



## **Appraisal of the Knowledge of Prevention of Anaemia in Pregnancy among Mothers Attending the Ante-Natal Clinic in Marmara Hospital, Kano-Nigeria**

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### **Abstract**

Anaemia in pregnancy is a worldwide public health problem affecting both developing and developed countries with a significant impact on the health of mothers and the fetus. In sub-Saharan countries, the magnitude of anaemia in pregnancy is quite alarming, whereby its prevalence is widely contributed by poor nutrition, iron and other micronutrients deficiencies. The study aimed to appraise the knowledge of the prevention of anaemia among pregnant mothers attending antenatal clinic in Marmara Hospital, Kano-Nigeria. The study utilized a descriptive cross-sectional survey design. 160 pregnant women were selected using Purposive sampling technique and closed-ended interviewed administered questionnaire were utilized to collect the data. Finding from the study indicates that 48.8% of the study respondents are between the ages of 21-30, 51.9% of the respondents do know the meaning of anaemia and more than do know of its causes. 73.7% go for medical checkup when the need warrants and 78.1% stating that they do their antenatal diligently. The study also found that there is a significant association between level of education and knowledge about anaemia at  $P > 0.005$ . Public enlightenment of women and the society as a whole on the importance of regular antenatal visits in ascertaining and maintaining desired nutritional level is urgently needed from the government and the relevant healthcare social workers.

**Key words:** *Knowledge, Practice, Anaemia, Pregnancy and Marmara Hospital*

### **Introduction**

Anaemia is a decrease in the concentration of circulating red blood cells or in the haemoglobin concentration and concomitant impaired capacity to transport oxygen (Paul, Lucy, Mary, Godwin, Seljul, Olugbenga&Kurgnan..., 2016).

Relative anaemia is a normal physiological phenomenon that occurs in pregnancy due to larger increase in plasma volume (approximately 45% in singleton and 50-60% in twin gestation) than in red cell mass,

resulting in the well-known physiological anaemia of pregnancy (Buhari, Imoru & Erhabor, 2016).

Absolute anaemia, on the other hand, involves a true decrease in red cell mass, involving increased red cell destruction as in haemoglobinopathy, malaria, bacterial infection e.g. urinary tract infection, and bleeding or decreased red cell production as in nutritional deficiency or chronic disease (Buhari, et al., 2016).

The World Health Organization (WHO) further divides anaemia in pregnancy into mild anaemia (haemoglobin 10 – 10.9g/dl), moderate anaemia (Hb 7.0-9.0g/dl) and severe anaemia (haemoglobin <7g/dl or 10.5 g/dl). Anaemia in pregnancy is therefore defined as a haemoglobin concentration <11.0 g/dl or <10.5 g/dl in the second half of pregnancy. However, in the tropics, a pregnant woman is said to be anaemic when haemoglobin is less than 10g/dl or PCV is <30% (Paul, Lucy, Mary, Godwin, Seljul, Olugbenga & Kurgnan..., 2016).

Anaemia in pregnancy is a worldwide public health problem affecting both developing and developed countries with significant impact on the health of mothers and fetus. In sub-Saharan countries, the magnitude of anaemia in pregnancy is quite alarming, whereby its prevalence is widely contributed by poor nutrition, iron and other micronutrients deficiencies, parasitic infestations, chronic infections, illiteracy, and short pregnancy intervals. According to the WHO classification, any prevalence level of anaemia that exceeds 40% in any population group is an indicator of a severe public health problem, for which Nigeria, and Kano state, in particular, qualifies (Margwe, 2015).

It has been estimated that the global prevalence of anaemia in pregnancy is 42%. Anaemia in pregnancy is thought to be one of the commonest problems affecting pregnant women in developing countries. By WHO's a criterion, over 2000 million people are anaemic, with pregnant women most affected. In developing countries, prevalence rates in pregnant women are commonly estimated to be in the range of 40% - 60% (Paul, et al., 2016).

In many developing countries, endemic problems such as malaria, helminthic infections, together with problems of poor nutrition make anaemia one of the most common pathologies in pregnancies (Esike, Anozie, Onoh, Sunday, Nwokpor and Umeora, 2016).

