AMAEMIA IN PREGNANCY AT BOOKING: PREVALENCE AND RISK FACTORS AMONG ANTENATAL ATTENDEES IN A SOUTHERN NIGERIA GENERAL HOSPITAL

Abstract

Background: Despite the fact that anaemia is a preventable morbidity in most cases, its prevalence among pregnant women is still unacceptably high, especially in rural and sub-urban settings. This is worrisome considering the enormous contribution of anaemia to maternal and infant morbidity and mortality.

Objective: This study aimed at determining the prevalence of anaemia at booking, identifying and describing its risk factors among pregnant women who attended the antenatal clinic of General Hospital, Etinan, a sub-urban area in Akwa Ibom State, South-South Nigeria.

Methodology: This was a cross-sectional descriptive study, involving 375 pregnant women seen at the antenatal (booking) clinic of General Hospital, Etinan, between April and October 2018, recruited through non-probability consecutive sampling technique. A pretested semi-structured interviewer-administered questionnaire was used to obtain data on socio-demographic, family and nutritional characteristics and obstetric and medical history of the respondents. Blood sample of each respondent was obtained from the median cubital vein, analysed with haemoglobinometer and their haemogloin (Hb) level determined and classified.

Results: The age of the respondents ranged from 15-49 years with mean and standard deviation of 26.62 ± 6.29. Results obtained show that out of 375 pregnant women, 265 had Hb <11g/dl giving 70.67% of anaemia among them. While 18.49% had mild anaemia, 4.15% had severe anaemia. Anaemia was statistically associated with rural residence (p=0.024), low educational status (0.02), low

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family income (p=0.003), being married (p=0.016), lower parity (p=0.000), late booking (p=0.001), non-use of family planning (p=0.000), non-use of insecticide treated nets (p=0.000), febrile illness in index pregnancy (p=0.000) and poor nutrition (p=0.000).

Conclusion:

The prevalence of anaemia among pregnant women in the study is high. This has far-reaching negative implications on the health status of the women during pregnancy, delivery and puerperum and that of the fetus. The need for preconception counseling and screening, health and nutrition education, early booking, contraception, treatment and prevention of causes of febrile illness, priority to girl child education and overall poverty eradication measures and recommended.

1. INTRODUCTION

Anaemia in pregnancy (AIP) is defined by the WHO as haemoglobin concentration of less than 11g/dl (Hb < 11g/dl) in a pregnant women.[1] It is classified into mild, moderate and severe anaemia when the haemoglobin concentration is 10.0 – 10.9g/d/, 7.0-9.9g/dl and < 7.0g/dl respectively.[2-6]

Though a preventable morbidity in most cases, AIP has been identified as the commonest pathology affecting pregnant women globally, contributing significantly to maternal, perinatal and infant morbidity and mortality, especially in middle~~edium~~ and low income countries.[1,2,7-9] Several studies have identified complications associated with AIP including low physical activity, pregnancy-induced hypertension, abortion, high risk of preterm delivery, post-partum

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haemorrhage, increased need for blood transfusion with the associated risks, impaired immune function, increased cardiac disease, post partum depression and sepsis.[4,5,10-14] Moreover, foetus/infant of anaemic mothers are prone to intrauterine growth retardation, intrauterine death, prematurity, low birth weight (LBW), neural tube defect, low APGAR score at 5 minutes of delivery, developmental delay and impaired physical and cognitive development.[5,10-14] AIP is a contributing factor to obstetric near misses especially in the sub-Saharan African countries; it was also a major cause of the non-attainment of goal 5 of the erstwhile millennium development goals (MDG-5).[6,14-18]

