Original Research Article

Knowledge of and Attitude to Anaemia and its Prevention and Prevalence of Anaemia in Women at Booking for Antenatal Care at the Rivers State University Teaching Hospital, Port-Harcourt, Nigeria.

Abstract:

Background: Anaemia in pregnancy is an important public health problem worldwide. Despite the efforts of government and health bodies, maternal anaemia still continues to be a common cause of morbidity and mortality. This suggests that there are other factors which contribute to the high prevalence of anaemia in pregnancy despite the intervention efforts.
Objective: This study sought to determine the prevalence and anaemic status of pregnant women at booking, to assess their knowledge of anaemia and attitude to anaemia prevention measures. And to determine associated risk factors for anaemia and if there is a correlation between anaemic status and level of knowledge/attitude to anaemia prevention
Methodology: An institutional based, cross-sectional study was carried out. 322 consenting participants between 18-48 years were interviewed at booking using a structured questionnaire. Information on socio-demographic characteristics; their knowledge on causes, symptoms, prevention, and complications of anaemia in pregnancy; and information on attitude towards anaemia prevention strategies were collected. The PCV and HIV results of the women were retrieved. Data were entered into Excel spreadsheet and analyzed with SPSS version 20. Associations between different variables were determined using Fisher's exact test or Chi-square test, as appropriate, and logistic regression used to test statistical significance at $P<0.05$.
Results: Their mean age±SD was 31.65±4.72 years and the median parity was 1.Of the 322 women, 194(60.2%) were anaemic,with 186(57.8%) having mild anaemia. There was no significant association between anaemia and age, marital status, education, employment, parity, pregnancy interval and socio-economic status, but there was significant association with gestational age and HIV status, with only gestational age remaining significant after logistic regression. The relationship between anaemia and knowledge and attitude was not significant, but higher educational status was significantly related to knowledge of anaemia and its prevention.
Conclusion: The prevalence of anaemia in this study was high. Despite good knowledge and attitude to anaemia prevention, late booking for ANC caused significant association with the occurrence of anaemia. Efforts are needed to encourage early bookingand early commencement of iron and folic acid supplements.

Key Words: Anaemia in Pregnancy, Prevalence, Knowledge, Attitude, Preventive Measures,

INTRODUCTION:

Anaemia in pregnancy is an important public health problem worldwide. The World Health Organization (WHO) defines Anaemia as "A condition in which the number of red blood cells or their oxygen-carrying capacity is inadequate to meet physiologic demands in the body". Anaemia in pregnancy is defined as haemoglobin (Hb) concentration <11g/dl (PCV <33) and it is divided into three levels of severity, as Mild anaemia - Hb level of 9.0-10.9g/dl (PCV 27-32), Moderate anaemia - Hb level of 7.0-8.9g/dl (PCV 21-26) and Severe anaemia - Hb level <7.0g/dl (PCV <21) [1].

Globally, anaemia affects about half of all pregnant women 15-49 years with a prevalence varying from 53.8% to 90% in developing countries and 8.3% to 23% in developed countries, with the 2016 prevalence in Nigeria put at 57.80%[2]. Prevalence of anaemia in pregnancyreported inprevious studies fromNigeria varies widely between 15% to 77% [3,4,5,6]. Earlier studies in Port-Harcourt have reported a prevalence of 23.3% [7], 62.2% [8] and 69.6% [9].

More than 50% of global anaemia cases are due to iron deficiency, resulting from inadequate dietary intake and absorption, increased iron requirements and excessive iron losses. Other causes include genetic defects and diseases affecting blood cell producing organs such as malaria, Schistosomiasis, Hookworm infestation and HIV infection [10,11]. Women often become anaemic during pregnancy due to the physiological changes of pregnancy.However, many of them are said to be already anaemic at conception and then the physiologic demand further worsens the anaemia in these women.

Among the reported risk factors for development of anaemia during pregnancy are low socio-economic status, illiteracy, grand-multiparity, too many and too frequent pregnancies (inadequate spacing) and late booking of pregnant women for antenatal care [12]. Anaemia in pregnancy, particularly when moderate to severe, can result into pre-term delivery, low birth weight, low Apgar score and risk of birth asphyxia, low mental capacity of children and in extreme cases, intrauterine fetal death and maternal mortality [10].

Maternal anaemia continues to be a common cause of morbidity and mortality despite the policy of routine iron and folate supplementation and intermittent preventive treatment for malaria with drugs. This suggests that there are other factors than those on the focus of the malaria control programme, which contribute to the trend of high prevalence of anaemia in pregnancy.This study therefore sought to determine the current prevalence and anaemic status of pregnant women at booking for antenatal care in RSUTH, to assess their knowledge of anaemia and attitude to anaemia prevention measures, to determine associated risk factors for anaemia in these women, and to determine if there is a correlation between anaemic status and level of knowledge/attitude to anaemia prevention. The findings of this study may identify areas of lapses in the knowledge

and attitudeto anaemia and its prevention. This will aid in improving the content of antenatal education sessions and focus on risk factor reduction.

