

## Food Consumption Pattern and Hemoglobin Levels of Pregnant Women Attending Ante-natal in Poly Clinic Asata, Enugu, Enugu State, Nigeria

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### Abstract

This study was carried out to determine effect of food consumption on haemoglobin levels of pregnant women in polyclinic Asata Enugu State. One hundred (100) samples were collected using semi-structured, self administered questionnaire. The data collected were analysed with SPSS version 17 to determine the anthropometric measurements and the mean and standard deviation were also determined. The result showed that the mean weight, height, BMI and standard deviation are  $74.6\pm 12.9$ ,  $1.61\pm 0.15$  and  $28.3\pm$  respectively. There was no significant difference ( $0.5 < 1.96$ ) in the BMI of anaemic and non-anaemic respondents. Apparently 33%, 5% were found to be mild and moderate anaemic respectively. In the food consumption pattern, majority (73%) of the subject eats 3times daily and most (81%) takes breakfast, lunch and supper. There was significant difference between mean haemoglobin levels of normal and anaemic pregnant mothers. Large number (73%) claimed to have knowledge of nutrition, yet analysis showed poor knowledge of nutrition. This study revealed high prevalence of anaemia among pregnant women. It is therefore recommended that adequate intervention programmes through nutrition education be explored in our health institutions.

**KEYWORDS:** Effect, Food-Consumption, Hemoglobin-Levels & Pregnant-Women

### Introduction

#### Background of the Study

Food is a basic human need and the major source of nutrients needed for human existence. You are what you eat is a general assertion, which is applicable in every stage and physiological state of life. Therefore, the effect of food consumption on hemoglobin levels of pregnant women should not be over emphasized.

Several factors have been found to affect food consumption pattern at every stage in life which ranges from social, cultural and economic factors such as religion, beliefs, food preferences, gender discrimination, education and women's employment all have noticeable influence on food consumption pattern. A lot of factors can reduce the hemoglobin levels during pregnancy which predisposes the pregnant mother to anemia.

Anemia is a global public health problem affecting both developing and developed countries with major consequences for human health as well as social and economic development. It occurs at all stages of life cycle, but is more prevalent in pregnant

women and young children. It occurs when the concentration of hemoglobin falls below what is normal for a person's age, gender and environment, resulting in the oxygen carrying capacity of the blood being reduced. Anemia is often classified as mild (Hb 9.0 – 11.0g/dl), moderate (Hb 7.0 – 9.0g/dl), severe (Hb 4.0 – 7.0 g/dl), and very severe Hb less than 4.0 g/dl. It can also be classified based on the Haematocrit (PCV) %.

The World Health Organization (WHO) estimated that in developing countries, prevalence rates in pregnant women are commonly in the range of 40 to 60 percent. Around half of those with anemia, are suffering from iron deficiency anemia, that is having deficient body iron stores but without frank anemia, the latter are therefore considered to be at risk of iron deficiency anemia.

Folate deficiencies and other causes account for the major proportion of the remaining anemia. For pregnant women anemia can result in severe morbidity and mortality and reduces the resistance to blood loss with the result that death may result from the blood loss associated with delivery. The so called physiological anemia occurs when there is disproportionate increase of plasma volume during pregnancy, leading to apparent reduction of red blood cells, hemoglobin and Haematocrit value.

During pregnancy, growth of the fetus and of the placenta and the larger amount of circulating blood in the expectant mother, lead to an increase in the demand for nutrients, especially iron and folic acid. The majority of women in the developing countries start pregnancy with depleted body stores of these nutrients and this means that their extra requirement is even higher than usual.

Poor dietary status reflected by low socio- economic status makes micronutrient deficiency both clinical and subclinical relatively more common. All these factors deplete the micronutrient stores of the mother, to the extent that she becomes anemic even in the first trimester in the next pregnancy and this brings a more severe outcome for both the mother and the child reported by (Bondevik & Abel, 2001). Yuan Xing et al (2009), on a study reported that an average of 63 percent of mothers were anemic and that the gestational age, ethnicity, residence and low income amounted significantly to the Hb level and the occurrence of anemia in pregnant mothers. Ma et al. (2004) reported 41.58% in pregnant people of Qingdao province of China were anemic and the subjects with iron deficiency anemia had much higher rates of vitamin C, folate and B12 deficiencies than those in the non anemic subjects and especially in the deficient rates of ascorbic acid and folate in the anemia group. Moreover, they observed that the decreasing trends of Hb concentrations were accompanied by the decreases of serum levels of vitamin A, ascorbic acid, folate and B<sub>12</sub> and concluded that multiple vitamin deficiencies may be associated with anemia in pregnant mothers in the last trimester. However, the work of Karaoglu et al (2010) on pregnant women of East Anatolian province of Turkey, registered a percentage of 27.1% of anemic pregnant women, having four or more children and being in the third trimester. Their finding also was associated with PICA (soil eating habits of pregnant women). Most of the anemia recorded was normocytic-normochromic indicating mixed anemia.