Being the commonest medical morbidity in pregnancy, AIP has a prevalence that cuts across every region of the world with the highest prevalence found in least developed countries. According to the WHO, as at 2011, about 38.2% of pregnant women globally were anaemic.[4.19] Regionally, ~~S~~sub-~~S~~saharan Africa has the highest prevalence of 57%, followed by south east Asia with 48%, while south America has the lowest prevalence of 24.1.[14] The prevalence also varies from country to country and from region to region within same countries. Studies have shown that the prevalence of AIP is as high as 99% among women in tertiary facility in India,[20] 90.5% in urban Pakistan,[9] 76% among pregnant adolescents in Ghana,[21] 39.9% in south Ethiopia,[8] 47.4% in northern Tanzania[4] to as low as 2.2% among pregnant women with early pregnancy in New Zealand. [22] In Nigeria, the overall prevalence of anaemia among pregnant women is put at 57.8%,[1] while studies have documented regional prevalence of 54.5% in Uyo South South Nigeria,[3] 56% in Abakiliki in south east Nigeria,[5] 39.2% in Sokoto north western Nigeria,[7] 76.5% in Abeokuta, south western Nigeria,[12] 71.3% in Azara in north ~~E~~east Nigeria,[23] and 60.4% in a tertiary facility in Ilorin, ~~N~~north central Nigeria.[24]

Anaemia in pregnancy is mostly a deficiency disease caused mainly by iron, folate and vitamin B12 depletion, especially in low income setting. Several risk factors are responsible for the deficiency. These borderbother on medical, economic, social, religious and cultural factors and include parasitic intestinal infestation, malaria, HIV infection and other causes of febrile illness in pregnancy, chronic illnesses, pica, young age, multigravidity, grand multiparity, advanced gestational age, close birth interval, history of excessive blood loss during pregnancy, low socio-economic status, illiteracy, haemoglobinopathy, low body max index (BMI) and, unhealthy cultural dietary practices.[7,8,24,27-31] Almost all the risk factors associated with anaemia in pregnancy are preventable through preconception screening, early booking, use of contraceptives and insecticide-treated nets, deworming, improved nutrition, overall improvement in socio-economic status, female education and other safe motherhood initiative recommendatios.[13]

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This study therefore aimed at determining the prevalence of anaemia at booking, as well as identifying and describing risk factors associated with anaemia among pregnant women who presented at sa secondary health area facility in a sub-urban area of southern Nigeria.

2. METHODOLOGY

2.1 Study Area

The study was carried out at the antenatal clinic of General Hospital, Etinan, Akwa Ibom State, south-south Nigeria. The General Hospital Etinan was founded as a missionary Hospital in 1927 by Qua Iboe Church (QIC). It was later taken over and is currently run by the Akwa Ibom State Hospital Management Board (HMB). It is a secondary Hhealth Ccare Ffacility that takes care of the health care needs of Etinan community and beyond. It has a

maternity unit with a standard antenatal clinic operated by trained nurses, supervised by medical officers.

2.2 Study Design

This was a cross-sectional descriptive study involving pregnant women who booked for ante-natal care at the maternity unit of the General Hospital, Etinan, Akwa Ibom State, south-south Nigeria.

2.3 Sample Selection: A total of 375 pregnant women who booked at the facility during the period of the study were recruited into the study using the formula:[32]

$M = \frac{Z^2 p(1-p)}{M^2}$, where

Z = Confidence level at 95% (standard value of 1.96%), at

M = 5% acceptable margin of error (Standard value 0.05)

P = Prevalence of anaemia among pregnant women in Nigeria (57.8%).[1] Substituting in the above formula gives 375~~%~~ (in the nearest 10).

A non-probability consecutive sampling technique was used to select the respondents.

The inclusion criteria were all consenting pregnant women who booked at the facility during the period of the study. The exclusion criteria were pregnant women with current bleeding, those who came for repeat visit, those with haemoglobinopathies, those who had blood transfusion in the current pregnancy and those who were in labour.

