IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 7.12 ⁜ Vol. 10, Issue 3, March 2023

DOI: 10.17148/IARJSET.2023.10311

Prevalence of Anaemia and its associated factors among pregnant women attending antenatal care at Sir Yahaya Memorial Hospital Birnin Kebbi, North West Nigeria

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INTRODUCTION: Anaemia is a global public health problem in both developing and developed countries; over 1.62 billion people suffer from anaemia, and is particularly more prevalent among pregnant women. The World Health Organization estimates that the prevalence of anaemia in pregnancy varies from 53.8% to 90.2% in developing countries and 8.3% to 23% in developed countries.

AIM: This investigation is aimed to determine the prevalence of anaemia and its associated factors among pregnant women attending Fati Lami antenatal care clinic of Sir Yahaya Memorial Hospital Birnin-Kebbi, northwest Nigeria.

METHODS. A total of 221 pregnant women were recruited from Fati Lami antenatal care clinic of Sir Yahaya Memorial Hospital Birnin-Kebbi using simple random technique after ethical approval was obtained from Research Ethics Committee of Sir Yahaya Memorial Hospital and consent from each study participant. Data on sociodemographics, economic status, and clinical history were collected using a pretested structured interviewer's questionnaire. Anaemia was diagnosed using the WHO-recommended cut-off of less than 33%. Participants were categorized into a subgroup of anaemia severity using the WHO cut-offs for mild, moderate, and severe anaemia.

RESULTS. The overall prevalence of anaemia among pregnant women in this study was found to be 126 (57.0%).Of this, 76 (60.3%) had mild anaemia, while 50 (39.7%) had moderate anaemia. Residence, Marital status, monthly family income, occupation, Number of deliveries, Inter-pregnancy interval, and current malaria attack were the variables which had statistically significant association with the prevalence of anaemia.

CONCLUSION. Based on the findings from our study, it showed a high prevalence of anaemia (57.0%) among pregnant women, making anaemia in pregnancy a severe public health problem. The predisposing factors associated with anaemia in this study were being in the rural area, having low monthly family income, women with less than eighteen months interval between pregnancies, women with greater than three number of deliveries and recent malaria attack. Educating pregnant women on anaemia should be intensified in antenatal care clinics.

KEYWORDS: Anaemia, Antenatal clinics, pregnant women, Prevalence

I. INTRODUCTION

Anaemia is a condition in which you lack healthy red blood cells that transfer proper amount of oxygen to all the parts of the body. The word "Anaemia" explain itself "an" mean without and "aemia" mean red blood cells. Anaemia may be defined as a condition in which there is a deficiency of haemoglobin concentration in body and it may vary from person to person and gender to gender. It is one of the most common nutritional deficiency diseases observed globally and affects more than 1.62 billion people of the world's population, of which 56 million are pregnant women. [1,2]. Anaemia is a major public health problem affecting all ages of the world's population, its highest prevalence being among pregnant women and children aged less than 5 years old. [2]. Anaemia in pregnancy affects about half of all pregnant women globally and constitutes an important global/reproductive health issue [3]. The World Health Organization estimates that the prevalence of anaemia in pregnancy varies from 53.8% to 90.2% in developing countries and 8.3% to 23% in developed countries [4].A haemoglobin concentration below 11.0gldl or packed cell volume (PCV) of less than 33.0% is regarded as anaemia during pregnancy by the World Health Organization (WHO) [5]. Anaemia in pregnancy ranges from mild (10.0–10.9 g/L or haematocrit of 30–32.9%), moderate (7–9.9 g/L or 21–29.9%) to severe (less than 7 g/L or less than 21%) [6]. Iron deficiency, which results from a protracted negative iron balance, accounts for 50% of anaemia

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 7.12 ⁜ Vol. 10, Issue 3, March 2023