Maternal anemia in pregnancy continued to be considered a risk factor for poor pregnancy outcome and can result in complications that threaten the life of both mother and fetus. However, current knowledge indicates that iron deficiency in pregnancy is a risk factor for preterm delivery followed by low birth weight and possible inferior neonatal health. Although, the extent to which maternal anemia affects maternal and neonatal health is still uncertain. Some studies have demonstrated a strong association between low hemoglobin before delivery and adverse outcomes while others have not found a significant association. Thomsen et al (1993) stressed that during pregnancy, the needs of the growing fetus and placenta as well as the increasing maternal blood volume and red cell mass, impose such a demand on maternal iron stores that iron supplementation at daily doses between 18 and 100mg from 16 weeks gestation onwards could not completely prevent the depletion of maternal iron stores at term.

The work of Dim and Onah (2007) on pregnant mothers in Enugu Southern Nigeria proved that 40.4 percent of the pregnant women were anemic, the majority of these anemic patients were mildly anemic and there was no case of severe anemia and those pregnant mothers in third trimester expressed significant anemia than those in the second trimester.

Furthermore, anemia is the end result of severe nutrient deficiency of one or more hematopoietic factors usually iron, less frequently folate or vitamin B12. We know that hemoglobin concentration, by which anemia is diagnosed is a relatively insensitive index of milder degrees of nutrient depletion, so that by the time a woman becomes anemic, she is already suffering from a marked degree of nutrient deficiency and because a low Hb content of the blood is more easily detected than the underlying deficiencies, it has come to be used as an index of hematopoietic nutritional status.

### **Statement of Problem**

The morbidity and mortality rate tend to rise in pregnancy with an increase in anemia (hemoglobin levels < 11g/dl). In the society because of the practice known as “eating down” which often stems from a belief that a larger fetus will cause a more difficult delivery, women tend to eat little during pregnancy, coupled with hormonal changes which expands the plasma volume, stimulates or reduce appetite predisposes the pregnant women to low hemoglobin levels (anemia).

Anemia in pregnancy is defined by the World Health Organization (WHO) as a hemoglobin concentration below 11g/dl (WHO, 1992). It continues to be a health problem in many developing countries and associated with increase rates of maternal and prenatal mortality, premature delivery, low birth weight and adverse outcomes (Mahomed, 2000). Although only 15% of pregnant women are anemic in developed countries (WHO, 2003).

The prevalence of anemia in developing countries is relatively high 35% to 75% (Nyuke, 2000). According to Allen (2000), the World Health Organization (WHO) estimates that average of 56% of pregnant women in developing countries are anemic. This percentage

ranges from 35% to 75% in specific areas and is much high than the 18% of pregnant women diagnosed with anemia in developed countries.

This study is instituted to determine the effect of food consumption on hemoglobin levels of pregnant women in polyclinic Asata.

### **General Objectives**

This study is aimed at determining the effect of food consumption on hemoglobin levels of pregnant women at registration for antenatal care in polyclinic Asata Enugu Nigeria.

### **Specific Objectives**

1. To determine the demographic and socio-economic state of respondents.
2. To examine the anthropometry of subjects.
3. To assess the food consumption pattern in the proportion of subjects with low hemoglobin levels
4. To determine the relationship between food consumption and hemoglobin levels during pregnancy.
5. To determine the prevalence of anemia among pregnant mothers in polyclinic Asata.
6. To examine the knowledge of respondents to the occurrence of anemia and other iron related problems.

### **Significance of the Study**

More than half of the pregnant women in the world have hemoglobin levels indicative of anemia (WHO, 1992). Knowledge of the current situation of the condition in our environment is necessary. The knowledge will motivate antenatal caregivers towards early detection and prompt management of anemia in pregnancy. The result of this study will form a basis for counseling and educating pregnant women the importance of natal nutrition.