2.4 Data Collection

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A pre-tested semi-structured questionnaire was used to collect data from the respondents by the author and trained assistants, after due explanation of the purpose of the study, assurance of confidentiality of information and verbal consent obtained from them. Pregnant women with no formal education were assisted with local dialect by the research assistants. The data contained in the questionnaire include socio-demographic, family and nutritional characteristics, as well as obstetric/medical history of the respondents. A sample of 2mls of blood was collected from the median cubital vein of each pregnant woman into ethylenediaminetraacetic acid (EDTA) bottle. This was analyzed with haemoglobinometer by trained medical laboratory technician. The haemoglobin level of each respondent was determined and classified according to the WHO criteria into normal haemogloin (Hb $\geq$ 11.0g/dl); mild anaemia (Hb:10.0-10.9g/dl), moderate anaemia (Hb:7-9.9g/dl) and severe anaemia (Hb < 7.0g/dl) ~~respectively~~.

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2.5.1 Data Analysis

Data obtained from the study were analysed with Epi-info statistical package (CDC). The percentage of independent and dependent variables were determined. Level of statistical significance was set at $p < 0.05$. Tables and charts were used to display data distribution.

2.6 Ethical Clearance and Consent

Approval for the study was obtained from the Research and Ethical ~~e~~Committee of Akwa Ibom State Ministry of Health. Permission was also obtained from the administrative head of the hospital and the head of the maternity unit, before commencement of data collection. Verbal consent was obtained from the

respondents before the administration of the questionnaires and collection of the blood samples.

3.0 RESULTS

A total of 375 pregnant women ~~who~~ were recruited for the study ~~all participated~~. The results obtained are shown below:

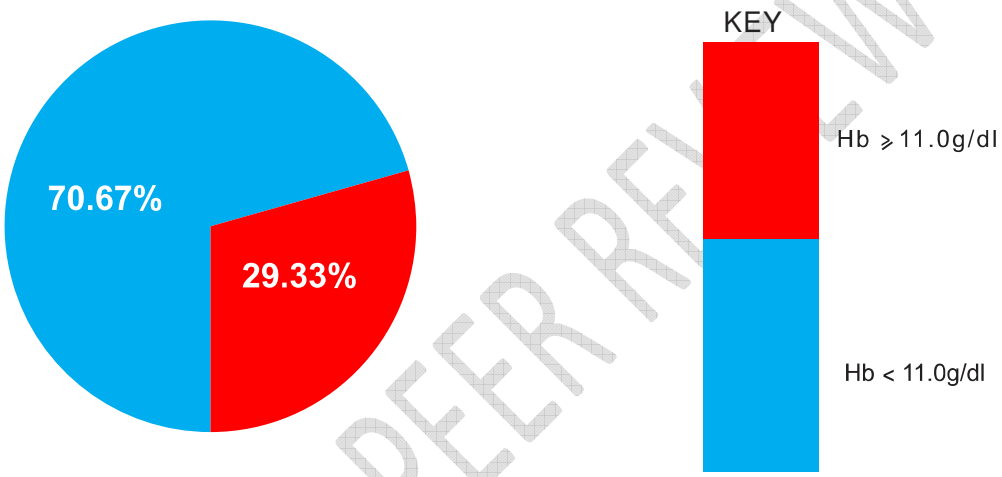

Figure 1: Haemoglobin levels of the pregnant women.

Figure 1 shows the haemogloin levels of the pregnant women in the study. Out of 375 pregnant women seen at the facility during the period of the study, majority 265 (70.67%) were anaemic (Hb < 11.0g/dl) while ~~least percentage~~ 110(29.33%) had normal haemoglobin level (Hb ≥ 11.0g/dl).