DOI: 10.17148/IARJSET.2023.10311

in women and 75% in women of reproductive age worldwide [7]. The lack of adequate dietary iron intake or absorption, the increased need for iron during pregnancy, and increased iron losses due to menstruation, worm infestation, and infections are all possible causes of the negative iron balance [8]. Anaemia in pregnant women continues to be one of the most intractable major public health issues, particularly in developing nations, because of a variety of sociocultural issues like a lack of essential nutrients like iron, folate, vitamin B12, C, and A, as well as a lack of awareness, poor dietary practices, parasitic infestations, blood loss, the Human Immunodeficiency Virus, tuberculosis, and malaria, as well as too early pregnancies, high parity, and poor uptake of ITNs among others [9]. Increased maternal age, reduced number of antenatal care visits, residing in rural areas, intestinal parasites, malaria parasitaemia, and being a primigravida are associated with anaemia in pregnancy [10]. Around the world, 500 million women of reproductive age suffer from anaemia. In 2011, 29% of non-pregnant women and 38% of pregnant women aged 15–49 years were anaemic worldwide, but the prevalence was highest in South Asia and Central and West Africa [11]. About 38.9% to 48.7% of pregnant women in South- East Asia, the Eastern Mediterranean, and Africa were anaemic [7].

In India, the prevalence varies from 65% to 75% [12]. While studies across Nigeria reported anaemia prevalence rates ranging from 24.5% to 76.5% [13, 14]. The adverse effects of anaemia during pregnancy include general fatigue, foetal anaemia, low birth weight, preterm delivery, increased risk of postpartum haemorrhage, intrauterine growth restriction, perinatal mortality stillbirth, reduced work capacity, low infection tolerance, shortness of breath, and decreased physical and mental performance. The World Health Organization (WHO) advises daily iron and folic acid supplementation for pregnant women as part of antenatal care to prevent anaemia in pregnancy and intermittent iron and folic acid supplementation for menstruating women living in areas where the prevalence of anaemia is 20% or higher. It is believed that iron supplementation, routine deworming, consistent use of insecticide-treated bed nets, nutritional counselling, food fortification, iron and folic acid supplements, raising awareness of anaemia among pregnant women during their antenatal visits, raising awareness of the underlying causes and complications, and treating anaemia are vital to preventing anaemia and its complications [15,16]. It is believed that understanding the severity of anaemia and its contributing factors can help prevent harmful foetal and mother consequences. This study aimed to find out the prevalence and factors associated with anaemia among pregnant women attending the Fati Lami antenatal care clinic of Sir Yahaya Memorial Hospital Birnin-Kebbi, Northwest Nigeria.

II. MATERIALS AND METHODS

Study Region, Design, and Population.

The study was conducted at Sir Yahaya Memorial Hospital Birni-kebbi. Sir Yahaya Memorial Hospital Birni-kebbi is a secondary health-care facility located in the State Capital, Kebbi State, North West, Nigeria. It serves as a referral centre in the State. The study was institution-based, descriptive, and cross-sectional in design and it included 221 pregnant women who attended the antenatal clinic of Sir Yahaya Memorial Hospital Birni-kebbi, from April to December 2022.

Sampling Technique.

The study participants were pregnant women attending antenatal care in Sir Yahaya Memorial Hospital Birni-kebbi. All pregnant women who consented to the study and were not critically ill were eligible to participate in the study. The sample size was estimated at 221 using the formula for calculating the sample size for proportion in cross-sectional studies,[19] a 75.7% prevalence of anaemia in pregnancy from a previous study,[20] a 5% margin of error, and an anticipated 95% response rate. The eligible participants were selected by systematic sampling technique; one of five patients presenting consecutively at the clinic was enrolled into the study over an eight clinic-day period until the required sample size was obtained.

Ethical Clearance.

The study design and methodology were reviewed by the ethical committee of Sir Yahaya Memorial Hospital Birni-kebbi and approval was obtained. Written consent was obtained from consenting participants after the consent form was properly explained to them. Confidentiality was ensured as identifiers were not collected during data collection and access to the data collected was restricted to the research team only.

Data Collection and Laboratory Analysis.