### **Methodology**

#### **Study Design**

The survey was a cross sectional study targeted among pregnant women in polyclinic Asata in Enugu metropolis, Enugu state Nigeria. It was a retrospective study of normal pregnant women who registered with the antenatal unit of the hospital.

#### **Sample Size**

Seventy three percent (73%) of all registered mothers from the month of February to July 2012 were randomly selected (100 samples) using a well structured questionnaires

#### **Selection of Respondents (Sample Technique)**

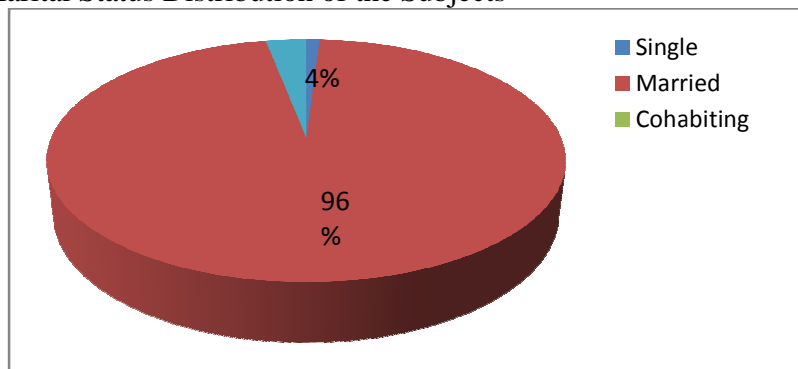
A structured and validated questionnaire was use to collect information on personal data, **Weight** to the nearest kilogram with the Hanson type weighing scale, **Height** was measured to the nearest 0.1 centimeter with the client standing erect, using a calibrated metre rule. With the measurement collected, the **BMI** was calculated and recorded to the nearest figure. **Hemoglobin** records were collected from the patients' folders. Food frequency and 24hours diet recall were used to collect data on the dietary history of the patients.

## Result Presentation and Analysis

The result of this study were obtained through statistical analysis of the information obtained from the questionnaire and are presented in the tables.

### Section A: Demographic Data of the Subjects

**Figure 1:** Marital Status Distribution of the Subjects



Almost 96% (96) of the subjects were married.

**Table 1:** Age information of the subjects

Mean Age(yrs)	S <sup>2</sup>	SD	Range
28.19	24.68	±4.97	15-39

**Figure 2:** Ethnicity distribution of the respondents

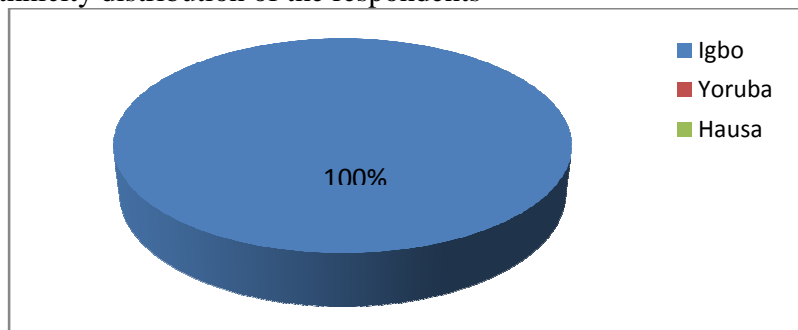
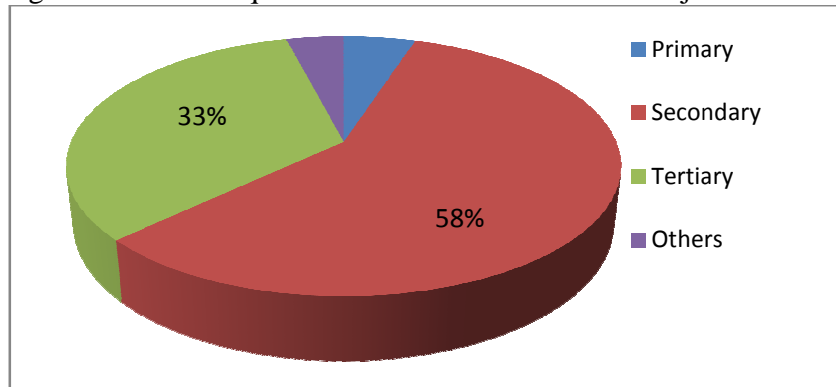


Figure 4.3 showed 100% (100) Igbo response.