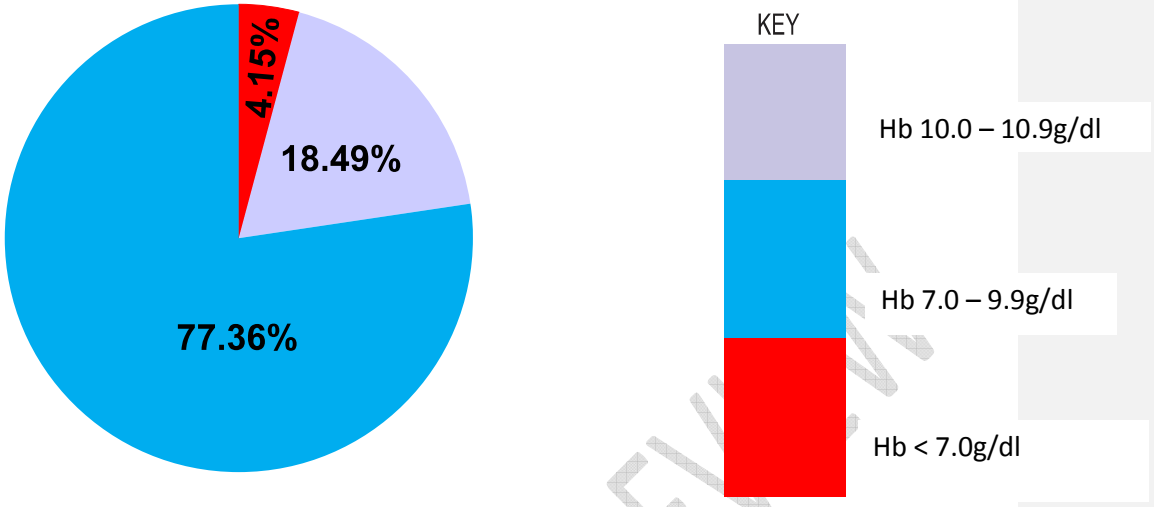

Figure 2: Classification of anaemia among the respondents:

The haemogloin levels of the anaemic respondents range from 4-10.9g/dl, with mean and standard deviation of 8.7± 1.0g/dl. Figure 2 depicts the classification of anaemia among the respondents. Out of 265 anaemic respondents, greater percentage 205 (77.36%) had moderate anaemia (Hb:7-9.9g/dl) while least percentage 11(4.15%) had severe anaemia (Hb <7.0g/dl).

Table 1: Socio-demographic characteristics of the anaemic respondents.

Characteristic	Frequency(N-265)	Percentage(%)
Age (years)		
15-19	15	5.70
20-24	46	17.36

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175	25-29	62	23.40
176	30-34	80	30.19
177	35-39	53	20.00
178	40-44	7	2.64
179	45.49	2	0.75
180	**Residence:**		
181	Urban	110	41.51
182	Rural	115	58.49
183	**Level of Education:**		
184	No formal Education	6	2.26
185	Primary Education	33	12.45
186	Secondary education	120	45.28
187	Tertiary education	106	40.00
188	**Currently married:**		
189	Yes	163	61.51
190	No	102	38.49
191	**Employment status**		
192	Unemployed	116	43.77
193	Employed	149	56.23
194	**Average Monthly family ~~in~~ income(N):**		
195	<50,000	179	67.55
196	50,000 – 99,000	74	27.92
197	≥ 100,000	12	4.53
198	**Religion:**		
199	Christianity	259	97.74

Other Religion	6	2.26

Table 1 summarises the socio-demographic characteristics of the pregnant women with anaemia. Their age distribution range from 15-49 years with mean age and standard deviation of 29.62 ± 6.29 years. The majority~~Significant percentage~~ of the respondents, 80(30.19%) belonged to 30-34 years age bracket, while the lowe~~a~~st number~~percentage~~, 2(0.75%), belonged to advanced reproductive age (44-49 years). Majority of the respondents, 58.49% came from rural areas. Most of the pregnant women, 159 (59.99%) had lower levels of education (secondary education and below). More than two thirds of the respondents (61.51%) were married. A higher~~Greater~~ percentage of the pregnant women were unemployed (56.23%), had lower family income (67.57%) and practi~~s~~ed Christianity (92.74%) ~~respectively~~.