The management of anaemia in pregnancy by nurses should be accurate and appropriate so that objectives and goals would be achieved. The nurse should assess the health history and physical status of the woman. This will provide important data about the type of anaemia involved, the extent and type of symptoms it produces, and the impact of those symptoms on the woman's life (Belleza, 2016)

Iron deficiency anaemia is characterized by low mean corpuscular volume (MCV), low mean corpuscular haemoglobin concentration (MCHC) and low ferritin levels. Peripheral smear shows hypochromic microcytic red cells. Severe anaemia in pregnancy (Hb<7 g/dL) requires urgent medical treatment and Hb<4 g/dL is an emergency carrying a risk of congestive cardiac failure, sepsis and death (Talaulikar, 2017).

#### **Statement of the Problem**

Anaemia in pregnancy has continued to be a global problem associated with increased maternal morbidity and mortality particularly in developing countries such as Nigeria. Worldwide 41.8% of pregnant women are anaemic as compared with 30.2% non-pregnant women; the most severely affected areas are South-East Asia (48.2%) and Africa (57.1%)(Ndukwu and Dienye, 2012).

A large proportion of the 17.2 million anaemic pregnant women in Africa live in the West African sub-region. The prevalence rate in some of the countries ranges from 50.2%, in Togo, 66.7%, in Nigeria, 68.3%, in Burkina Faso, 72.7%, in Benin and 75.1%, in the Gambia. Local prevalence studies from Nigeria range from 35.3% in Lagos to 72% in Kano State (Ndukwu and Dienye, 2012).

The higher percentage of women having anaemia may be due to their low literacy level. Adequate Maternal knowledge of anaemia may encourage women to take iron supplements during pregnancy and after childbirth (Tashara, Achen, Quadras, D'Souza, D'Souza & Sankar, 2016).

### **Significance of the study**

It is believed that findings from this study will help to improve control of maternal anaemia and reduce anaemia related health problems by bringing out points or areas of concern related to mother's knowledge and practice on prevention of anaemia in pregnancy. This will help relevant health policymakers in formulating policy on preventive measures in respect of anaemia, to minimize, if not eliminate, its occurrence among the vulnerable group of the society, particularly pregnant women in the locality of study.

### **Materials and Methods**

#### **Research design**

This study utilized descriptive cross-sectional survey design which is concerned with describing the characteristics of a particular individual, or of a group clearly and in these context pregnant women. Structured instruments were used and take out data and then make statements about the population on the basis of data analysis. Data collected were examined for completeness, comprehensibility, consistency and reliability.

#### **Target Population**

The population of this study comprises of all the pregnant women attending antenatal clinic in Marmara Hospital for the two to three weeks in which the data were collected.

#### **Sample size and Sampling Technique**

The sample size for this study was calculated below using the Cochran formula:  $n = \frac{4pq}{d^2}$ .

Where,

$n$ =sample size,  $p$ =prevalence,  $q=100-p$  and  $d=10\%$  error of  $p$  and,

$p=72\%$  (Ndukwu and Dienye, 2012),  $q=100-72=28$ , and  $d=(10/100) * 72=7.2$

Substituting the values in the formula,

$n = \frac{4 * 72 * 28}{(7.2)^2}$ ;  $n=155$

Attrition value=  $n * (10\%)$  i.e.  $155 * (10/100) = 15.5$

Hence, sample size,  $n=155+15.5=170.5$  approximately 171

Purposive sampling technique was employed in this study where the researcher decides

purposely to select respondent who is judged to be knowledgeable about the issues under study.

#### **Research Instrument/tools**

A well structured administered interview questionnaire was used to assess the appraisal of knowledge of prevention of anaemia in pregnancy among pregnant women attending antenatal clinic in Marmara Hospital, Kano-Nigeria which was adapted from similar research conducted in Tanzania by (Margwe, 2015). There are 33 questions on knowledge about anaemia in Pregnancy with a scoring system, 1 for correct answer and 0 for an incorrect answer. A score greater than 60% represent good knowledge while a score between 50 – 60% represents fair knowledge and a score of less than 50% indicate poor knowledge.