Ninety eight (98%) percent of the subjects were Christians.

**Figure 3:** Higher educational qualification distribution of the subjects.



Majority 58%, 33% of the subjects had secondary and tertiary education respectively.

**Figure 4:** Occupation of respondents

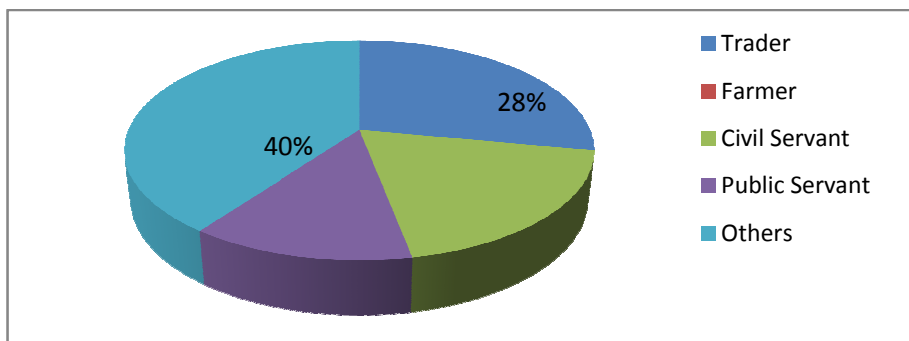
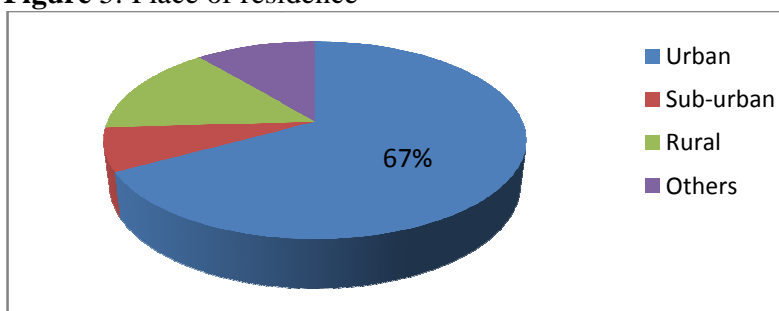


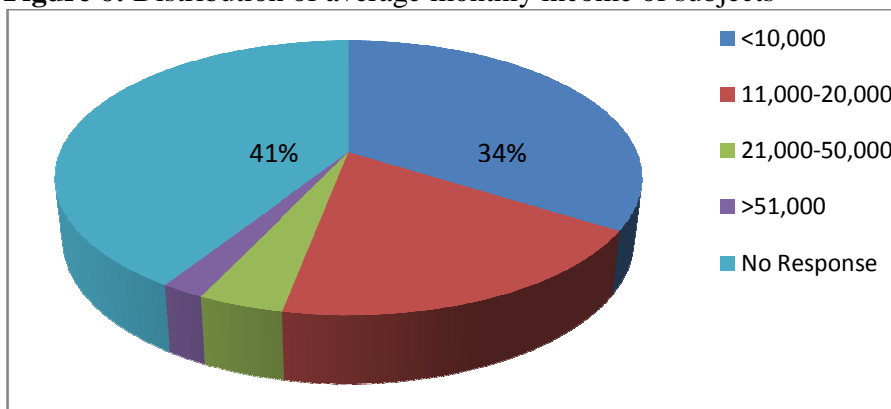
Figure 4 showed that 28% (28) of the subjects were traders while majority 40% (40) said others which includes, housewife, unemployed, students etc.

**Figure 5:** Place of residence



Majority 67% (67) of the subjects reside in the urban.

**Figure 6:** Distribution of average monthly income of subjects



Thirty four (34%) percent respondents earn less than ₦10,000 per month, while majority 41%(41) of the mothers did not respond to their average monthly income.