A pretested structured interviewer's questionnaire was used to collect data on demographics and socioeconomic status by trained research assistants. About three to four millilitres (3 - 4ml) of venous blood was drawn into a syringe from each consenting participant and then transferred into a labelled EDTA container and transported to the laboratory for analysis. Trained laboratory technicians did the analyses in Sir Yahaya Memorial Hospital laboratory Birni-kebbi. PCV was estimated using a standard laboratory technique and procedure. Anaemia was diagnosed using the WHO-recommended cut-off packed cell volume (PCV) of less than 33%. Participants were categorized into a subgroup of anaemia severity using the WHO cut-offs for mild, moderate, and severe anaemia [6].

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International Advanced Research Journal in Science, Engineering and Technology

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DOI: 10.17148/IARJSET.2023.10311

Data Management and Analysis.

Data was collected and entered into the database on a weekly basis after cleaning. Confidentiality of data collected was ensured as identifiers were not included and data access was strictly restricted to the research team only. At the end of the study, data was subject to descriptive and inferential statistical analysis using Statistical Package for Social Science (SPSS IBM Version 22.0) computer statistical software. Quantitative variables were summarized using mean and standard deviation, while qualitative variables were summarized using frequencies and percentages. Frequency distribution tables were constructed, and cross tabulations were done to examine the relationship between categorical variables. Chi-square analysis was used to determine the factors that were associated with anaemia. All levels of significance were set at $p < 0.05$.

III. RESULTS

Sociodemographic characteristics of respondents

All the 221 questionnaires administered were filled, returned and analysed, giving a response rate of 100%. The respondents' ages ranged from 18 to 42 years (mean = 27.76 ±4.89). A larger proportion of the respondents 127 (57.5%) were aged 21-29 years. most of the respondents 196 (88.7%) reside in urban areas, the majority of the respondents practised Islam as a religion 182 (82.4%), 201 (91.0%) of the 221 respondents were married, and most of them 146 (66.1%) belong to the Hausa ethnic group, and 91(41.1%) had Secondary education. A larger proportion of the respondents 126(57.0%) were full-time housewives, and 102(46.1%) respondents reported a monthly family income ≥ N100, 000 as shown in [Table 1].

Obstetric and medical characteristics of respondents

Concerning the Obstetric and medical characteristics, majority of the respondents 97 (43.9%) were in the third trimester, 106 (48.0%) has one-two deliveries. 120 (54.3%) respondents has inter-pregnancy interval of >18 months and 192 (86.9%) has no history of Contraceptive use. 204 (92.3%) has no Vaginal bleeding during this pregnancy, 157(71.0%) respondents has history of Previous medical illness. 139 (62.9%) has malaria during Diagnosis of previous medical illness and 156 (70.6%) has no Current malarial attack as shown in [Table 2].

Table 1:Sociodemographic characteristics of respondents

S/N	Variables	Frequency (%) n = 221
1.	**Age (Years)**	
	≤ 20	11 (5.0)
	21–29	127 (57.5)
	30–39	74 (33.5)
	> 40	9 (4.0)
2.	**Residence**	
	Rural	196(88.7)
	Urban	25(11.3)
3.	**Religion**	
	Muslim	182(82.4)
	Christian	39(17.6)
	Traditional	
4.	**Marital status**	
	Married	201(91.0)
	Single	2(0.9)
	Widowed	12(5.4)
	Divorced/Separated	6(2.7)
5.	**Tribe**	
	Hausa	146(66.1)
	Fulani	24(10.9)
	Igbo	17(7.7)
	Yoruba	23(10.4)
	Others	11(4.9)
6.	**Education level**	

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 7.12 ⁜ Vol. 10, Issue 3, March 2023

DOI: 10.17148/IARJSET.2023.10311

	Qur'anic education	12(5.4)
	Primary education	41(18.7)
	Secondary education	91(41.1)
	Tertiary education	77(34.8)
7.	**Occupation**	
	Housewife	126(57.0)
	Government employee	35(15.8)
	Private employee	26(11.8)
	Trader	13(5.9)
	Handicraft	21(9.5)
8.	**Family monthly income (Naira)**	
	≤50,000	28(12.7)
	51,000-99,000	91(41.2)
	≥100,000	102(46.1)