METHODOLOGY:

Study Site/Area:

This study was conducted in the antenatal clinic of RSUTHlocated in Port Harcourt city, an urban area in Nigeria, a tertiary hospital owned and funded by the Government of Rivers Stateof Nigeria. Patients are expected to pay directly for services they receive (except few that participate in the National Health Insurance Scheme). The hospital provides emergency obstetric services to women referred from other centers, as well as providing antenatal care and delivery services for low and high-risk pregnant women registered with the hospital. There are Five teams headed by consultants that run antenatal care services Mondays through Fridays. There is an average annual ANC attendance of over 12,000.

Study design and population:

An institutional based, cross-sectional study was carried out. Consenting participants were interviewed using a structured questionnaire that required about ten minutes to complete. The study population was all pregnant women between the ages of 18-48 years booking for the first time in the current pregnancy for antenatal careat the RSUTH.All previously booked patients already receivingsupplementation and health talks in the clinic were excluded.

Sample size determination:

The required sample size, of 322, was determined by using sample size for single population proportion formula [13] with the prevalence of anaemia from a previous study in the study area by Okoh et al 2015 [9].

$n = (Z\alpha/2)^2 \times p(1-p) / d^2$

Where, Z = critical value for normal distribution at 95% confidence level which equals to 1.96 (z value at $\alpha = 0.05$, two tailed).

p = Proportion 69.6% who had anaemia in previous study. d = margin of error = 5% in case of our study = 0.05. n = sample size

$n = 1.96^2 \times 0.70 \times (1-0.70) / (0.05)^2$

$n = 3.84 \times 0.70 \times 0.30 / 0.0025 =$ **322.**

Sampling Technique / Procedures:

All consecutive consenting pregnant women booking for ANC on each clinic day were recruited for the study until the required sample size was attained. An average of 15 women register for

antenatal care daily in this Centre. With five clinic days per week, about 10 women were recruited daily using convenient sampling to achieve the required number. The recruitment however lasted for about8 weeks due to a drop in attendance witnessed due to the Covid 19 pandemic.

Data Collection Instrument / Methods:

Data was collected by structured questionnaire administered to the study participants to collect information on socio-demographic characteristics; their knowledge on causes, symptoms, prevention, and complications of anaemia in pregnancy; and information on attitude towards anaemia prevention strategies.

Anaemia knowledge was determined using an index summated scale to which 16 questions were put to the respondents to assesstheir knowledge about anaemia. Each correct answer was scored 1, while each wrong answer was scored 0. Attitude of the women towards anaemia prevention was determined with a Likert summated scale, with 8 items scoring minimum of 8 and maximum of 40 points. To each item on thescale, the participants were asked to give one of the following responses: 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree).

The participants folders were tagged for easy follow up. The packed cell volume of all participating women was retrieved from their antenatal records at their subsequent visit, a week after booking, when their routine investigations results are generally available. This was used to calculate the prevalence and anaemia status of the participants. The HIV status, which is one of the risk factors for anaemia, was also retrieved. Antenatal care patients following testing at our clinics are usually informed about their results at the next visit and positive cases counselled by the trained nurses in the department, following which further tests are conducted and treatment with antiretroviral drugs commenced.

The data was collected by trained internship doctors running routine antenatal care for each clinic day Monday through Friday. Prior to data collection, the data collectors were trained for one day. Close supervision and daily check-up of the data was carried out by one of the authorsdaily, to improve quality of data.

Data Analysis:

Index summated scale was used to group the participants into those with Low-knowledge (1-6), Average-knowledge (7-12) and High-knowledge (13-16) of anaemia. Based on Likert summated scale scores, the participants were categorized into groups of Poor-attitude (8.0-23.0), Neutral-attitude (24.0) and Good-attitude (25.0-40.0) towards anaemia prevention in pregnancy.The participants “family feeding expenditure per capita” was determined by their estimated monthly feeding expenditure divided by number of persons in the household. This was classed as Low - <$22 (<N10,000), Middle - $22 - $32 (N10,000 – N15,000) and High - >$33 (≥N16,000) using exchange rate of N460 to $1. This served to determine their socio-economic circumstance.

The association of anaemia as dependent variable was compared with possible risk factors of age of respondent, educational status, parity, occupation, gestational age at booking, last pregnancy interval, HIV status, and knowledge of anaemia and attitude to anaemia prevention of the respondents.Coded data were entered into Excel spreadsheet and exported to SPSS version 20 for statistical analysis. Descriptive statistics such as Mean, and frequencies were used to present the results in tables and figures. Cross-tabulation was used to determine associations between different variables using Fisher's exact test or Chi-square test, as appropriate, and logistic regression used to test statistical significance at $P<0.05$.

Ethical approval:

Prior to data collection, the proposal was submitted to the RSUTH Research and Ethics Committee, as the study involved use of human subjects and patients of the hospital. Ethical clearance letter was obtained (RSUTH/REC/2020002). Individual written informed consent was also collected from each participant.

RESULTS:

Three hundred and twenty-two women consented to participate. Their Mean age ± SD was 31.65±4.72years; Median age was 32years and Range was 18 – 43years. Majority of the women, 313(97.2%) were married, had tertiary education 57.7% and 78.0% were employed or making income, while 22.0% of them were unemployed and without any source of personal income. As regards their 'family feeding expenditure per capita', majority 182(56.5%) were in the Middle class, 86(26.7%) were in the High class and 54(16.8%) were in the Low class (see Table 1).