**Section B: Anthropometry/Biochemical Data**

**Table 2(a):** Anthropometry Parameter of the subjects

Parameter	Mean	SD	Range
Weight (kg)	74.6	±12.9	43-131
Height (m)	1.61	±0.15	1.46-1.75
BM1 body mass index (kg/m <sup>2</sup> )	28.3	±8.4	19.6-47.0

**Table 2(b):** Mean BMI of anemic and non-anemic pregnant women

Categories	Mean (BMI)	SD	Range
Anemic	28.8	±7.5	19.6-47.0
Non-anemia	28.1	±6.6	20.2-40.0

**Table 2(c):** Hematologic values of subjects

Parameter	Categories	Frequency	%
Hemoglobin	Normal>11	62	62
	Mild anemia 9.0-11.0g/dl	33	33
	Moderate anemia 7.0-9.0g/dl	5	5
	Severe anemia 4.0-7.0g/dl	0	0
	Very severe anemia <4.0g/dl	0	0
<b>Total</b>		<b>100</b>	<b>100</b>

**Table 2(d):** Distribution of mean hemoglobin levels of non-anemic and anemic pregnant women

Categories	Mean (mg/dl)	SD	Range
Non-anemic	11.9	±0.45	11.3-13.3
Anemic	10.1	±0.67	8.7-11

**Table 2(e): Blood Pressure of the respondents**

Blood Pressure (BP)	Categories	Frequency	%	Mean	Range
Systolic:	Optimal <120	74	74	100.3mmHg	70-110
	Normal 120-129	14	14	120.4mmHg	120-125
	High-normal 130-139	6	6	131.5mmHg	130-139
	Hypertension ≥140	6	6	146.8mmHg	140-160
<b>Total</b>		<b>100</b>	<b>100</b>		
Diastolic:	Optimal <80	85	85	62.1mmHg	50-78
	Normal 80-84	11	11	80mmHg	
	High-normal 85-89	0	0		
	Hypertension ≥90	4	4	92.5mmHg	90.100
<b>Total</b>		<b>100</b>	<b>100</b>		

Whelton PK. Epidemiology of hypertension. Lancet 1994; 344:101-6.

The table showed 6 % ( 6 ) & 4 % ( 4 ) systolic & diastolic pressure indicative of hypertension (preeclampsia) respectively.

**Section C: Gestational Data**

**Table 3:** Gestational response of the subjects

Categories	Response	Frequency	%
(a) Those that have given birth before	Yes	63	63
	No	37	37
	<b>Total</b>	<b>100</b>	<b>100</b>
(b) Number of children	1-3	44	69.9
	4-6	13	20.6
	7-9	-	-
	>10	-	-
	None	6	9.5
<b>Total</b>	<b>63</b>	<b>100</b>	
(c) Those that smoke	Yes	4	4
	No	96	96
	<b>Total</b>	<b>100</b>	<b>100</b>
(d) Those that take alcohol	Yes	31	31
	No	69	69
	<b>Total</b>	<b>100</b>	<b>100</b>
(e) Those that still take while pregnant?	Yes	19	61.3
	No	10	32.3
	No response	2	6.4
	<b>Total</b>	<b>31</b>	<b>100</b>



Questions	Response	Frequency	%
(f) When did you report to the hospital for antenatal care?	≤ 1 month of pregnant	0	0
	2-3 months of pregnant	9	9
	4-5 months of pregnant	56	56
	6-7 months of pregnant	31	31
	≥ 8 months of pregnant	4	4
(g) What is the current age of your pregnancy?	1-2 months	2	2
	3-4 months	13	13
	5-6 months	36	36
	7-8 months	39	39
	≥ 9 months	10	10
	<b>Total</b>	<b>100</b>	<b>100</b>
(h) Are you HIV positive?	Yes	5	5
	No	87	87
	No response	8	8
	<b>Total</b>	<b>100</b>	<b>100</b>
(i) Robust baby could put difficulties during pregnancy	Yes	63	63
	No	21	21
	No response	16	16
	<b>Total</b>	<b>100</b>	<b>100</b>
(j) ... Mothers should consume less food to reduce the size of the baby for easy/safe delivery	Yes	67	67
	No	30	30
	No response	3	3
	<b>Total</b>	<b>100</b>	<b>100</b>
Questions	Response	Frequency	%
(k) How often do you take your routine drugs?	At will	6	6
	Once daily	14	14
	Twice daily	11	11
	As recommended	57	57
	No response	12	12
	<b>Total</b>	<b>100</b>	<b>100</b>
(l) Do you take iron supplements before pregnancy?	Yes	44	44
	No	42	42
	No response	14	14
	<b>Total</b>	<b>100</b>	<b>100</b>

(m) Are you currently taking iron supplements?	Yes	92	92
	No	4	4
	No response	4	4
	<b>Total</b>	<b>100</b>	<b>100</b>
(n) Do you take iron supplements after delivery?	Yes	35	35
	No	61	61
	No response	4	4
	<b>Total</b>	<b>100</b>	<b>100</b>

The table showed majority 63%(63) had given birth before and that out of the 63 mothers, most 69.9% (44) had 1-3 children. 4%(4) of the subjects smokes while 31%(31) takes alcohol. Table 3(e) showed that out of the 31 mothers who took alcohol, most 61.3% (19) still take while pregnant. Five percent 5%(5) were HIV positive.