#### **Validity and reliability of the research instrument**

The tool for the study was be adopted by the researcher after reviewing of relevant literature (Margwe, 2015), and presented to the supervisor for face and content validity. A team of three (3) experts or juries in the field of Maternal and Child Health Nursing vetted the questionnaire and made necessary corrections where applicable.

The reliability of the tool was calculated using SPSS, after conducting a pilot study using 10% of the sample size for this study (17). The tool was found to be reliable with Cronbach alpha value of 0.679

#### **Ethical consideration**

The ethical clearance for conducting this study was granted by The Research Ethical Committee at The Ministry of Health, Kano State (reference number MOH/Off/797/T. I/922). Permission was also sought from the relevant authorities of Marmara Hospital, Kano-Nigeria research ethical committee to carry out the study. The pregnant women had a thorough explanation about the study, including the general purpose of the study, and possible risks and benefits, and what was

expected of them. Their informed consent was sought as regard to the conduct of the study which included voluntary participation in the study and withdrawal from the study if they find participation in the study unpleasant. To ensure confidentiality, participant's data were

linked to a code number. This was done so as to avert any harm that may befall the respondents to be used for this study. This is in line with Helsinki declaration, Belmont report and CIOMS declaration of 2012.

**Results**

**Table1:** Frequency distribution of Studied Respondents according to their Socio-Demographic Characteristics (n = 160)

Socio-demographic characteristics	n	%
<b>Age in years</b>		
10-20	55	34.4
21-30	78	48.8
31-40	27	16.9
<b>Ethnicity</b>		
Hausa	151	94.4
Fulani	9	5.6
<b>Educational Status</b>		
Primary	6	3.8
Secondary	127	79.4
Diploma	15	9.4
University	9	5.6
Informal	3	1.9
<b>Marital Status</b>		
Married	155	96.9
Single	5	3.12
<b>Occupation</b>		
Housewife	62	38.8
Trader	31	19.4
Civil servant	12	7.5
Business Tycoon	49	30.6
Craftsman	6	3.8

Table 1 above shows that the majority (48.8%) of the study respondents are between the ages of 21-30, this suggests that majority of the respondents are young adults. The table also reveals that 94.4% of the respondents are of the Hausa ethnic group, with 79.4% of the

respondents having a highest educational qualification of secondary school, almost all the respondents (96.9%) are married and 38.8% of the study respondents are Housewives.

**Table 2.2a:** Frequency Distribution of the Studied Respondents in Relation to their Knowledge of Anemia in Pregnancy (n=160)

Statement	Correct		Incorrect	
	n	%	n	%
1. Anemia is defined as a decrease in number of white blood cell count in the body.	9	5.6	151	94.4
2. The inability of the heart to pump blood to body parts is what is defined as anemia.	3	1.9	157	98.1
3. Anemia is defined as a decrease in concentration of red blood cells or hemoglobin level in the blood.	83	51.9	77	48.1
4. Anemia is when a person has no blood in the body.	3	1.9	157	98.1
5. Poor dietary intake causes anemia.	62	38.8	98	61.2
6. Parasitic infections e.g. malaria can cause anemia.	90	56.2	70	43.8
7. Chronic infections e.g. TB and HIV can be a cause of anemia.	72	45.0	88	55.0
8. Anemia can be caused by reproductive problems.	80	50.0	80	50.0
9. Genetic blood disorders e.g. Sickle cell disease causes anemia.	86	53.8	74	46.2
10. Witchcraft is a cause of anemia.	29	18.1	131	81.9
11. Anemia can be gotten from contact with infected person.	15	9.4	145	90.6
12. Reduced body weight is a sign of anemia.	70	43.8	90	56.2
13. The skin of an anemic person appears pale, paleness of the conjunctiva, palm and tongue.	122	76.2	38	23.8
14. General body malaise is a sign of anemia.	81	50.6	79	49.4
15. Heart palpitation is another sign of anemia.	57	35.6	103	64.4
16. Another sign of anemia is fatigue.	68	42.5	92	57.5

**Table 2.2b:** Frequency Distribution of the Studied Respondents in Relation to their Knowledge of Anemia in Pregnancy (n=160)

