

## **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, at statistical significance level of 5%.

**Results:** Their mean age  $\pm$  SD was 31.65 $\pm$ 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. The relationship between anaemia and knowledge and attitude was not significant.

**Conclusion:** The prevalence of anaemia in this study was high. Despite good knowledge and attitude to anaemia prevention, late booking for ANC and HIV caused significant association with the occurrence of anaemia. Efforts are needed to encourage early booking and 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 273.2 million people (42.6%) and Africa represents the largest proportion of 84.5 million people which is a prevalence of 62.3%. A total of 32.4 million pregnant women of 15-49 years of age worldwide have anaemia at a prevalence of 38.2%, in Africa 9.2 million pregnant women are affected with a prevalence of 46.3% [2]. Prevalence of anaemia in pregnancy in Nigeria 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].

Despite the National health policy of routine iron supplementation and intermittent preventive treatment for malaria with anti-malarial drugs, maternal anaemia continues to be a common cause of morbidity and mortality. This situation suggests that there are important factors, other than those on the focus of the control programme, which contribute to the persistent 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 will identify areas of lapses

in the knowledge and attitude to 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 RSUTH, a tertiary hospital owned and funded by the Government of Rivers State. 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. The hospital is well equipped and has availability of qualified team comprising of Obstetricians, Paediatricians and Anaesthetists. There is availability of laboratory and blood bank services in 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 care at the RSUTH. All previously booked patients already receiving supplementation 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 about 8 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.

Knowledge about anaemia was determined by using an index summated scale to which a series of 16 questions seeking whether the respondents had correct knowledge about anaemia. For each correct answer, a respondent is scored 1, while for each wrong answer a respondent is scored 0. Attitude of pregnant women towards anaemia prevention measures was determined by Likert summated scale, which was made up of 8 items translating into 40 points. To each of the items of the Likert summated scale, the respondents were required to give one of the following alternatives: 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 authors daily, 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. The Likert summated scale was used to determine attitude towards anaemia prevention measures in pregnancy. Based on the

score points, the participants were categorized into groups of Poor-attitude (8.0-23.0), Neutral-attitude (24.0) and Good-attitude (25.0-40.0). 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 ( $\geq$ N16,000) using exchange rate of N460 to \$1. This served to determine their socio-economic circumstance.

The association of anaemia as dependent dichotomous variable (anaemic or non-anaemic) was compared with possible risk factors (predictor variables). The predictor variables included age of respondent, education, 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, at statistical significance level of 5%.

#### **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  $\pm$  SD was 31.65 $\pm$ 4.72 years; Median age was 32 years and Range was 18 – 43 years. 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 parity was Para 1, with a Range of 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

<b>Variables (N = 322)</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Age in years</b>		
≤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
<b>Marital status</b>		
Single	8	2.5
Married	313	97.2
Widowed	1	0.3
<b>Educational level</b>		
Primary	6	1.9
Secondary	84	26.1
Post-secondary	46	14.3
Tertiary	186	57.7
<b>Employment status</b>		
Unemployed/student	71	22.0
Employee	109	33.9
Self-employed	142	44.1
<b>Socio-economic status</b>		
High	86	26.7
Middle	182	56.5
Low	54	16.8

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

<b>Variables (N = 322)</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Parity</b>		
Para 0	103	32.0
Para 1	95	29.5

Para 2 – 4	116	36.0
Para $\geq$ 5	8	2.5
<i>Median = Para 1; Range = Para 0 – 6</i>		
<b>Gestational age</b>		
First trimester	57	17.7
Second trimester	171	53.1
Third trimester	93	28.9
Post-term	1	0.3
<b>Interval between previous and current pregnancy (N = 219)</b>		
Adequate ( $\geq$ 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 5, 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 4. Table 5 shows the relationship 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 ( $P=0.737$ ).