#### Section D: Food Consumption

**Table 4:** Food Consumption Distribution of the subjects

Questions	Response	Frequency	%
(a) How often do you eat a day?	Once	1	1
	2x daily	8	8
	3x daily	73	73
	4x daily	14	14
	Others	4	4
	<b>Total</b>	<b>100</b>	<b>100</b>
(b) Which of these meals do you normally eat?	Breakfast alone	4	4
	Breakfast & Lunch	14	14
	Breakfast, Lunch & Supper	81	81
	Lunch alone	-	-
	Supper alone	1	1
<b>Total</b>	<b>100</b>	<b>100</b>	
(c) Do you eat in between meals?	Never	6	6
	Sometimes	69	69
	Always	18	18
	No response	7	7
	<b>Total</b>	<b>100</b>	<b>100</b>
(d) What do you eat as in between meals?	Fruits	55	63.2
	Vegetables	11	12.6
	Confectionaries	14	16.1
	Others	7	8.1
	<b>Total</b>	<b>87</b>	<b>100</b>

Questions	Response	Frequency	%
(e) How often do you eat fruits?	Daily	41	41
	2x daily	14	14
	3x daily	7	7
	2x-3x/week	11	11
	Occasionally	27	27
<b>Total</b>		<b>100</b>	<b>100</b>
(f) How hungry do you feel at first trimester?	Less hungry	51	51
	More hungry	22	22
	Very hungry	18	18
	Same as before	9	9
<b>Total</b>		<b>100</b>	<b>100</b>
(g) How do you eat at first trimester?	Less	51	51
	More	22	22
	Very more	18	18
	Same as before	9	9
<b>Total</b>		<b>100</b>	<b>100</b>
(h) Did you change the amount of your food intake during your last pregnancy?	No	57	57
	Yes	43	43
<b>Total</b>		<b>100</b>	<b>100</b>
(i) If yes, was it	Less	24	24
	More	15	15
	Very More	4	4
<b>Total</b>		<b>43</b>	<b>100</b>
Questions	Response	Frequency	%
(j) While pregnant, if presented with the following foods to make choice, which will you go for?	Fruits	50	50
	Vegetables	36	36
	Cereals	8	8
	Legumes	6	6
<b>Total</b>		<b>100</b>	<b>100</b>

Table 4:4 showed that most 73% (73) of the subjects eat 3xdaily and mostly 81%(81) eat breakfast, lunch & supper. 69% (69) sometimes eat in between meals while 63.2%(55) and 16.1%(14) of those that eat in between meals used fruits and confectionaries respectively. Table 4 (e) further showed that 27% (27) of subjects eat fruits occasionally. Fifty one percentages (51%) each, feel less hungry at first trimester and as well eat less at

first trimester. 57% (57) changed the amount of food intake during their last pregnancy by consuming less 55.8%.

**Table: 4.5:** Food Consumption Pattern in Women with Low Hb Levels

Questions	Response	Frequency	%
(a) How often do you eat a day?	Once	1	2.6
	2x daily	6	15.8
	3x daily	24	63.2
	4x daily	4	10.5
	Others	3	7.9
	Total	38	100
(b) Do you eat in between meals?	Never	3	7.9
	Sometimes	29	76.3
	Always	2	5.3
	No response	4	10.5
	Total	38	100
(c) How hungry do you feel at first triester?	Less hungry	19	50
	More hungry	8	21.1
	Very hungry	8	21.1
	Same as before	3	7.8
	Total	38	100

Analysis from this table showed that 15.8%(6) of the respondents who were anemic eats two times daily. 7.9%(3) and 76.3%(29) never and sometimes eat in between meals respectively, while majority 50% felt less hungry at their first trimester.