Statements	Correct		Incorrect	
	n	%	n	%
17. Coughing of blood can be a sign of anemia.	13	8.1	147	91.9
18. Anemia treatment should be at the hospital.	154	96.2	6	3.8
19. Anemia can be treated using traditional healers.	6	3.8	154	96.2
20. Anemia can be prevented by eating high carbohydrate diet.	23	14.4	137	85.6
21. Anemia can be prevented by eating meat and eggs.	111	69.4	49	30.6
22. Anemia can be prevented by eating green vegetables and fruits.	136	56.0	24	15.0
23. Anemia can be prevented by eating high fat diet.	6	3.8	154	96.2
24. Anemia can be prevented by treating malaria.	75	46.8	85	51.2
25. Do you think anemia can cause complications to the mother and her child?	155	96.9	5	3.1
26. Low birth weight baby is a complication of anemia.	88	55.0	72	45.0
27. Maternal death can be a cause of anemia.	138	92.5	12	7.5
28. Preterm delivery is a complication of anemia.	65	40.6	95	59.4
29. As a complication of anemia, still birth and death may occur.	80	50.0	80	50.0
30. Unhealthy baby is a complication of anemia.	95	59.4	65	40.6
31. Large baby is one of the complications of anemia.	21	13.1	139	86.9
32. Coughing of blood is another complication of anemia.	25	15.6	135	84.4
33. Maternal obesity can be another complication of anemia.	32	20.0	128	80.0

Table 2.2a and 2.2b above displays the knowledge of Anemia in Pregnancy as obtained from the respondents. The table shows that 51.9% of the respondents do know the meaning of Anemia and more than half of the respondents do know of the causes of anaemia, with 85.6%, 56.3% 45%, 50% and

53.8% of the respondents selecting Poor dietary intake, Parasitic infections e.g. malaria, Chronic infections e.g. TB and HIV, Reproductive cause and Genetic blood disorders e.g. Sickle cell disease respectively as the causes of anaemia in pregnancy.

**Table 3:** Relationship between Knowledge on Causes of Anaemia and Respondents' Level of Education (n=160)

Statement	Level of education	Agree		Disagree		$\chi^2$	P value
		n	%	n	%		
Poor dietary intake causes anaemia	Informal education	3	1.875	0	0.0	10.914	<b>0.028*</b>
	Primary school	3	1.875	3	1.875		
	Secondary school	107	66.875	20	12.5		
	Diploma	15	9.375	0	0.0		
	University	9	5.625	0	0.0		
Parasitic infections e.g. malaria can cause anaemia.	Informal education	0	0.0	3	1.875	23.543	<b>0.001*</b>
	Primary school	6	3.75	0	0.0		
	Secondary school	72	45.0	55	34.375		
	Diploma	12	7.5	3	1.875		
	University	0	0.0	9	5.625		
Chronic infections e.g. TB and HIV can be a cause of anaemia.	Informal education	0	0.0	3	1.875	4.374	0.358
	Primary school	3	1.875	3	1.875		
	Secondary school	57	36.625	70	43.75		
	Diploma	9	5.625	6	3.75		
	University	3	1.875	6	3.75		
Anaemia can be caused by reproductive problems.	Informal education	0	0.0	3	1.875	10.671	<b>0.031*</b>
	Primary school	6	3.75	0	0.0		
	Secondary school	65	40.625	62	38.75		
	Diploma	6	3.75	9	5.625		
	University	3	1.875	6	3.75		
Genetic blood disorders e.g. Sickle cell disease causes anaemia.	Informal education	0	0.0	3	1.875	15.258	<b>0.004*</b>
	Primary school	3	1.875	3	1.875		
	Secondary school	74	46.25	53	33.125		
	Diploma	9	5.625	6	3.75		
	University	0	0.0	9	5.625		
Witchcraft is a cause of anaemia.	Informal education	0	0.0	3	1.875	10.557	<b>0.032*</b>
	Primary school	3	1.875	3	1.875		
	Secondary school	26	16.25	101	63.125		
	Diploma	0	0.0	15	9.375		
	University	0	0.0	9	5.625		
Anemia can be gotten from contact with infected person.	Informal education	0	0.0	3	1.875	4.301	0.367
	Primary school	0	0.0	6	3.75		
	Secondary school	15	9.375	112	70.0		
	Diploma	0	0.0	15	9.375		
	University	0	0.0	9	5.625		