Table 2: Obstetric and medical characteristics of respondents

	Variables	**Frequency (%) N = 221**
1.	**Duration of current pregnancy**	
	First trimester	35(15.8)
	Second trimester	83(37.6)
	Third trimester	97(43.9)
	Unknown	6(2.7)
2.	**Number of deliveries**	
	No births	11(5.0)
	1-2	75(33.9)
	3-4	106(48.0)
	>5	29(13.1)
3.	**Inter-pregnancy interval**	
	≤ 18 months	101(45.7)
	>18 months	120(54.3)
4.	**Contraceptive use**	
	Yes	29(13.1)
	No	192(86.9)
5.	**Vaginal bleeding during this pregnancy**	
	Yes	17(7.7)
	No	204(92.3)
6.	**Previous medical illness**	
	Yes	157(71.0)
	No	64(29.0)
7.	**Diagnosis of previous medical illness**	
	Malaria	139(62.9)
	Intestinal parasitosis	30(13.6)
	Others	52(23.5)
8.	**Current malarial attack**	
	Yes	65(29.4)
	No	156(70.6)

Table 3:Prevalence and pattern of anaemia among respondents

	Variables	**Frequency (%)**
Haemoglobin concentration status (n = 221)		
	Anaemic	126(57.0)
	Non- Anaemic	95(43.0)
Pattern of anaemia (n = 126)		
	Mild anaemia	76(60.3)
	Moderate anaemia	50(39.7)

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DOI: 10.17148/IARJSET.2023.10311

Table 4: Factors associated with anaemia among the respondents			
Variables	**Haemoglobin concentration status**		**Test of Significance**
	Anaemic frequency (%)	**Non Anaemic frequency (%)**	
Age (Years)			
≤ 29	63 (45.7)	75 (54.3)	$X^2 = 2.5458$
≥ 30	43 (51.8)	40 (48.2)	p-val = .4671
Residence			
Rural	81(41.3)	115(58.7)	$X^2 = 6.3917$
Urban	17 (68.0)	8(32.0)	p-val = .0115*
Religion			
Muslim	97(53.3)	85(46.7)	$X^2 = 3.8893$
Christian	14(35.9)	25(64.1)	p-val = .0486*
Marital status			
Married	121(60.2)	80(39.8)	$X^2 = 6.7869$
Others	6(30.0)	14(70.0)	p-val = .0092*
Tribe			
Hausa/Fulani	96(56.5)	74(43.5)	$X^2 = 5.5727$
Other tribes	22(43.4)	29(56.6)	p-val = .2334
Education level			
Primary and below	23(43.4)	30(56.6)	$X^2 = 1.6902$
Formal	80(47.6)	88(52.4)	p-val = .6391
Occupation			
Housewife	86(68.3)	40(31.7)	$X^2 = 18.21$
Employed	38(40.0)	57(60.0)	p-val = .0011*
Family monthly income (Naira)			
≤ 99,000	59(49.6)	60(50.4)	$X^2 = 7.1803$
≥ 100,000	37(36.3)	65(63.7)	p-val = .0276*
Duration of current pregnancy			
First trimester	15(42.9)	20(57.1)	$X^2 = 5.071$ p-val = .16667
Second trimester	47(56.6)	36(43.4)	
Third trimester	40(41.2)	57(58.8)	
Unknown	2(33.3)	4(66.7)	
Number of deliveries			
≤ 2	39(45.3)	47(54.7)	$X^2 = 0.3614$
≥ 3	79(58.5)	56(41.5)	p-val = .0157*
Contraceptive use			
Yes	13(44.8)	16(55.2)	$X^2 = 0.6101$
No	101(52.6)	91(47.4)	p-val = . 4348
Vaginal bleeding during this pregnancy			
Yes	12(70.6)	5(29.4)	$X^2 = 2.0771$
No	107(52.5)	97(47.5)	p-val = . 1495
Previous medical illness			
Yes	97(61.8)	60()38/2	$X^2 = 0.1007$
No	41(64.0)	23(36.0)	p-val = . 7501
Diagnosis of previous medical illness			
Malaria	93(66.9)	46(33.1)	$X^2 = 2.0513$
Others	47(57.3)	35(42.7)	p-val = .3586
Current malarial attack			
Yes	40(61.5)	25(38.5)	$X^2 = 15.7624$
No	51(32.7)	105(67.3)	p-val = .000072*