Regarding their obstetric characteristics, Their Median paritywas Para 1, with a Rangeof Para 0 – 6. Majority of the women, 171(53.1%) booked in the second trimester, 93(28.9%) booked in the third trimester and only 57(17.7%) booked early as recommended in the first trimester. Concerning the interval between their previous pregnancy and the current pregnancy, of the 219 women who had previously given birth, 127(58.0%) had adequate interval of two or more years in between the pregnancies, while 92(42%) had less than two years in between their pregnancies (see Table 2).

Table 1: Socio-demographic characteristics of women at booking for ANC in RSUTH

Variables (N = 322)	Frequency	Percentage
Age in years		
≤24 years	20	6.2
25 – 29 years	88	27.3
30 – 34 years	119	37.0
35 – 39 years	80	24.8

≥40 years	15	4.7
Marital status		
Single	8	2.5
Married	313	97.2
Widowed	1	0.3
Educational level		
Primary	6	1.9
Secondary	84	26.1
Post-secondary	46	14.3
Tertiary	186	57.7
Employment status		
Unemployed/student	71	22.0
Employee	109	33.9
Self-employed	142	44.1
Socio-economic status		
High	86	26.7
Middle	182	56.5
Low	54	16.8

Table 2: Obstetric characteristics of women at booking for ANC in RSUTH

Variables (N = 322)	**Frequency**	**Percentage**
Parity		
Para 0	103	32.0
Para 1	95	29.5
Para 2 – 4	116	36.0
Para ≥5	8	2.5
Median = Para 1; Range = Para 0 – 6		
Gestational age		
First trimester	57	17.7
Second trimester	171	53.1
Third trimester	93	28.9
Post-term	1	0.3
Interval between previous and		

current pregnancy (N = 219)		
Adequate (≥2 years)	127	58.0
Short (<2 years)	92	42.0

Figure 1 refers to the HIV status of the women, with 28(8.7%) testing positive, while 294 of the women (91.3%) were negative for the virus. Figure 2 & 3 refers to the prevalence of anaemia in the study participants, 194(60.2%) of the women were anaemic and 128(39.8%) had no anaemia. Of those found to be anaemic, 194(60.2%), majority 186(57.8%) had mild anaemia, with moderate and severe anaemia being found in 4(1.2%) each.

Their percentage knowledge of anaemia in pregnancy, calculated using the index summated scale, revealed a majority 171(53.1%) had an average knowledge with another 116(36.0%) having good knowledge, only 35(10.9%) had poor knowledge (Figure 4). On the other hand, their attitude to anaemia prevention, as calculated with the Likert scale and as shown in Figure 4, revealed 249(77.3%) had good attitude, while 45(14.0%) were neutral and 28(8.7%) recorded poor attitude.

Comparison of the socio-demographic factors with anaemia among the women revealed no statistically significant difference with their age (P=0.516), marital status (P=0.358), educational status (P=0.818) and their socio-economic status (P=0.068) see Table 3. However, a comparison of obstetric factors with anaemia among the women revealed a significant association of anaemia with the gestational age at booking (P=0.0001) and the HIV status of the women (P=0.038), but not significant for parity (P=0.611) and interpregnancy interval (P=0.493) see Table 4A. However, on multiple logistic regression (Table 4B) only gestational age at booking remained significant (P=0.0001).Table 5 shows therelationship between anaemic status with knowledge of anaemia and attitude to prevention of anaemia among the women, with no significant association with knowledge (P=0.431) and attitude (P=0.737).

Comparison of sociodemographic factors and knowledge of anaemia and its preventive measures (Table 6), revealed significant finding for educational status (P=0.003) and employment status (P=0.043) on bivariate analysis, but following logistic regression (Table 6B) only educational status (P=0.001) remained significant. The higher the educational status the more likely a woman will have good knowledge of anaemia and its prevention. There was no significant findings on comparison of obstetric factors and knowledge in the bivariate analysis (Table 7). On the other hand, comparison of sociodemographic (Table 8) and obstetric (Table 9) factors and attitude to prevention of anaemia was only significant for employment status (P=0.023).

