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Associating Decrease in Platelet Count with Gestational Attendees in Rivers State University Teaching Hospital, Port Harcourt Antenatal Clinic

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Maintenance of hemostasis is enabled by the presence of nonnucleated blood cell type known as platelets, produced by the cellular fragments of megakaryocytes. Platelet count below <150,000×10^3/mm^3 can pave way for the occurrence of thrombocytopenia. Occurrence of thrombocytopenia in pregnancy is one of the commonest abnormalities encountered, though benign in nature, resolves after birth. It is important to investigate for thrombocytopaenia due to the need for good haemostasis during pregnancy and the risk of neonatal hemorrhage. This study aimed at associating decrease in platelet count with gestational attendees in Rivers State University Teaching Hospital, Port Harcourt antenatal clinic. A total of 120 apparently healthy pregnant women were coopted into the study. Whole blood samples were drawn into EDTA anticoagulant bottles for analysis of platelet count using a Sysmex autoanalyser. Data was analysed using graph pad prism version 6.0. Revelations from the study showed the prevalence of thrombocytopaenia in pregnancy as 3.33%, the mean platelet count was (218.1±63.94). Mean platelet count did not differ in groups based on gestational age (first trimester - 202.6±63.08, second trimester - 221.8±60.54, third trimester - 226.3±69.36, P=0.2784) and maternal age (<21=204.5±34.65, 21-30=211.3±60.59, 31-40=219.2±62.12, >40=304.0±128.2, P=0.1083). Mean platelet count based on parity showed significant increase between the second and the third group (0-1=221.4±71.78, 2-3=203.0±49.45, 4 and above=269.7±33.80, P=0.0128). It is important that pregnant women be examined for platelet count in early stage of pregnancy to avoid maternal and fetal consequences.

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Keywords: Platelet count; gestational attendees and thrombocytopaenia.

1. INTRODUCTION

Platelet count of less than 150 × 10^9/L gradually leads to thrombocytopenia and it succeeds anemia as the most common hematologic abnormality seen in pregnancy [1]. Platelet count is usually 10% lower in normal pregnancy as compared to non – pregnant state. However, as the gestational age increases, platelet count drops further. Inspite of this, most women will still have platelets within the normal level. Most cases of thrombocytopenia in pregnancy have shown as moderate and has no link with important morbidity of mother and/or neonate [2].

Most women are asymptomatic however, show no platelet related issues during their antenatal care. Some women develop issues with bruising or small red marks on the skin (these are known as purpura or petechiae) [2]. Rarely some women may experience bleeding such as nosebleeds [1].

Mother and fetus may need crucial clinical attention during delivery, worries about fetal thrombocytopenia may arise [3].

The total occurrence of thrombocytopenia in pregnancy is 8%, but when patients with obstetric or medical conditions are excluded, the occurrence lowers to 5.1% [4]. The commonest cause is gestational thrombocytopenia, which makes for almost three fourth of all cases. Hypertensive disorders accounts for 21% [5] Thrombocytopenia is seen more in patients with eclampsia (30%) than in patients with both moderate and serious forms of pre-eclampsia (15%–18%), of the patients who have serious preeclampsia, 4% to 12% will manifest criteria for HELLP syndrome (Hemolysis, elevated liver enzymes, and low platelet counts) [1].

2. MATERIALS AND METHODS

2.1 Experimental Design

This is a cross sectional study which associates decrease in platelet count with gestational attendees, carried out specifically so as to ascertain if gestational age, parity and maternal age affect platelet count during pregnancy.

2.2 Study Area and Study Population

The study was carried out in Rivers state university teaching hospital, Port Harcourt, Nigeria.The study population comprised of 120 apparently healthy pregnant women irrespective of their age, parity gestational age attending antenatal clinic at Rivers State university teaching hospital.

2.3 Eligibility Criteria

Only apparently healthy pregnant women were recruited as test subjects.

2.4 Sample Collection/analysis

Venous blood sample was collected by standard venipuncture directly into a vacutainer from each subject, out of which 4 ml of blood was placed in a glass bottle containing 1.2g/dl dipotassium-ethylene diamine-tetraacetate. The sample was analyzed for platelet count using sysmex XP automatic blood analyzer.