**Table 6:** 24Hour dietary recall

FOOD GROUPS	BREAKFAST	LUNCH	SUPPER
Cereal base	50 (50)	22 (22)	24 (24)
Root/tubers base	10 (10)	48 (48)	40 (40)
Legume base	27 (27)	11 (11)	10 (10)
Fruit vegetable	1 (1)	8 (8)	14 (14)
Sugars/Beverages	4 (4)	0 (0)	0 (0)
Egg/meat/fish	1 (0)	3 (3)	7 (7)
Milk/milk pdt	1 (1)	0 (0)	0 (0)

Skipped meal	6 (6)	8 (8)	5 (5)
TOTAL	100 (100)	100 (100)	100 (100)

The table shows 24hours dietary recall. About 60% of the respondents selected their breakfast from cereals and root/tuber base groups. While 70%, 64% selected from cereal and root/tuber base group for lunch and supper respectively.

**SECTION E: NUTRITION KNOWLEDGE**

**Table 7:** Distribution of Knowledge in Nutrition

Questions	Response	Frequency	%
(a) Do you have knowledge of nutrition?	Yes	73	73
	No	27	27
	Total	100	100
(b) From where did you obtain the knowledge?	School	47	64.4
	Nurses	11	15.1
	Doctors	7	9.6
	Nutritionist-Dietitian	5	6.8
	Nutrition Counseling	3	4.1
	Total	73	100
(c) Nutrition is the science of ..	Purchasing food	4	5.5
	Cooking food	2	2.7
	Food and other substances therein	10	13.7
	Eating balanced diet	51	69.2
	No response	6	8.2
	Total	73	100
(d) Which of these food nutrients is the major source of energy to the body?	Protein	42	57.5
	Carbohydrate	15	20.6
	Beans	3	4.1
	Vitamins/Minerals	10	13.7
	No response	3	4.1
	Total	73	100

Questions	Response	Frequency	%
(e) Which of these is body building nutrients?	Carbohydrates	5	6.9
	Proteins	45	61.6
	Vitamins	14	19.2
	Minerals	2	2.7
	No response	7	9.6
	Total	73	100
(f) Which serve as defense to the body?	Proteins	16	21.9

	Carbohydrates	5	6.9
	Vitamins	38	52.1
	Minerals	2	2.7
	No response	12	16.4
	Total	73	100
(g) Which of these foods have high contents of iron?	Unripe plantain	54	74.0
	Ripe plantain	10	13.7
	Liver	2	2.7
	Banana	2	2.7
	No response	5	6.9
	Total	73	100
(h) Which of these nutrients will lead to anemia, if deficient in the body?	Zinc	3	4.1
	Iodine	13	17.8
	Iron	21	28.8
	Magnesium	7	9.6
	No response	29	39.7
	Total	73	100

Questions	Response	Frequency	%
(i) Who is the right person to meet for food and nutrition related matters?	Doctors	20	27.4
	Nurses	-	0
	Dietitians	47	64.4
	Pharmacist	2	2.7
	Total	No response	4
		73	100

## Discussion

### Personal data of the subjects

The personal data of the subjects are presented with all bring pregnant. Majority 96% of the subjects are married with the mean age 28.19 which is consistent with the recommended age for child bearing Dickson (2005). There is no doubt that between 20-35 is the time to have your children. Older women are more likely to face medical complications. They includes a greater risk of miscarriage, stillbirth, multiple pregnancy cancer, needing a caesarean or assisted delivery, foetal anomalies such as Down's syndrome and even a heart attack in pregnancy. The subjects were totally (100%) ibos (igbo) in tribe with majority (98%) Christians. This could be because Enugu is regarded as capital of igboland and mostly Christians. The occupational responses of the subjects showed that large number (40%) said "others" in response to their occupations. This could be either they are housewives, unemployed and/or there was nothing meaningful doing. Though, majority (67%) reside in the urban. Thirty four 34%, 19% were receiving a monthly income of <N10,000.00 and 11,000-20,000 respectively. One of the causative factors in high level of anemia found in this study could result from poor income. This is

because, income had been identified as an indicator of the quality and quantity of foods available to individual (Egbert, 1996).

#### **Anthropometric and Biochemical assessment of the subjects**

This mean weight, height, and BMI were determined to be 74.6kg, 1.61m and 28.3kg/m<sup>2</sup> respectively. The percent expended weight gain could be calculated due to unavailability of pre-pregnancy weight. Though, there were no significant difference  $p > 0.05$  between mean BMI of anemic & normal respondents. This could be as a result of undetermined pre-pregnancy weight which I presumed; their weight must have been massed by different gestational ages prior to collection of data. Moderate anemia in pregnancy may increase preterm birth and or low birth weight babies (Earle & Woteki, 1993).