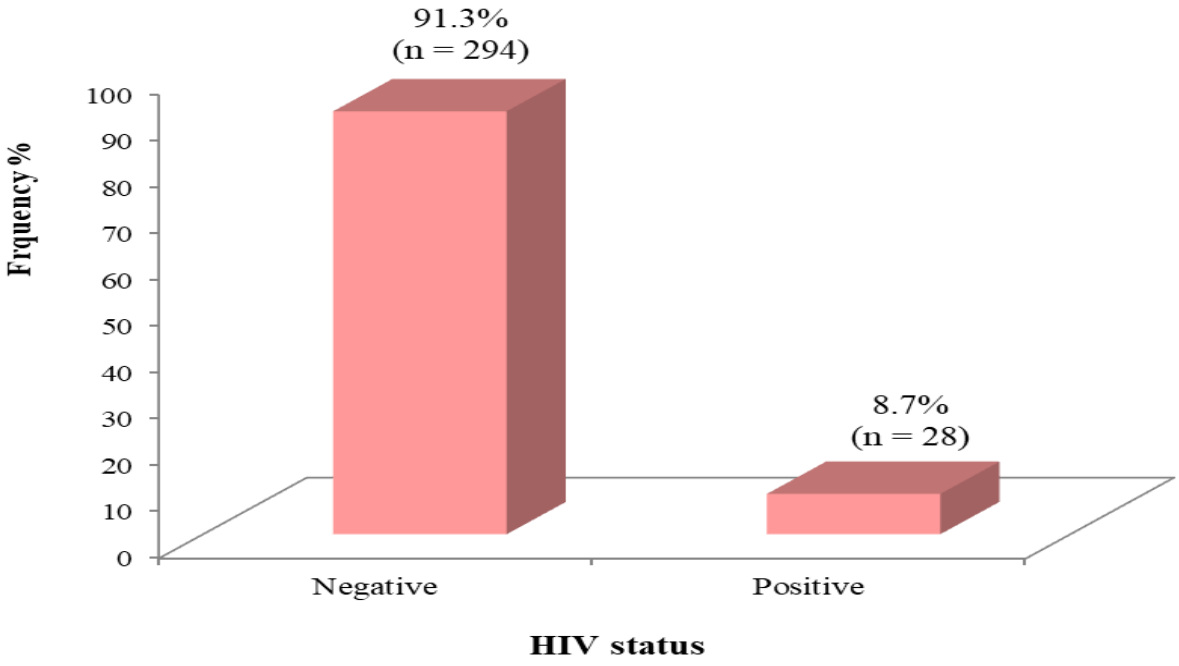

Figure 1: HIV status of women at booking for ANC in RSUTH.

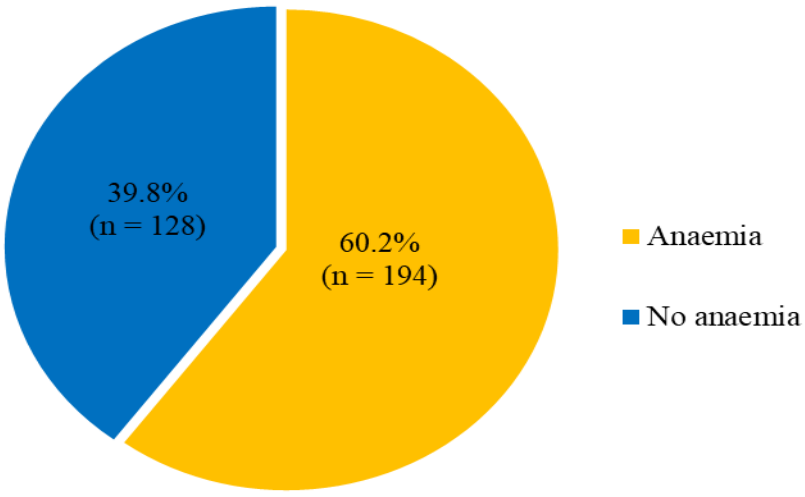

Figure 2: Prevalence of anaemia among women at booking for ANC in RSUTH.

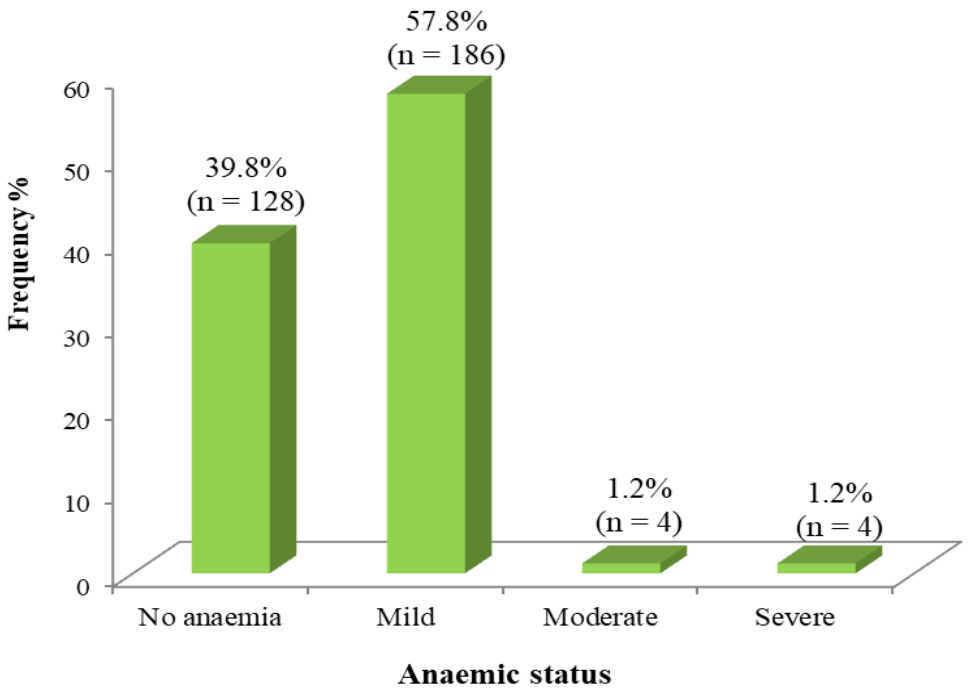

Figure 3: Anaemic status among women at booking for ANC in RSUTH.