**Table 4:** Relationship between Knowledge on Signs and Symptoms of Anemia and Respondents' Level of Education (n=160)

Statement	Level of education	Agree		Disagree		$\chi^2$	P-value
		n	%	n	%		
Reduced body weight is a sign of anaemia.	Informal education	3	1.875	0	0.0	9.196	0.056
	Primary school	0	0.0	6	3.75		
	Secondary school	58	36.25	69	43.125		
	Diploma	6	3.75	9	5.625		
	University	3	1.875	6	3.75		
The skin of an anaemic person appears pale, paleness of the conjunctiva, palm and tongue.	Informal education	0	0.0	3	1.875	16.776	<b>0.002*</b>
	Primary school	6	3.75	0	0.0		
	Secondary school	95	59.375	32	20.0		
	Diploma	15	9.375	0	0.0		
	University	6	3.75	3	1.875		
General body malaise is a sign of anaemia.	Informal education	0	0.0	3	1.875	11.652	<b>0.020*</b>
	Primary school	3	1.875	3	1.875		
	Secondary school	72	45.0	55	34.375		
	Diploma	3	1.875	12	7.5		
	University	3	1.875	6	3.75		
Heart palpitation is another sign of anaemia.	Informal education	0	0.0	3	1.875	9.916	<b>0.042*</b>
	Primary school	3	1.875	3	1.875		
	Secondary school	51	31.875	76	47.5		
	Diploma	3	1.875	12	7.5		
	University	0	0.0	9	5.625		
Another sign of anaemia is fatigue.	Informal education	0	0.0	3	1.875	18.898	<b>0.001*</b>
	Primary school	6	3.75	0	0.0		
	Secondary school	53	33.125	74	46.25		
	Diploma	9	5.625	6	3.75		
	University	0	0.0	9	5.625		
Coughing of blood can be a sign of anaemia.	Informal education	0	0.0	3	1.875	9.795	<b>0.044*</b>
	Primary school	0	0.0	6	3.75		
	Secondary school	10	6.25	117	73.125		
	Diploma	0	0.0	15	9.375		
	University	3	1.875	6	3.75		



**Table 5:** Relationship between Knowledge on Prevention of Anemia and Respondents' Level of Education (n=160)

Statement	Level of Education	Agree		Disagree		$\chi^2$	P value
		n	%	n	%		
Anaemia can be prevented by eating a high carbohydrate diet.	Informal education	3	1.875	0	0.0	29.549	<b>0.001*</b>
	Primary school	0	0.0	6	3.75		
	Secondary school	14	8.75	113	70.625		
	Diploma	6	3.75	9	5.625		
	University	0	0.0	9	5.625		
Anaemia can be prevented by eating meat and eggs.	Informal education	3	1.875	0	0.0	10.229	<b>0.037*</b>
	Primary school	6	3.75	0	0.0		
	Secondary school	90	56.25	37	23.125		
	Diploma	6	3.75	9	5.625		
	University	6	3.75	3	1.875		
Anaemia can be prevented by eating green vegetables and fruits.	Informal education	0	0.0	3	1.875	40.562	<b>0.001*</b>
	Primary school	6	3.75	0	0.0		
	Secondary school	112	70.0	15	9.375		
	Diploma	15	9.375	0	0.0		
	University	3	1.875	6	3.75		
Anaemia can be prevented by eating high-fat diet.	Informal education	0	0.0	3	1.875	37.288	<b>0.001*</b>
	Primary school	3	1.875	3	1.875		
	Secondary school	3	1.875	124	77.5		
	Diploma	0	0.0	15	9.375		
	University	0	0.0	9	5.625		
Anaemia can be prevented by treating malaria.	Informal education	0	0.0	3	1.875	5.327	0.255
	Primary school	3	1.875	3	1.875		
	Secondary school	57	35.625	70	43.75		
	Diploma	9	5.625	6	3.75		
	University	6	3.75	3	1.875		