Table 2: Family and nutrition characteristics of the respondent

Characteristic	Frequency(N-265)	Percentage(%)
Planned for this pregnancy?		
Yes	110	41.51
No	155	58.49
Use of Insecticide-Treated Net (ITN)		
Yes	97	36.60
No	168	63.40

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Nutritional Status**		
Good	55	20.76
Fair	200	75.47
Poor	10	3.77

** Nutritional Status:

Good – Eats 3 times a day with good food and meat most days of the week.

Fair – Eats 3 times only occasionally, eats 2 times most days of the week, taking ~~with~~ meat 2-3 times a week.

Poor – Eats only one to two times most days. Rarely takes~~eats~~ meat.

Table 2 shows some practices~~family~~ and nutritional characteristics in index pregnancy among the respondents. Majority of the pregnant women did not plan for the pregnancy (58.49%) and did not use insecticide-treated net (ITN), (63.4%) respectively.

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Only 20.76% of the pregnant women had good nutritional status during the pregnancy, while majority, 79.24%, had poor~~bad~~ (fair and poor) nutritional status.

Table 3: Obstetric and medical history of the respondents.

Characteristic	**Frequency(~~N~~n-265)**	**Percentage(%)**
Parity:		
0	37	13.96
1-2	170	64.15
3-4	51	19.25
≥ 5	7	2.64
Trimester at booking:		
First (week 1-13)	32	12.07
Second (week -14-28)	141	53.21
Third (week 29-38)	92	34.72

Bleeding per Vaginaan		
In index pregnancy		
Yes	9	3.4
No	256	96.6
Interval between last and		
Current pregnancies (n=228)* **		
< 6 months	6	2.63
6-11 months	67	29.39
1-2 years	131	>7.46
> 2 years	9	3.95
Uncertain	15	6.58
Use of family planning after		
Last pregnancy (n=228)		
Yes	23	10.09
No	205	89.91
Febrile illness in index pregnancy		
(n=265)		
Yes	235	88.68
No	30	11.32
HIV Status (n=265)		
Positive	19	7.17
Negative	246	92.83

***228 of the respondents were para ≥1

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Table 3 shows the obstetric and medical history of the pregnant women in the study. Almost all respondents (97.36%) had lower parity (parity~~a~~ ≤4).

Majority of the pregnant women 233 (87.93%) booked late (Second and third trimesters). A small percentage, 9 (3.4%) of the respondent had per vaginal bleeding in the index pregnancy. Out of 228 pregnant women who had given birth previously, majority of them 131(57.46%) and 205 (89.91%) had birth interval of 1-2 years and had not used contraceptives, respectively. Medically, most of the respondent, 88.68% had febrile illness in the index pregnancy, while ~~only~~ 7.17% of them were HIV positive.

Table 4: Association between AIP and socio-demographic characteristics

Characteristic	Anaemia in pregnancy Yes N(%)	No N(%)	Statistical Tests and Values
Age (Year):			
< 30	123(46-45)	45(40-91)	$X^2 = 0.953$ Df 1
≥ 30	142 (53.59)	65(59.09)	Pp=0.329
Residence:			
Urban	110(41.51)	32(29.09)	$X^2 = 5.095$ Df 1
Rural	155(58.49)	78(70.91)	p = 0.025
Educational level:			
Lower Education	159(59.99)	80(72.73)	X^2=5.448 Df 1
Higher education	106(40.00)	30(27.27)	p = 0.020
Currently married			
Yes	163(61.51)	82(79.54)	$X^2 = 5.832$ Df 1
No	102(38.49)	28(25.46)	p = 0.016
Employment status			
Unemployed	116(43.77)	52(47.27)	$X^2 = 0.385$ Df 1
Employed	149(56.23)	58(52.73)	$X^2 = 0.535$
Religion:			
Christianity	259(97.74)	107(97.27)	$X^2 = 0.071$ Df 1
Other Religion:	6(2.26)	3(2.73)	p = 0.790
Average monthly family Income (in Naira)			
<50,000	179(65.55)	11(82.73)	$X^2 = 0,.885$ Df 1
≥50,000	86(32.45)	19(17.27)	p = 0.0003