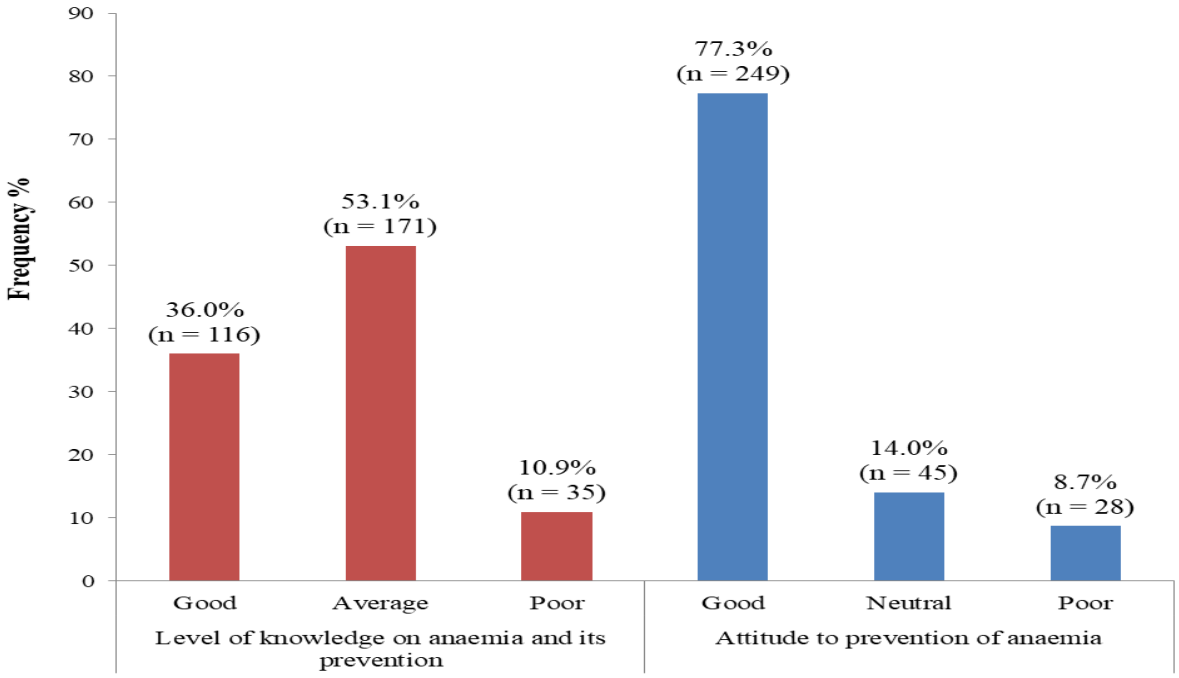

Figure 4: Knowledge on anaemia and its prevention and attitude to prevention of anaemia among women at booking for ANC in RSUTH.

Table 3: Socio-demographic factors associated with anaemiaamong women at booking for ANC in RSUTH

	Anaemia		
	Yes	No	Total
Variables (N = 322)	**n (%)**	**n (%)**	**n**
Age in years			
≤24 years	13 (65.0)	7 (35.0)	20
25 – 29 years	56 (63.6)	32 (36.4)	88
30 – 34 years	72 (60.5)	47 (39.5)	119
35 – 39years	47 (58.8)	33 (41.2)	80
≥40 years	6 (40.0)	9 (60.0)	15
	Chi Square = 3.256; p-value = 0.516		
Marital status			
Single	6 (75.0)	2 (25.0)	8
Married	188 (60.1)	125 (39.9)	313
Widowed	0 (0.0)	1 (100.0)	1
	Fisher's exact test = 2.050; p-value = 0.358		
Educational level			
Primary	3 (50.0)	3 (50.0)	6
Secondary	53 (63.1)	31 (36.9)	84
Post-secondary	21 (45.7)	25 (54.3)	46
Tertiary	117 (62.9)	69 (37.1)	186
	Fisher's exact test = 5.028; p-value = 0.152		
Employment status			
Unemployed/Student	41 (57.7)	30 (42.3)	71
Employee	68 (62.4)	41 (37.6)	109
Self-employed	85 (59.9)	57 (40.1)	142
	Chi Square = 0.402; p-value = 0.818		
Socio-economic status			
High	53 (61.6)	33 (38.4)	86
Middle	116 (63.7)	66 (36.3)	182
Low	25 (46.3)	29 (53.7)	54
	Chi Square = 5.382; p-value = 0.068		

Table 4A: Obstetric factors associated with anaemiaamong women at booking for ANC in RSUTH

Variables (N = 322)	Anaemia		Total
	Yes n (%)	No n (%)	n
Parity			
Para 0	62 (60.2)	41 (39.8)	103
Para 1	59 (62.1)	36 (37.9)	95
Para 2 – 4	70 (60.3)	46 (39.7)	116
Para ≥5	3 (37.5)	5 (62.5)	8
	Fisher's exact test = 1.861; p-value = 0.611		
Gestational age			
First trimester	17 (29.8)	40 (70.2	57
Second trimester	117 (68.4)	54 (31.6)	171
Third trimester	59 (63.4)	34 (36.6)	93
Post-third trimester	1 (100.0)	0 (0.0)	1
	*Fisher's exact test = 27.223; p-value = 0.0001**		
Interval between previous and current pregnancy (N = 219)			
Adequate (≥2 years)	79 (62.2)	48 (37.8)	127
Short (<2 years)	53 (57.6)	39 (42.4)	92
	Chi Square = 0.471; p-value = 0.493		
HIV status			
Positive	22 (78.6)	6 (21.4)	28
Negative	172 (58.5)	122 (41.5)	294
	*Chi Square = 4.299; p-value = 0.038**		