2.5 Principle

The instrument performs blood cell count by direct current (DC) detection method, red blood cells are lysed using a chemical agent called stromatolyzer, blood sample is aspirated (to a fixed predetermined volume using the transducer) and a stream of cells in suspension is passed through a small aperture across which an electric current is applied, which cause the deflection of electrodes.

Platelets are counted based on their size in a single file. Each cell that passes alters the electrical impedance and thus is counted. The degree of change is directly proportional to the size of the cell.

2.6 Data Analysis

Graph pad prism version 6.0 was used to analyze for descriptive statistics (mean and standard deviation) and ANOVA. Comparison between each group using the Tukey's multiple comparison tests. P value < 0.05 were considered statistically significant.

3. RESULTS

3.1 Demographic Detail of Participants

A total number of 120 pregnant subjects were enrolled into the study from the antenatal clinic of the rivers state university teaching hospital, Port

Harcourt, for the analysis of platelet count. Subjects distribution based on their age group were as follows: 4(6.5%), 45 (37.5%), 70 (58.3%), 3 (2.5%), for less than 20 years, 21-30 years, 31-40 years and 41 years and above respectively. Distribution of subjects based on gestational age were as follows; 31(35.5%), 55(45.9%) and 34(28.3%) for first, second and third trimester respectively. Distribution of subjects based on number of pregnancies was as follows: 66(55.0%), 45(37.5%), 9(7.5%) for 0-1 pregnancies, 2-3 pregnancies and 4 and above pregnancies respectively.

2: Mean± SD of Platelet in pregnant Women

A total number of 120 test subjects were screened for platelet count. The mean ±SD of the platelet count was obtained and shown in Table 2.

Effect of gestational age on platelet count in pregnant women. The pregnant subjects were grouped onto 3 (first trimester, second trimester and third trimester) based on gestational age, analysis of variance was used to determine their statistically significant difference $(P < 0.05)$.

There was no statistically significant difference $(P = 0.2784)$ based on gestational age. There was also no statistical significance in between the various group using Turkey's multiple comparison test as shown in Table 3.

Effect of maternal age on platelet count in pregnant women. The pregnant subjects were grouped into 4 based on maternal age, analysis of variance (ANOVA) was used to determine their statistically significant difference $(P < 0.05)$, there was no statistically significant difference $(P > 0.05)$ based on maternal age groups, there was also no statistically significant difference in between the various groups using Turkey's multiple comparison test as shown in Table 4.

Table 1. Demographic detail of participants

Subjects		Frequency (%)
Age group	< 20	2 (1.7)
	21-30	45 (37.5)
	31-40	70 (58.3)
	> 41	3 (2.5)
	Total	**120 (100)**
Gestational age	1st Trimester	31 (25.8)
	2nd Trimester	55 (45.9)
	3rd Trimester	34 (28.3)
	Total	**120 (100)**
Parity	0-1	66 (55.0)
	2-3	45 (37.5)
	4 and above	9 (7.5)
	Total	**120 (100)**

Table 2. Mean± SD of platelet in pregnant women

Subject (n)	Platelet count ($\times 10^9$/L)
120	218.1 ± 63.94

Table 3. Effect of gestational age on platelet count in pregnant women

Parameters (Months)	Platelet count ($\times 10^9$/L)
First trimester (A)	202.6 ± 63.08
Second trimester (B)	221.8 ± 60.54
Third trimester (C)	226.3 ± 69.36
F value	1.293
P-value	0.2784
TMC	All = NS

Key: TMC- turkey's multiple comparison, NS- Non significant

Table 4. Effect of maternal age on platelet count in pregnant women

Parameters (Yrs)	Platelet count (×10^9/L)
<21 (A)	204.5 ± 34.65
21-30 (B)	211.3 ± 60.59
31-40 (C)	219.2 ± 62.12
>40 (D)	304.0 ± 128.2
F value	2.068
P-value	0.1083
TMC	All-NS