*Statistically significant ($p < 0.05$)

Prevalence, pattern and factors associated with anaemia among respondents

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 7.12 ⁜ Vol. 10, Issue 3, March 2023

DOI: 10.17148/IARJSET.2023.10311

About 126 (57.0%) of the 221 pregnant women were anaemic. Of these, 76 (60.3%) had mild anaemia, while 50 (39.7%) had moderate anaemia and there is no severe anaemia found in this study as shown in [Table 3]. The proportion of respondents with anaemia was significantly higher ($p < 0.05$) among rural respondents (68.0%) as compared to those who resides in urban area (41.3%) and among those who are currently married (60.2%) as compared to those who are not currently married (30.0%). It was significantly higher among those who are fully house wives (68.3%) as compared to those who not fully house wives. It was also found significantly higher among respondents with monthly family income of ≤ 99,000 Naira (64.3%) as compared to those with ≥ 100,000 Naira (36.3%). It was also significantly higher among respondents who has ≥ 3 deliveries (58.5%) as compared to those with < 3 deliveries (45.3%) and among those with inter-pregnancy interval of ≤ 18 months (72.3%) as compared to those with > 18 months (25.7%). It was also found significantly higher among respondents with current malaria attack (61.5%) as compared to those with no malaria (32.7%). [Table 4].

IV. DISCUSSION

The diagnosis of anaemia during booking among pregnant women is essential as it affords one the opportunity to institute interventions to prevent the complication of anaemia especially considering the prevalent high maternal and perinatal morbidity and mortality associated with anaemia in pregnancy in the tropics [17]. Data from the literature in developing countries have reported prevalence of anaemia in pregnancy that ranged from 35.0% to 75.0% [18]. The study assessed the prevalence and factors associated with anaemia among pregnant women attending the Fati Lami Antenatal Care Clinic of Sir Yahaya Memorial Hospital Birnin-Kebbi, Kebbi State, Nigeria. The high prevalence of anaemia among the respondents in this study was (57.0%) which is in the middle range when compared to findings from other studies in Nigeria [17, 19, 20, 21,] and from countries in South Eastern Africa [22, 23].

In this study, the overall prevalence of anaemia among pregnant women was 57.0%. The high prevalence of anaemia in this study was mostly related to low sociodemographic factors and obstetrical history. The pattern of anaemia among the respondents in this study in which majority of them (60.3%) had mild anaemia, while the remaining ones (39.7%) had moderate anaemia, but none of them had severe anaemia which is in concordance with the findings in studies conducted in Enugu, South Eastern Nigeria in which most (90.7%) of the women had mild anaemia, a few of them (9.3%) had moderate anaemia, but none of them had severe anaemia [24]. Other studies across Nigeria generally reported similar results, with most respondents having mild anaemia, while a few had moderate anaemia, and very few or none of the respondents had severe anaemia [25, 26]. In the present study, majority of anaemic patients belonged to the age group of 26–30 years (48.4%). It is comparable to the studies by [27,28,29] This may be due to the recurrent pregnancies and poor birth spacing in reproductive age women which make them more prone to anaemia in our study. Nearly 68% of anaemic subjects belonged to rural population while 32% in the urban population which is similar to (62%) and (65.9%) [30, 31]. The reason for higher burden of anaemia in the rural population may be related to inaccessibility of health-care centres.