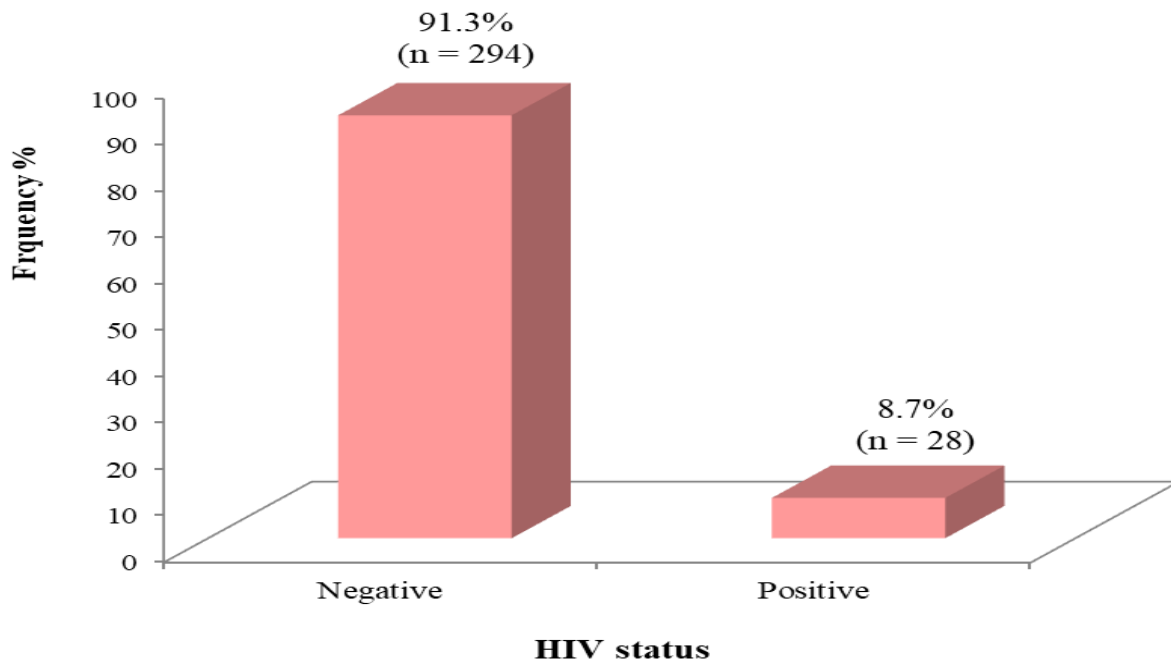


Figure 1: HIV status of women at booking for ANC in RSUTH

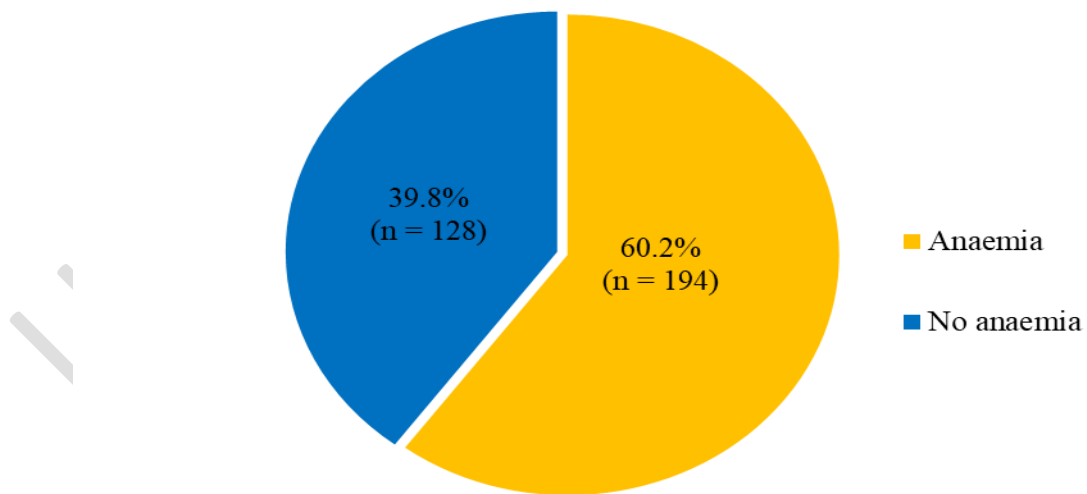


Figure 2: Prevalence of anaemia among women at booking for ANC in RSUTH



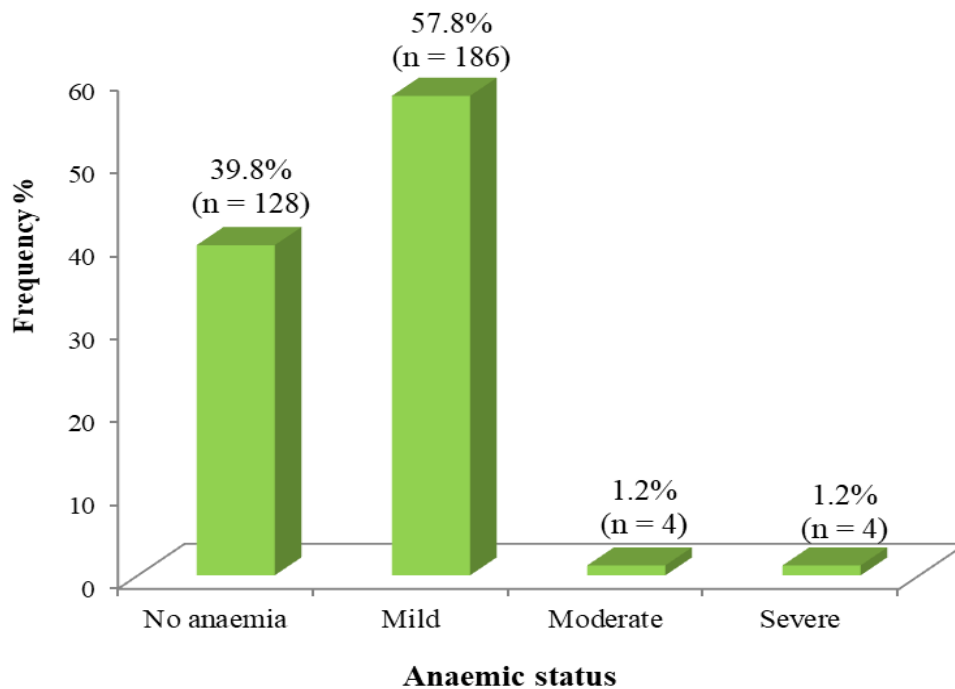


Figure 3: Anaemic status among women at booking for ANC in RSUTH

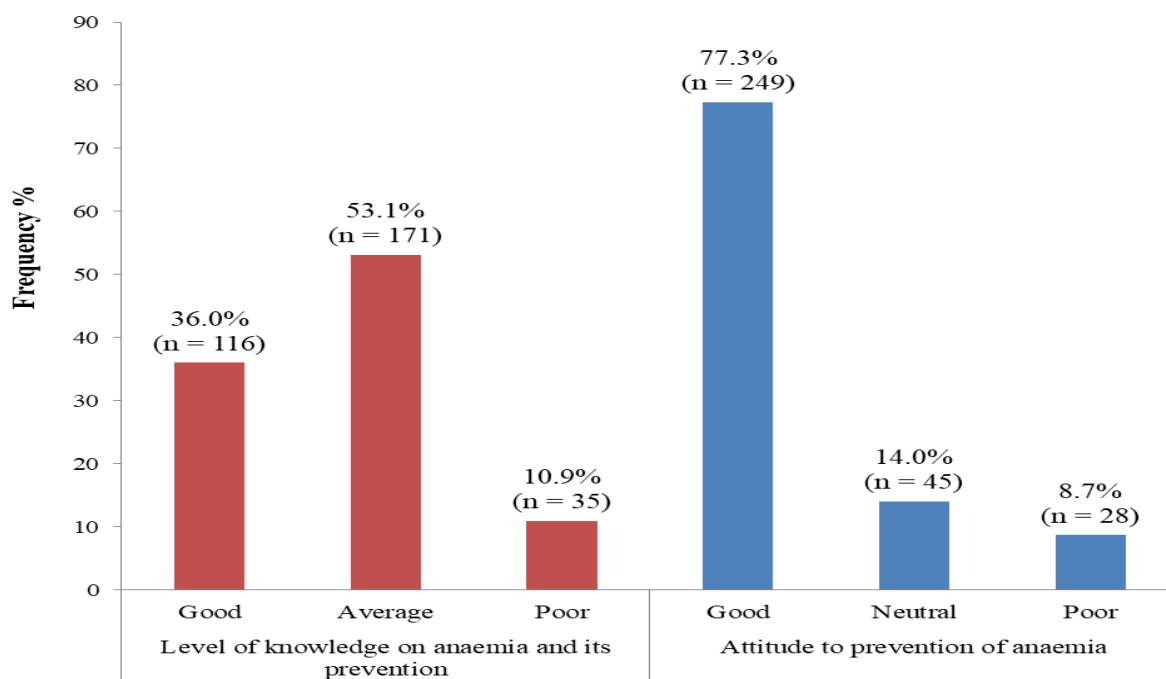


Figure 4: Knowledge on anaemia and its prevention and attitude to prevention of anaemia among women at booking for ANC in RSUTH.

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

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

Table 4: Obstetric factors associated with anaemia among women at booking for ANC in RSUTH

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

\*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

Variables (N = 322)	Anaemia status		Total n (%)
	Anaemia n (%)	No Anaemia n (%)	
<b>Level of knowledge on anaemia</b>			
Good	75 (64.7)	41 (35.3)	116 (100.0)

Average	100 (58.5)	71 (41.5)	171 (100.0)
Poor	19 (54.3)	16 (45.7)	35 (100.0)

*Chi Square = 1.684; p-value = 0.431*

**Attitude to prevention of anaemia**

Good	151 (60.6)	98 (39.4)	249 (100.0)
Neutral	28 (62.2)	17 (37.8)	45 (100.0)
Poor	15 (53.6)	13 (46.4)	28 (100.0)

*Chi Square = 0.611; p-value = 0.737*

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**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 problem 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.

According to WHO classification, the prevalence in this study falls under >40% and categorized as severe public health problem [12]. This is despite more than a decade of interventions through ANC services with iron supplementation, control of malaria and other infections, deworming, education to improve diet and family planning as prescribed by WHO [15]. This suggest that either key determinants of anaemia have not been fully identified or appropriate interventions

have not been put in place. 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.

This study revealed that the women had a good knowledge of anaemia and good attitude to anaemia prevention measures, however a comparison with the anaemic status of the women did not yield a significant difference. Knowledge may lead to understanding of the problem and change in behaviour, while attitude as a measure of how people feel about a given issue is one among other factors 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 and HIV caused a 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.

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UNDER PEER REVIEW