Key: TMC- turkey's multiple comparison, NS- non significant

Table 5. Effect of parity on platelet count in pregnant women

Parameters	Platelet count (×10^9/L)
0-1 (A)	221.4 ± 71.78
2-3 (B)	203.0 ± 49.45
4 and above (C)	269.7 ± 33.80
F value	4.522
P-value	0.0128
TMC	A-B = NS
	A-C = NS
	B-C = S

Key: TMC- turkey's multiple comparison, NS- non significant, S- significant

Effect of parity on platelet count in pregnant women. The pregnant subject were grouped into 3 (0-1, 2-3, 4 and above) according to the number of parity, analysis of variance (ANOVA) was used to determine their statistical significance ($P < 0.05$), The difference in mean platelet count based on parity was statistically significant (P= 0.0128). There was no statistical significance between platelet counts of subjects with parity of 0-1 and those with parity of 2-3, there was also no statistically significant difference between mean platelet count of subjects with parity of 0-1 and those with parity of 4 and above but the difference in mean platelet count between subjects with parity of 2-3 and parity of 4 and above was statistically significant using the turkey's multiple comparison test as shown in Table 5.

4. DISCUSSION

The relationship between thrombocytopaenia and pregnancy outcomes for both mother and fetus has made normal platelet count very serious during pregnancy [4]. The occurrence of thrombocytopenia in pregnancy is 3.3% as shown in this study. This is lower than that of Ajibola et al. [6] in Lagos state, Nigeria who noted that the occurrence is 13.5% in a work showing 274 pregnant women. In another development, Osaro et al. [7] had same number of study subjects as ours found an occurrence of 6.7%, which was somewhat higher than ours. Reasons may be due to seasonal and genetic variations in platelet counts. Seasonal disparities in platelet counts have been shown with reduced platelet counts seen in spring and summer, on the contrary somewhat raised platelet counts have been seen in autumn and winter. [8,9]. Obviously, the period within which our study took place is a low thrombocytopenia season (summer and autumn).

Moreso, this study shows that the pregnant women had a fairly normal platelet count on the average with a mean value of $218 \times 10^9/L$, The findings however is similar to that of Boehlen et al. [10] who recorded a mean platelet count of $213 \times 10^9/L$.

From the result of this study, comparison of mean platelet count during normal pregnancy reveals a non-significant increase from 202.6±63.08 in the first trimester, 221-8±60.54 in the second trimester to 226.3±69.36 in the third trimester, this result is in contrast to studies conducted by Ajibola *et al.* [6] where they found a reduction in platelet count as gestation progressed. However, a study by Harrison et al. [11] showed that gestational age does not affect platelet count in pregnancy.

The finding from this study could not associate level of platelet with maternal age. Platelet count

in relation to maternal age showed no statistical significant ($P>0.05$). This is in line with Imoru and Buseri [12] who conducted a study on 150 pregnant women attending antenatal clinic in Aminu Kano Teaching Hospital (AKTH).

The study shows that parity has significant effect on platelet count during pregnancy ($P< 0.05$) , This is in contrast to the report by Imoru and Buseri [12]. Also, comparison between pregnant women with parity 0 to 1 and those with parity of 2 to 3 showed no statistical significance. There was also no significant difference between pregnant women with parity of 0 to 1 and those with parity of 4 and above. However, the difference in mean platelet count between pregnant women with parity of 2 to 3 and those with parity of 4 and above was statistically significant.

5. CONCLUSION

Conclusively, it has been established in the study that in pregnancy, the occurrence of thrombocytopaenia is low and gestational age, maternal age and parity are not associated with thromboctopaenia in pregnancy. Moreso, underlying disorder such as Hemolysis, elevated liver enzymes, and low platelet counts, eclampsia, and hypertensive disorder has been identified as the cause of low platelet count in pregnancy. Routine screening for thrombocytopaenia to guarantee early detection and treatment for the maintenance of normal haemostasis during pregnancy to prevent maternal or neonatal issues.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

ETHICAL APPROVAL AND CONSENT

Verbal informed consent was obtained from all the subjects recruited for the study upon clearance by the department of medical laboratory science, rivers state university, port Harcourt

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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