Result showed that 33%, 5% had mild and moderate anemia respectively. There were no incidence of severe anemia, which is consistent with the study conducted on pregnant mothers in Enugu Southern Nigeria, proved that 40.4 percent of the pregnant women were anemic, the majority of these anemic patients were mildly anemic and there were no case of severe anemia (Dim & Onah, 2007). Data from this study revealed 38% prevalence of anemia.

#### **Gestational Data of the Subjects**

The result of the study showed that 63% have given birth before and 69.9% of the sample had 1-3 children. This is not too far from Onyechi and Nkwuaku (2011), were 52.3%, 47.6% have given birth before and had 1-4 children respectively. The high parity among the women may have been contributory factor to the percentage of women with anemia. This result is in line with Dallman, Simes and Stekel (1998), who showed in their study, that the closer the time intervals between subsequent pregnancies the higher the incidence of iron deficiency anemia. Also, Drufus (1998) in his study showed that iron deficiency anemia increases with a high number of pregnancies because of physiological demand. Almost all that participated in the study were in their second (56%) and third trimesters (35%). This would have limited the antenatal care given and probably the high prevalence of iron deficiency anemia.

These women might not have received enough precautionary dietary advice they would have used to prevent anemia. This is consistent with Onyechi and Nkwuaku (2011) were 41%, 58.1% of their participant were in their second and third trimester respectively. The search showed that iron requirement is low during the first trimester but rises steadily during the second and third trimester. Sixty-one percent 61% of the subjects do not take iron supplement after delivery and likewise 42% do not take iron supplement before pregnancy – coupled with late registration in antenatal attendance which could predispose them to anemia. Women during antenatal clinics are encouraged to start oral iron supplement daily as soon as they become pregnant. Beaton and McCabe (1999), noted in their study that there was non compliance with the frequency of oral iron supplementation. Daily iron supplementation was recommended rather weekly.

### **Food Consumption**

Greater percentage 51% each, of the respondents feels less hungry and as well eats less during their first trimester respectively. Also greater percent (67%) believed that mothers should consume less food to reduce the size of the baby for easy/safe delivery. This practice should be discouraged as pregnancy is a high physiologic state; hence any alteration in the supply of essential nutrient(s) could affect the health of both mother and unborn child.

The respondent's food consumption pattern revealed that they consumed limited number of foods rich in iron. Their foods were high in starchy foods like roots & tubers which may contain phytate that could bind iron and other nutrients making it uneasy for absorption. Bruce et al. (1992), in their study confirmed that phytate found in these foods can decrease non-hem iron absorption by 51-52%.

### **Knowledge of Nutrition**

Majority (75%) of the subjects claimed to have knowledge of nutrition but results presented in Table 7 showed otherwise. The poor nutritional knowledge may have limited their level of awareness in terms of appropriate food choice(s).

### **CONCLUSION**

From the study, it is evidence that food consumption has an effect on the hemoglobin levels of pregnant women. It is evidence that anemia is existing among pregnant women in polyclinic Asata in Enugu metropolis.

The prevalence of anemia among pregnant women is mostly due to poor intake of foods; particularly iron foods, unspaced birth, late registration for antenatal, low income level, poor intake of iron supplements and limited knowledge/awareness in appropriate food choice(s). All could have contributed to the prevalence of anemia seen in this study.

### **RECOMMENDATION**

The following recommendations were made based on the findings in this research:

- ❖ Policies and laws that would enable Dietitians exists at least one Dietitian in every federal and state hospitals should be enact. This will help foster the knowledge of nutrition and in return prevent anemia and other nutritional related diseases among pregnant women.
- ❖ Government intervention in controlling and preventing iron deficiency anemia among pregnant women would include iron fortification of staple foods or condiments by the government and effective advocacy and communication on the national importance of iron deficiency prevention and control.
- ❖ Opportunities for creating more awareness on dangers of anemia through the healthcare professionals that iron supplementation be provided to pregnant women. Dietary diversification, home gardening, proper combination of foods rich in iron, early registration in antenatal clinics should be communicated through mass media with the help of nutritionist Dietitians if properly placed.



These would help eradicate anemia as we work towards achieving vision 20 20 20.

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