*Statistically significant (*p<0.05)*

Table 4B: Multiple logistic regression predictors of anaemia among women at booking for ANC in RSUTH

Factors	Coefficient(B)	Odds ratio (OR)	95% CI	p value
Gestational age at booking				
After first trimester	1.518	4.563	2.44 – 8.53	0.0001*
First trimester [R]		1		

HIV status				
Positive	0.814	2.257	0.87 – 5.86	0.095
Negative [R]		1		

*Statistically significant (p<*0.05*)

Table 5: Relationship between anaemic status, knowledge on anaemia & its prevention and attitude to prevention of anaemia among women at booking for ANC in RSUTH

	Anaemia status		
Variables (N = 322)	**Anaemia n (%)**	**No Anaemia n (%)**	**Total n**
Level of knowledge on anaemia			
Good	75 (64.7)	41 (35.3)	116
Average	100 (58.5)	71 (41.5)	171
Poor	19 (54.3)	16 (45.7)	35
	Chi Square = 1.684; p-value = 0.431		
Attitude to prevention of anaemia			
Good	151 (60.6)	98 (39.4)	249
Neutral	28 (62.2)	17 (37.8)	45
Poor	15 (53.6)	13 (46.4)	28
	Chi Square = 0.611; p-value = 0.737		

Table 6: **Sociodemographicfactors** association with **knowledge of anaemia** and its prevention among women at booking for ANC in RSUTH

	Knowledge of anaemia & its prevention		
Variables (N = 322)	**Good n (%)**	**Average/Poor n (%)**	**Total n**
Age in years			
≤24 years	7 (35.0)	13 (85.0)	20
25 – 29 years	37 (42.0)	51 (58.0)	88
30 – 34 years	38 (31.9)	81 (68.1)	119
35 – 39years	31 (38.8)	49 (61.2)	80
≥40 years	3 (20.0)	12 (80.0)	15

	Chi Square = 4.187; p-value = 0.381		
Marital status			
Single	4 (50.0)	4 (50.0)	8
Married	112 (35.8)	201 (64.2)	313
Widowed	0 (0.0)	1 (100.0)	1
	Fisher's exact test = 1.323; p-value = 0.659		
Educational level			
Primary	0 (0.0)	6 (100.0)	6
Secondary	19 (22.6)	65 (77.4)	84
Post-secondary	18 (39.1)	28 (60.9)	46
Tertiary	79 (42.5)	107 (57.5)	186
	*Fisher's exact test = 13.553; p-value = 0.003**		
Employment status			
Unemployed/Student	27 (38.0)	44 (62.0)	71
Employee	48 (44.0)	61 (56.0)	109
Self-employed	41 (28.9)	01 (71.1)	142
	*Chi Square = 6.311; p-value = 0.043**		
Socio-economic status			
High	38 (44.2)	48 (55.8)	86
Middle	58 (31.9)	124 (68.1)	182
Low	20 (37.0)	34 (63.0)	54
	Chi Square = 3.874; p-value = 0.144		

*Statistically significant (*p<0.05)*

Table 6B: Multiple logistic regression showing sociodemographic factors associated with knowledge of anaemia & its prevention among women at booking for ANC in RSUTH

Factors	**Coefficient(B)**	**Odds ratio (OR)**	**95% CI**	**p value**
Educational level				
Above secondary	1.011	2.749	1.55 – 4.88	0.001*
Secondary and below [R]		1		

Employment status				
Unemployed	0.224	1.251	0.71 – 2.19	0.435
Employed [R]		1		

*Statistically significant (p<*0.05*)

Table 7**: Obstetric factors** association with **knowledge of anaemia**& its prevention among women at booking for ANC in RSUTH

Variables (N = 322)	**Knowledge of anaemia & its prevention**		**Total**
	Yes	**No**	
	n (%)	**n (%)**	**n**
Parity			
Para 0	32 (31.1)	71 (68.9)	103
Para 1	32 (33.7)	63 (66.3)	95
Para 2 – 4	51 (44.0)	65 (56.0)	116
Para ≥5	1 (12.5)	7 (87.5)	8
	Chi Square = 6.419; p-value = 0.093		
Gestational age			
First trimester	17 (29.8)	40 (70.2)	57
Second trimester	59 (34.5)	112 (65.5)	171
Third trimester	40 (43.0)	53 (57.0)	93
Post-third trimester	0 (0.0)	1 (100.0)	1
	Fisher's exact test = 3.561; p-value = 0.278		
Interval between previous and current pregnancy (N = 219)			
Adequate	49 (38.6)	78 (61.4)	127
Short	35 (38.0)	57 (62.0)	92
	Chi Square = 0.007; p-value = 0.935		

HIV status			
Positive	6 (21.4)	22 (78.6)	28
Negative	110 (37.4)	184 (62.6)	294
	Chi Square = 2.835; p-value = 0.092		

Table 8: **Sociodemographic factors** association with **attitude to prevention** of anaemia among women at booking for ANC in RSUTH