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Table 4 shows association between anaemia and socio-demographic characteristics among the pregnant women. Anaemia was statistically associated with rural residence (p=0.025), lower educational status (p = 0.002), being currently married (p = 0.016). and lower monthly family income (p = 0.0003).

Table 5: Association between AIP and obstetric and medical history and family and nutritional characteristics of the respondents

Characteristic	Anaemia in pregnancy		Statistical
	Yes N(%)	No N(%)	Tests and Values
Parity:			
<5	258(97.35)	96(87.27)	X^2 = 14,958
			Df 1
≥ 5	7(2.64)	14(12.73)	p = 0.000
Trimester at booking:			
<Second Trimester	32(12.07)	29(26.36)	X^2 = 11.651
			Df 1
≥Second Trimester	233(89.93)	8(73.64)	p = 0.001
Per vaginaam Bleeding			
In index pregnancy:			
Yes	9(3.4)	7(6.36)	Y^2 = 1.679
			Df 1
No	256(96.6)	103(93.64)	p = 0.195
Interval between last and			
Index pregnancies (n=228)			
< 2 years	73(32.02)	49(33.33)	X^2 = 0.070
			Df 1
≥ 2 years	155(67.99)	98(66.67)	p = 0.791
Use of family planning after			
Last delivery (n=228)			
Yes	23(10.09)	47(31.97)	X^2 = 28.196
			Df 1
No	205(89.91)	100(68.03)	p = 0.000
Febrile illness in index pregnancy			
(n=265):			
Yes	235(88.68)	79(71.82)	X^2 = 16.225
			Df 1
No	30 (11.32)	31(28.18)	p = 0.000
HIV Status (n=265)			

Positive	19(7.17)	7(6.36)	$X^2 = 0.078$ Df 1
Negative	246(92.83)	103(93.64)	p = 0.789
Nutritional Status:			
Good	55(20.76)	49(44.55)	X2 = 21.952 Df 1
Bad (Fair and Poor)	210(79.24)	61(55.45)	p = 0.000
Use of Insecticide-Treated Nets (ITN):			
Yes	92(36.60)	78(70.91)	$X^2 = 36.756$ Df 1
No	168(63.40)	32(29.09)	p = 0.000

Table 5 summaries the association between AIP and obstetric and medical history and, family and nutritional characteristics of the respondents. AIP was statistically significantly associated with lower parity (p = 0.000), late booking (p= 0.001), non-use of contraceptives (p = 0.000), febrile illness in index pregnancy (p= 0.000), poorbad nutritional status (p = 0.000) and non-use of insecticide-treated bed nets (p = 0.000)

4.0 DISCUSSION

The results of the study reveal a high prevalence rate (70.65%) of anaemia among pregnant women seen at General Hospital, Etinan, a sub-urban area of south-south Nigeria (Figure 1). This rate is similar to findings by Idowu, et al., in Abeokuta, western Nigeria,[12] Dattijo, et al., in Azara, north eastern Nigeria[23] and Huang, et al., in south eChina.[33] It is however, lower than the 99% found by Manjulatha, et al., in a tertiary health facility in India,[20] 90.5% by Baing-Ansari, et al., in Urban Pakistain,[9] and 76% by Okafor, et al., in a rural community in Calabar, Ssouth-Ssouth Nigeria.,[34] It isbut higher than findings from other workers in Uyo, Ssouth-Ssouth, Nigeria,[3] Shagamu, south western Nigeria,[4] Addis – Ababa, Etiopia,[6] South Sudan[25] and Nepal.[35] The high prevalence rate of anaemia obtained in this

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study with similar and higher rates obtained in other studies are an attestation that anaemia is still a common morbidity among pregnant population across the globe and therefore calls for closer attention and more ~~w~~holistic approach to its prevention, prompt identification and treatment so as to ensure maternal and child well being during and after pregnancy.

