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Anaemia at the end of pregnancy, an assessment of women in Port Harcourt, Nigeria

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Abstract
Background: Anaemia in pregnancy is associated with high foeto-maternal morbidity and mortality. It has significant prevalence in Africa with poor pregnancy outcome.
Methods: We assessed pregnant women presenting in labour, documented their booking status, age, haematocrit at presentation, their mode of delivery and occurrence of post-partum haemorrhage or not as well.
Results: Four hundred and sixty-two (462) women were included in the study. Modal age group was 26-35 years [299 (64.7%)]. Majority were booked 402 (87.2%), 335 (70.3%), and 47 (10.2%), had moderate to severe anaemia and post-partum haemorrhage respectively. Patient's booking status and packed cell were significantly associated with post-partum haemorrhage p= 0.04 and $p<0.001$ respectively.
Conclusion: Anaemia in late pregnancy is common in our community, 70.3% of the women presented with varying degrees of anaemia. Booking status and packed cell volume are strong predictors of post-partum haemorrhage.

Keywords: Anaemia, pregnancy, gestational age

Introduction
Anaemia at any gestational age is associated with increased foeto-maternal morbidity and mortality and of public health importance. It is a condition in which the oxygen-carrying capacity is not sufficient to meet physiologic needs of the body and it varies by sex, age, altitude, smoking, and pregnancy status [1]. Haemoglobin concentration of 11.0g/dl in the 1st and 3rd trimesters and 10.5g/dl in the 2nd trimester is defined as anaemia in pregnancy [2]. Some women in the reproductive age are thought to be anaemic even before they are pregnant, and constitute the largest population group mostly affected with anaemia (468.4 million, 95% CI: 446.2, 490.6) [3]. Fifty-eight percent of pregnant women in Nigeria are said to be anaemic [4] and a previous study conducted in our facility revelled a prevalence of 69.6% among women starting antenatal care. Additionally, anaemia was commoner in women of teen-age and the haematocrit was lower as the gestational age at booking increased [5].
Females in low- and middle-income countries appear to be at higher risk of having anaemia due to iron deficiency, helminthiasis and haemoglobinopathies which are also common in these regions. Anaemia has dire consequences in pregnancy and when it persists till late pregnancy and labour, it poses a challenge for treatment, increases the cost of care and put the baby and mother at risk. We undertook this prospective study to evaluate the severity of anaemia in women presenting in labour and the effect of anaemia on some outcomes of delivery such as the occurrence of post-partum haemorrhage.

Methods
This was a prospective assessment of all women presenting to the labour ward of Rivers State University Teaching Hospital (RSUTH) for delivery between December 2017 and September 2018. RSUTH is a tertiary centre in the heart of Port Harcourt, it is a 365 bed-capacity facility with an average of 13,200 women registering for Antenatal care and 10,000 deliveries carried out annually.
All consenting mothers' biodata was taken when they presented in Labour – their age, booking history, Packed cell volume (PCV), mode of delivery and history of post-partum haemorrhage (PPH), Post-partum haemorrhage was defined in this study as loss of more than 500mls of blood

during delivery [6] or loss of any amount of blood that led to cardiopulmonary decompensation of the mother after delivery. The data were analysed using IBM Statistical Product and Service Solution (SPSS) version 25.0. (Armonk, NY). Categorical variables were presented in frequencies and percentages while continuous variable in mean and standard deviation. A Chi-Squared test was carried out to determine the association between booking status, packed cell volume and development of postpartum haemorrhage. Logistic regression was carried out to determine the predictors of post-partum haemorrhage. P-value of ≤0.05 was taken as statistically significant level.

Results

Four hundred and sixty-two women were included in the study. Their mean age was 31.2 ± 5.2 years. The majority of study participants 299 (64.7%) were aged 26-35 years Majority had moderate to severe anaemia 335 (70.3%); were booked and had postpartum haemorrhage 402 (87.2%) and 47 (10.2%) respectively Table 1.

Of the 402 booked parturient, 278 (69.2%) had anaemia while 124 (30.8%) had normal Packed cell volume. Among the unbooked patients, 77.6% had anaemia (Table 2). There was a statistically significant association between the booking status of the patients and occurrence of anaemia (χ^2 =14.3 p=0.001).

Table 3, shows the occurrence of post-partum haemorrhage by booking status. Of 400 booked patients, 8.2% developed PPH while 14 (23.3%) of unbooked patients developed post-partum haemorrhage. There was a statistically significant association between patients booking status and development of post-partum haemorrhage p<0.001.

From Table 4, 57.6% and 6.2% of severely and moderately anaemic patients developed post-partum haemorrhage during delivery respectively. the association between PCV category and development of post-partum haemorrhage was statistically significant p<0.001 (Table 4).

A significantly higher proportion of study participants who were unbooked presented with severe anaemia (χ^2 =14.3; p=0.001), Table 2. A significantly higher proportion of un-booked study participants also developed PPH (χ^2 =13.9; p<0.001), Table *3*. The highest proportion of persons to who developed post-partum haemorrhage was found in persons with severe anaemia. This difference was significant. (χ^2 =87.1; p<0.001), Table 4.

Amongst the study participants, packed cell volume was found to be the strongest determinant of post-partum haemorrhage. The adjusted regression analysis revealed that for every unit increase in PCV of study participants, there was a 16% decrease in the probability of occurrence of PPH and was statistically significant (p<0.001). Booking status was associated with post-partum haemorrhage, adjusted odds ratio (aOR) =2.32, 95%CI 1.06-5.09. This association was statistically significant, p<0.001, (Table 5).

