often eat more than three times per day especially among older pregnant women. Varieties of foods were taken at different periods of the day, however, breakfast was often the most skipped meal. Foods taken for dinner were mostly heavy meals which were foods which could have been preferably taken earlier in the day Protein-rich foods were mainly derived from animal sources. Snacks which were often taken in between meals were pastries and consumption of fruits was not a common practice. The findings suggest a need for several nutrition education interventions for pregnant women. During antenatal care programme, 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.

#### CONSENT

As per international standard or university standard, participants' written consent has been collected and preserved by the authors.

#### ETHICAL APPROVAL

The approval to conduct the study was taken from Obafemi Awolowo University Teaching Hospital complex Ethical Review Committee. Adequate information on the study was given to the participants. They were assured of utmost confidentiality and anonymity of their responses to protect their interest. Participation was voluntary and participants who did not want to take part in the study were excused to observe principle of autonomy. Participants were treated with respect and their integrity was protected.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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