	Attitude to prevention of anaemia		
Variables (N = 322)	**Good n (%)**	**Neutral/Poor n (%)**	**Total n**
Age in years			
≤24 years	14 (70.0)	6 (30.0)	20
25 – 29 years	66 (75.0)	22 (25.0)	88
30 – 34 years	98 (82.4)	21 (17.6)	119
35 – 39years	61 (76.2)	19 (23.8)	80
≥40 years	10 (66.7)	5 (33.3)	15
	Chi Square = 3.624; p-value = 0.459		
Marital status			
Single	6 (75.0)	2 (25.0)	8
Married	242 (77.3)	71 (22.7)	313
Widowed	1 (100.0)	0 (0.0)	1
	Fisher's exact test = 0.599; p-value = 1.000		
Educational level			
Primary	4 (66.7)	2 (33.3)	6
Secondary	65 (77.4)	19 (22.6)	84
Post-secondary	34 (73.9)	12 (26.1)	46
Tertiary	146 (78.5)	40 (21.5)	186
	Fisher's exact test = 1.213; p-value = 0.772		
Employment status			

Unemployed/Student	61 (85.9)	10 (14.1)	71
Employee	88 (80.7)	21 (19.3)	109
Self-employed	100 (70.4)	42 (29.6)	142
	*Chi Square = 7.570; p-value = 0.023**		
Socio-economic status			
High	69 (80.2)	17 (19.8)	86
Middle	138 (75.8)	44 (24.2)	182
Low	42 (77.8)	12 (22.2)	54
	Chi Square = 0.655; p-value = 0.721		

*Statistically significant (*p<0.05)*

Table 9: **Obstetric factors** association with **attitude to prevention** of anaemia among women at booking for ANC in RSUTH.

Variables (N = 322)	**Attitude to prevention of anaemia**		
	Yes n (%)	**No n (%)**	**Total n**
Parity			
Para 0	79 (76.7)	24 (23.3)	103
Para 1	68 (71.6)	27 (28.4)	95
Para 2 – 4	95 (81.9)	21 (18.1)	116
Para ≥5	7 (87.5)	1 (12.5)	8
	Chi Square = 3.667; p-value = 0.300		
Gestational age			
First trimester	41 (71.9)	16 (28.1)	57
Second trimester	131 (76.6)	40 (23.4)	171
Third trimester	76 (81.7)	17 (18.3)	93
Post-third trimester	1 (100.0)	0 (0.0)	1
	Fisher's exact test = 2.471; p-value = 0.498		
Interval between previous and current pregnancy (N = 219)			

Adequate	98 (77.2)	29 (22.8)	127
Short	72 (78.3)	20 (21.7)	92
	Chi Square = 0.037; p-value = 0.848		
HIV status			
Positive	23 (82.1)	5 (17.9)	28
Negative	226 (76.9)	68 (23.1)	294
	Chi Square = 0.405; p-value = 0.524		

DISCUSSION:

The prevalence of anaemia in pregnant women at booking in this study was 60.2%, out of which 2.4% had moderate and severe anaemia. This finding is slightly lower than the prevalence of 69.6% earlier reported in the study area by Okoh et al in 2015 [9], in both magnitude and the proportion of pregnant women with moderate and severe anaemia. Majority of the women (51.3%) in the earlier study had moderate anaemia compared to this study, where majority (57.8%) had mild anaemia. The difference may lie in the fact that the previous study was retrospective in design and probably because over time, the knowledge and attitude to anaemia prevention in the general population may have improved.

The prevalence of anaemia in these studies are unacceptably high and indicates that anaemia is still a major problemin our environment. The prevalence of anaemia in pregnancy reported by other studies in our city and other parts of Nigeria, and indeed Africa, varies widely. Two other studies in Port-Harcourt have reported 23.3% [7] and 62.2% [8]. Studies from other parts of Nigeria have reported figures ranging from 15% to 76.9% [3,4,5,6]. A recent study in Tanzania by Margwe and Lupindu 2018 reported a prevalence of 46.3%, out of which 10.45% had severe anaemia [14]. The differences observed may be due to the stage in pregnancy that the haemoglobin concentration was estimated. While some studies were done at the booking visit, others were carried out during ANC when interventions such as Iron and Folate supplementation and malaria chemoprophylaxis had commenced. Other factors that might explain the differences recorded from region to region would include geographical variation, dietary lifestyle, and health seeking behaviour.

The prevalence in this study of more than 40% is categorized as a severe public health problem, according to a WHO classification [12]. This is happening despite many yearsof implementation of interventionssuch as iron and folate supplementation, control of malaria and other infections, deworming, education to improve diet and family planning as prescribed by WHO [15]. This suggests that there are other factors, which contribute to the trend of high prevalence of anaemia in pregnancy. This study, and indeed a previous study in our Centre [16], reported late booking

predominantly in the second trimester and this was significantly associated with the finding of anaemia in the study population. Other studies have also observed an increasing prevalence with gestational age [5,9,17,18]. This delay in health seeking behaviour of women contributes to the increasing prevalence of anaemia seen with increasing gestational age. Hemodilution peaking at the second trimester may be another reason why anaemia is seen more within this stage of pregnancy, but early booking and early supplementation with Iron and Folate,should counteract this effect.