**Table 6:** Relationship between Knowledge on Complications of Anaemia and Respondents' Level of Education (n=160)

Statement	Level of Education	Agree		Disagree		$\chi^2$	P-value
		n	%	n	%		
Low birth weight baby is a complication of anaemia.	Informal education	0	0.0	3	1.875	5.902	0.207
	Primary school	3	1.875	3	1.875		
	Secondary school	73	45.625	54	33.75		
	Diploma	9	5.625	6	3.75		
	University	3	1.875	6	3.75		
Maternal death can be a cause of anaemia.	Informal education	0	0.0	3	1.875	54.355	<b>0.001*</b>
	Primary school	6	3.75	0	0.0		
	Secondary school	124	77.5	3	1.875		
	Diploma	12	7.5	3	1.875		
	University	6	3.75	3	1.875		
Preterm delivery is a complication of anaemia.	Informal education	0	0.0	3	1.875	12.865	<b>0.012*</b>
	Primary school	3	1.875	3	1.875		
	Secondary school	59	36.875	68	42.5		
	Diploma	3	1.875	12	7.5		
	University	0	0.0	9	5.625		
As a complication of anaemia, stillbirth and death may occur.	Informal education	0	0.0	3	1.875	5.238	0.264
	Primary school	3	1.875	3	1.875		
	Secondary school	68	42.5	59	36.875		
	Diploma	6	3.75	9	5.625		
	University	3	1.875	6	3.75		
Unhealthy baby is a complication of anaemia.	Informal education	0	0.0	3	1.875	24.372	<b>0.001*</b>
	Primary school	6	3.75	0	0.0		
	Secondary school	77	48.125	50	31.25		
	Diploma	12	7.5	3	1.875		
	University	0	0.0	9	5.625		
Large baby is one of the complications of anaemia.	Informal education	0	0.0	3	1.875	6.281	0.179
	Primary school	0	0.0	6	3.75		
	Secondary school	21	13.125	106	66.25		
	Diploma	0	0.0	15	9.375		
	University	0	0.0	9	5.625		
Coughing of blood is another complication of anaemia.	Informal education	0	0.0	3	1.875	10.655	<b>0.031*</b>
	Primary school	3	1.875	3	1.875		
	Secondary school	22	13.75	105	65.625		
	Diploma	0	0.0	15	9.375		
	University	0	0.0	9	5.625		
Maternal obesity can be another complication of anaemia.	Informal education	0	0.0	3	1.875	10.763	<b>0.029*</b>
	Primary school	3	1.875	3	1.875		
	Secondary school	29	18.125	98	61.25		
	Diploma	0	0.0	15	9.375		
	University	0	0.0	9	5.625		

\* denotes significant p value < 0.05

The finding of the study as per the contents of table 3 - 6 is with regards to the relationship

between the level of education and knowledge of anaemia in pregnancy. The result of the

study was found to be statistically significant at  $p=0.006$  with particular reference to the definition of anaemia, at  $p=0.028$ ,  $p=0.031$ ,  $p=0.032$ ,  $p=0.001$  and  $p=0.004$  with particular references to poor dietary intake, reproductive cause, witchcraft, parasitic infection e.g. malaria and genetic disorders e.g. sickle cell disease, respectively, as causes of anaemia at  $p$ -value  $<0.05$ .

The study result was also found to be statistically significant at  $p=0.012$ ,  $p=0.031$ ,  $p=0.029$ ,  $p=0.001$  and  $p=0.001$  with particular references to preterm delivery, coughing of blood, maternal obesity, maternal death and unhealthy baby, respectively as complications of anaemia at  $p$ -value  $<0.05$ .

### Discussion

In the present study, the majority of the study respondents are between the ages of 21-30, followed by 10-20, then 31-40, and none were of above the age of 40. This is similar to a study conducted in Dr. PrabhakarKoreHospital in Karnataka which showed that majority 242 (60.50%) of the women were in the age group 20-24 years followed by 106 (26.50%) in the age group 25-18 years, in the age group of 15-19 years 34 (8.50%) and less in 30-34 years 18 (4.50%) (Yadav et. al, 2014). Other studies in Nigeria noted that majority of the women were 30-34 years (34.1%) followed by of 25-18 years (33.5%), 20-24 years (14.8%), 35-39 years (12.9%) and rest were in other age groups which was different from our study (Yadav et. al, 2014).