However, lack of awareness about the factors causing anaemia and possible strategies to prevent the risk factors of anaemia plays a vital role. Prevalence of anaemia was more in subjects (54.5%) having monthly income <10,000 per capital, this may be due to the reason that the low socioeconomic class was likely to be poorly educated and often has financial constraints. It is also supported by the observation that women with low income tend to consume diets that are low in micronutrients, animal protein, and vitamins [32]. It closely correlates with a studies by [33, 34, 35] where women of low socioeconomic group had higher prevalence of anaemia. When distributed according to education levels, anaemia was found to be more prevalent in secondary level of education (48.7%). However, another study showed a direct relationship between impact of literacy and anaemia [36]. The present study was in concurrence with the other studies (37%) and (38.5%) who showed patients with anaemia in same group [37, 28]. In this study, the number of children were found to be significantly associated with anaemia in pregnant women ($p< 0.05$).This finding is supported by the findings of previous report from Tanzania. [38]26 The incidence of anaemia during pregnancy is expected to be higher as the number of pregnancies increases because of the repeated drain on the iron reserves. In fact, multiparity, especially when the pregnancies have occurred in a rapid sequence, is traditionally regarded as a cause of anaemia in pregnancy. Anaemia was more prevalent among the subjects who have family size >2 (64.2%) as compared to patients who have family size ≤2 (46.7%). There may be a direct relationship of family size with anaemia due to food insecurity for large family size; however, no significant relationship of anaemia with family size could be derived in the present study. Similarly, the higher incidence of anaemia in family size >2 was also reported [39].

In the present study, majority of anaemic respondents (56.6%) belonged to the second trimester as compared to the first and third trimesters which had (42.9%) and (41.2%) of patients, respectively. Similar results (36.5%) were reported in a study [26]. The physiological haemo-dilution that takes place during pregnancy reaches its peak during the second trimester and may account for the increase in anaemia seen at this time in pregnancy. Also the increased demand for micro-nutrient in pregnancy increases as the pregnancy progresses. It has been found in our study that (70.4%) of patients

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 7.12 ⁜ Vol. 10, Issue 3, March 2023

DOI: 10.17148/IARJSET.2023.10311

of anaemia were multigravida while 29.6% were primigravida. This may be explained by the fact that repeated childbirths make the patients more prone to malnutrition resulting in anaemia and reducing maternal iron reserves at every pregnancy by causing blood loss at each delivery. Other study also concluded that multiparous women had higher risk of anaemia [27]. Women with prior pregnancy sustain a 500–600 mg iron loss per pregnancy, which is increased by haemorrhage after delivery. Iron deficiency is, therefore, definitely more common as parity increases. About (25.7%) of respondents had anaemia with interpregnancy interval of > 18 months as compared to (72.3%) of respondents with interpregnancy interval of ≤ 18 months. On the contrary, higher prevalence of anaemia in those with repeated pregnancies with poor birth spacing was reported [40]. However, a cause-effect relationship still needs to be proved. In the present study, current malaria attack were found to be significantly associated with anaemia in pregnant women (p <0.05), as were the findings of [41]. In order to avoid anaemia during pregnancy, receiving early antenatal care would serve as an important preventive measure.

V. CONCLUSION

Based on the findings from our study, it showed a high prevalence of anaemia (57.8%) among pregnant women attending the Fati Lami antenatal care clinic of Sir Yahaya Memorial Hospital Birnin Kebbi, northwest Nigeria, making anaemia in pregnancy a severe public health problem. The predisposing factors associated with anaemia in this studies were being in the rural area, having low monthly family income, women with less than eighteen months interval between pregnancies, women with greater than three number of deliveries and recent malaria attack. Educating pregnant women on anaemia should be intensified in antenatal care clinics.

ACKNOWLEDGMENTS

This research was supported by Tertiary Education Trust Fund (TETFund) under the 2021 Institutional Based Research (IBR) projects in Kebbi State Polytechnic Dakingari, Kebbi State, Nigeria. We also wish to thank the management and staff of the Sir Yahaya Memorial Hospital Birnin-Kebbi, Kebbi State, Nigeria.

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