The study revealed that the women had a good knowledge and attitude to anaemia and itsprevention measures, however a comparison with the anaemic status of the women did not yield a significant difference. Knowledge of a problem may lead to its understanding and behavioral change, while attitude is a factor that can influence anaemia intervention programme. A study in Ethiopia by Oumer and Hussein 2019 reported good knowledge and attitude among their participants but poor adherence to prevention practice [19]. The report from Tanzania [14] revealed low knowledge and poor attitude among participants and a significant association of these with anaemia. The difference can be explained by the study population, our study was done in an urban metropolitan setting with over 90% haven acquired secondary level education, while theirs was in a rural setting with majority of the participants haven acquired primary and informal education.

CONCLUSION:

The prevalence of anaemia in this study at 60.2% was high. Despite the good knowledge and attitude to anaemia and its prevention, late booking for ANC causeda significant association with the occurrence of anaemia. Efforts are needed to encourage early booking among pregnant women, during the first trimester as recommended by WHO, and when not possible, women should be encouraged to commence iron and folate supplements early at home.

References:

1. World Health Organization. Haemoglobin concentration for the diagnosis of anaemia and assessment of severity VMNIS Vitamin and Mineral Nutrition Information System. 2011; Pp:2-5.
2. World Health Organization: The Global Health Observatory: Prevalence of anaemia in pregnant women 15-49 years. Available at https://www.who.int/data/gho/indicator-metedata-registry/imr-details/4552
3. Agan T, Ekabua JE, Udoh AE, Ekanem EI, Efiok EE, Mgbekem MA. Prevalence of anaemia in women with asymptomatic malaria parasitemia at first antenatal care visit at the University of Calabar Teaching Hospital, Calabar, Nigeria. International Journal of Women's Health 2010; 2: 229-233.

4. Nwizu EN, Iliyasu Z, Ibrahim SA, Galadanci HS. Socio-demographic and maternal factors in anaemia in pregnancy at booking in Kano, northern Nigeria. African Journal of Reproductive Health 2011; 15: 33-41.
5. Olubukola A, Odunayo A, Adesina O. Anaemia in pregnancy at two levels of health care in Ibadan, southwest Nigeria. Annals of African Medicine 2011; 10: 272-277.
6. Gwarzo MY, Ugwa EA. The pattern of anaemia in northern Nigerian pregnant women. Journal of Medicine and Medical Sciences 2013; 4: 319-323.
7. Buseri FI, Uko EK, Jeremiah ZA, Usanga EA. Prevalence and risk factors of anaemia among pregnant women in Nigeria. The Open Hematology Journal 2008; 2: 14-19.
8. Ndukwu GU, Dienye PO. Prevalence and socio-demographic factors associated with anaemia in pregnancy in a primary health center in Rivers State, Nigeria. African Journal of Primary Health Care & Family Medicine 2012; 4: 1-7.
9. Okoh DA, Iyalla C, Omunakwe H, Iwo-Amah RS. A retrospective study of the prevalence of anaemia in pregnancy at booking in Niger Delta, Nigeria. Journal of Obstetrics and Gynaecology 2015; Early online: 1-4. https://doi.org/10.3109/01443615.2015.1116500.
10. Pasricha SR, Drakesmith H, Black J, Hipgrave D, Biggs BA. Control of iron deficiency anaemia in low- and middle-income countries. Blood 2013; 121: 2607-17.
11. Stevens GA, Finucane MM, De-Regil LM, Paciorek CJ, Flaxman SR, Branca F, et al. Global, regional and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995-2011: a systematic analysis of population-representative data. Lancet. Glob. Heal. 2013; 1: e16-25.
12. Benoist B de, McLean E, Egl I, Cogswell M. Worldwide prevalence of anaemia 1993-2005: WHO global database on anaemia. WHO; 2008.
13. Daniel WW. Biostatistics. A foundation for analysis in the health sciences. 7th edition. New York: John Wiley and Sons. Pp: 141-142.
14. Margwe JA, Lupindu AM. Knowledge and Attitude of Pregnant Women in Rural Tanzania on Prevention of Anaemia. African Journal of Reproductive Health Sept 2018; 22(3): 71-79. http://dx.doi.org/10.29063/ajrh2018/v22i3.8.
15. World Health Organization (WHO). Global Nutrition Targets 2025: Anaemia Policy Brief. 1-7 (2012).
16. Awoyesuku PA, MacPepple DA, Kwosah NJ. Pattern and Socio-demographic Determinants of Gestational Age at Antenatal Booking at the Rivers State University Teaching Hospital, Nigeria: A TwoYear Review. Asian Journal of Pregnancy and Childbirth. 2019; 2(3): 1-8.
17. Uche-Nwachi BO, Odekunle A, Jacinto S, Burnet M, Clapperton M, David Y, et al. Anaemia in pregnancy: association with parity, abortions and child spacing in primary healthcare clinic attendees in Trinidad and Tobago. African Health Sciences 2010; 10: 66-70.

18. Al-Mehaisen I, Khader Y, Al-Kuran O, Abu-Isa F, Amarin Z. Maternal anaemia in rural Jordan: room for improvement. Anaemia 2011; 2011: 3818-12.
19. Oumer A, Hussein A. Knowledge, Attitude and Practice of Pregnant Mothers towards Prevention of Iron Deficiency Anaemia in Ethiopia: Institutional Based Cross Sectional Study. Health Care Current Reviews 2019; 7(1): no.238. 1-7.