The study also reveals that majority of the respondents are of the Hausa ethnic group, with most of the respondents having the highest educational qualification of secondary school, followed by those with a Diploma. Some of the women attended up to University level and few of the women had primary school level of education with only a minimum of the women being illiterate, i.e., having only informal education. The reason for most of the women having secondary school as the highest level of education might

be due to societal negative attitude towards women's education.

This is similar to the study conducted in Karnataka, which indicated that majority 148 (37.0%) of the women had secondary level education followed by primary level education 121 (30.3%), higher secondary 55 (13.8%), illiterate 43 (10.8%) and 33 (8.3%) had graduate-level education in this study (Yadav et. al, 2014).

Concerning knowledge of anaemia in pregnancy, about half of the respondents know the meaning of Anemia and more than half of the respondents' knowledge of the causes of anemia. Also, most of the respondents are aware of the main signs of Anemia in Pregnancy, and the majority of the respondents believe that the treatment of anaemia should be sought at the hospital, and almost all the women believed that Anemia can cause complications to mother and her fetus. The moderate knowledge of the women might be due to their frequent visits to the hospital for antenatal during their pregnancy period (s) where health education on various topics are giving, including that related to anaemia.

The findings of the study are in contrast to the study conducted at Health Centers of Haryana, which revealed that out of 100 antenatal women, only 38% have adequate knowledge and 29% have inadequate knowledge regarding the prevention of Anemia (Swapna, 2017). Findings from this study are also contrary to that of a study conducted in a government hospital in India, which revealed that knowledge-based questions had low response especially among women with low educational level (Chako, Premkumar, Joseph, James, Prabha, Jacob & Sivakumar, 2016).

Findings from the study showed that there is a significant association between level of education and knowledge about anemia, with particular references to definition, causes, signs and symptoms, preventive measures and complications of anaemia.

This is similar to the study conducted in Karnataka, where the study found that there was significant association regarding knowledge about the cause of anaemia, sign and symptoms, proper diet to prevent, prevention and treatment and preventive practices with women's education (Yadav, Swamy&Banje, 2014).

### Conclusion

The study result showed poor knowledge regarding the definition of anaemia and itscauses , signs and symptoms of anaemia, as well as proper diet to prevent anaemia. However, knowledge regarding the prevention and treatment of anaemia and knowledge regarding preventive practices of anaemia was found to be adequate. The study also revealed that almost all of the respondents have Antenatal Clinic as the centre for their source of information regarding matters related to pregnancy (and in this case, anaemia in pregnancy) and that there is a significant relationship between the level of education and knowledge of anaemia among the respondents.

### Recommendations

Based on the Findings and Conclusions of this study, the following recommendations are hereby made for improvement:

1. Public enlightenment of women (particularly those pregnant) and the society as a whole on the importance of regular antenatal visits in ascertaining and maintaining desired nutritional level is urgently needed from the government and relevant healthcare social workers.
2. Health Education on anaemia in pregnancy should be carried out on regular basis in the state's various hospitals/clinics. Health care personnel, especially the nurses, should always give health talk on anaemia in pregnancy; including its preventive measures and how to recognize it, plus were to seek for help when it occurs on every clinic day at their various duty post.

3. The government at all levels should subsidize or make dietary supplements readily available for pregnant women at an affordable price.
4. Health personnel should enlighten pregnant women on the risks of anaemia in pregnancy to both woman and her child and on the importance of antenatal for continuous monitoring of her and her child's health. Towards that end, Nurses and Doctors have to increase their commitment and dedication as they discharge their duties, to overcome the problem of anaemia in pregnancy as it is prevalent in society.
5. The society and government should put more focus tailored towards educating women especially in the northern parts of Nigeria, and most especially in rural areas, as the relationship between education and good healthy life can never be overemphasized.
6. Other researchers in line with the topic of study can make use of the findings from this study to further their research to improve maternal and fetal well-being and to reduce maternal and fetal mortality related to anaemia in pregnancy.

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