Although not statistically significant, the study has shown that socio-demographically, pregnant women of higher age (≥ 30 years) were more affected by anaemia than those of lower age (< 30 years). This is in disagreement with findings by Olubukola~~,~~ et al., in a study in Ibadan, which found anaemia associated with pregnant women of lower age.[36] The finding here could be due to the fact the population of women above 30 years in the study was more than that of women of lower age. This underscore the need to educate women of advanced reproductive age on practices that could avert anaemia in pregnancy among them.

The study established a significant association between anaemia and other socio-demographic characteristics including rural residence, low educational status, being married and low family monthly income. These findings are similar to findings from several other studies on AIP [8,9,18,37-39]. The need therefore to embark on a more intensive health education to women in rural and sub-urban areas, establish~~ed~~ more primary health care centres in rural areas to enhance ready access of health workers to rural women for information, education and counseling on measures to prevent anaemia in pregnancy; give priority to girl child education and improve socio-economic conditions of the rural and sub-urban dwellers ~~is advocated~~.

From Table 5~~In this study~~, anaemia was found to be statistically associated with lower parity, late booking, non-use of family planning, febrile illness in index

pregnancy, poor~~bad~~ nutrition in pregnancy and non-use of insecticide-treated bed nets(ITN). These findings are similar to findings from several other studies on risk factors for anaemia in pregnancy in other settings.[30,31,39-43] This underscores the need to pay special attention to women of lower parity, who sometimes have poor spacing between births, with the aim of educating them on anaemia prevention measures, especially during pregnancy. The need to educate pregnant women, especially those in the rural areas on the importance of early booking and booking in certified health facilities is also of utmost importance.

Furthermore there is need for early screening of pregnant women for febrile illnesses with the aim of prompt identification and treatment of causes, especially in ~~S~~sub-~~s~~Saharan Africa, where malaria and other infestations and infections are major causes of fever, haemolysis and resultant~~subsequent~~ anaemia among the general population and pregnant population in particular.[7,27,44-45]

Moreover, the importance of good nutrition among pregnant women to avert anaemia is a well known fact scientifically. Therefore the need for adequate pre-conception, conception and post-partum nutrition among women of child bearing age is recommended.

Finally, other risk factors such as non-use of contraceptives and insecticide-treated bed nets (ITN), associated with anaemia in pregnancy identified here, should be appropriately addressed. These cost-effective measures should be made readily available and affordable and possibly free to reproductive aged and pregnant women as important tools to preventing anaemia in pregnancy.

5.0 LIMITATION

The study concentrated on pregnant women in General Hospital, Etinan only and did not assess pregnant women in the core rural areas of Etinan. Therefore its

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findings may not be a true reflection on anaemia among pregnant women in Etinan as a whole. Further studies involving core rural areas is recommended.

6.0 CONCLUSION

The prevalence of anaemia among pregnant women in Etinan, a sub-urban area of ~~S~~south-~~S~~south Nigeria is high. This has far reaching negative implications for the women during pregnancy, delivery, puerperal and the foetus. The need for pre-conception counseling, screening, health and nutrition education, early booking, contraception, prompt identification and treatment of causes of febrile illnesses and overall improvement of socio-economic status and priority to girl child education is recommended.

CONSENT

Verbal consent was obtained from all the correspondents

ETHICAL APPROVAL

All authors hereby declare that the research was approved by the relevant ethical committee and that the research was performed according to ethical standard in compliance with the Declaration of Helsinki.

COMPETING INTERESTS

We hereby declare that we have no competing interest in this research

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