Table 1: Social and Obstetric Characteristics of study participants

	Frequency	Percentage (%)
Age Category (n=462)		
15-25	70	15.2
26-35	299	64.7
36-47	93	20.1
Mean Age (SD)	31.2 (5.2)	
PCV Category (n=462)		
Severe anaemia	33	7.1
Moderate anaemia	292	63.2
normal PCV	137	29.7
Mean PCV (SD)	33 (4.9)	
Vaginal Delivery (n=462)		
No	2	0.4
Yes	460	99.6
Booked Delivery (n=460)		
No	58	12.6
Yes	402	87.4
Developed PPH (n=460)		
No	413	89.8
Yes	47	10.2

Table 2: Prevalence of Anaemia by booking status of study participants

Booked Delivery	PCV Category			Chi-square (p-value)
	severe	moderate	normal PCV	
No	11 (33.3)	34 (11.7)	13 (9.5)	14.3 (0.001)
Yes	22 (66.7)	256 (88.3)	124 (90.5)	

Table 3: Prevalence of occurrence of Post-Partum Haemorrhage (PPH) by booking status

Booked Delivery	Developed PPH		Chi-square (p-value)
	No	Yes	
No	44 (10.7)	14 (29.8)	13.9 (<0.001)
Yes	367 (89.3)	33 (70.2)	

Table 4: Prevalence of occurrence of Post-Partum Haemorrhage by anaemia status

PCV Category	Developed PPH		Chi-square (p-value)
	No	Yes	
Severe anaemia	14 (3.4)	19 (40.4)	87.1 (<0.001)
Moderate anaemia	273 (66.1)	18 (38.3)	
Normal PCV	126 (30.5)	10 (21.3)	

Table 5: Logistic Regression Analysis for Predictors of Post-partum haemorrhage among study participants

Variable	Crude O.R (95% C.I)	p-value	Adjusted O.R (95% C.I)	p-value
Age	1.01 (0.95-1.07)	0.67	1.02 (0.96 – 1.08)	0.61
Booking Status	3.54 (1.76 – 7.12)	<0.001	2.32 (1.06 – 5.09)	0.04
PCV	0.83 (0.78 – 0.88)	<0.001	0.84 (0.79 -0.89)	<0.001

Discussion

It is advocated that the prevention and management of anaemia during pregnancy and post-partum should remain a global public health and research priority [7]. Anaemia in pregnancy is a serious public health concern in our community as well, it is common for women to go through pregnancy without antenatal care by trained personnel and then present in labour with anaemia of varying grades. Many factors contribute to anaemia in pregnancy such as low socio-economic status, malaria endemicity, helminths infestation, HIV infection, a significant prevalence of the sickle cell gene, the normal haematologic changes in pregnancy amongst others. Anaemia in pregnancy carries a risk for anaemic heart failure, intrauterine growth restriction, preterm labour, puerperal sepsis, uterine sub-involution and lactation failure [8].

In our study, 70.3% of the women evaluated presented in labour with anaemia of varying grades. This is slightly higher than the prevalence of anaemia at the initiation of antenatal care earlier reported in our centre (69.6%) [5], we presume that this may be due to the inclusion of unbook mothers who came to deliver in our centre during this study, they made up to 12.6% of the participants here. Unbooked mothers have an increased risk of adverse foeto-maternal outcomes.

In our study, the adverse outcomes assessed were anaemia and PPH in these unbooked mothers; a statistically significantly higher proportion of them presented in labour with severe anaemia (χ^2 =14.3; p=0.001) and also developed PPH (χ^2 =13.9; p<0.001). It has been reported severally that anaemia increased the risk of PPH [9], and this is largely due to the effect of anaemia on the myometrium causing uterine atony because of reduced oxygen transportation to the myometrium, causing enzymes and cellular dysfunction [10, 11]. A study in Assam India showed that women with severe anaemia had higher odds of developing PPH, small for age neonates and perinatal death [12]. Kaima Frass showed the link between anaemia, uterine atony and PPH in anaemic women who had Caesarean Section; in his study, 39.6% (32/53) of women with severe anaemia had an emergency hysterectomy for uterine atony [13].

We found in this study that the adjusted regression analysis revealed that for every unit increase in PCV of study participants, there was a 16% decrease in the probability of occurrence of post-partum haemorrhage and this probability was statistically significant (p<0.001). Also, there was a statistically significant association between booking status and post-partum haemorrhage p= 0.04; such that un-booked women were 2.3 times more likely to experience PPH than booked women. There is need for a proactive management of anaemia in pregnancy, the PCV should be checked early in the third trimester and interventions to prevent anaemia in labour be taken. There is need to review the content of antenatal clinic health talks so that women learn the importance of preventing anaemia before delivery.

Conclusion

Anaemia in late pregnancy is quite common in our community as 70.3% of the women presented with varying degrees of anaemia in labour. Although antenatal services are provided in the hospital and other facilities, the strategies for preventing anaemia need to be strengthened. Booking status was found to be a predictor of PPH such that un-booked women were 2.3 times more likely to experience PPH than booked women in the study population. Every unit increase in the packed cell volume of these pregnant women could reduce the risk of having postpartum haemorrhage by 16% which is one commonest causes of maternal mortality in developing countries such as ours. This stresses the need to actively prevent anaemia in pregnancy.

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