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Research Paper

Impact of Platelet Indices on the Severity of Preeclampsia in University Of Ilorin Teaching Hospital Ilorin, Nigeria

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ABSTRACT:
Background: *Preeclampsia ranks high among the major causes of maternal and perinatal morbidity and mortality especially in low-resource income countries. The evaluation of platelet indices abnormalities which are among the biochemical characteristics of preeclampsia and its severity is minimally investigated in many developing countries including Nigeria.*
Objectives: *To determine the impact of platelet indices on the severity of preeclampsia in University of Ilorin Teaching Hospital, Ilorin.*
Study design: *A prospective case-control study of consented subjects who were pregnant women at gestational age of 28 weeks and above diagnosed with preeclampsia who met the study criteria and controls who were consented healthy normotensive pregnant women at the same gestational age who also met the study criteria. Subjects and controls were matched for social status, gestational age and gravidity.*
Methodology: *A total of 140 parturient comprising 70 each from subjects and controls who satisfied the inclusion criteria were recruited for the study by purposive sampling. Subjects and controls were matched for gestational age, gravidity and social status. Social and medical histories of each parturient as well as the blood pressure and platelet indices samples were obtained. The results were analysed using SPSS version 21.0 with appropriate tables and figures generated.*
Results: *The mean platelet count declined with severity of preeclampsia, while MPV, PDW and PLCR elevated as disease severity increased. The differences in the platelet indices between mild and severe preeclampsia were statistically significant as shown below. The mean platelet count (181.68 ± 44.42 x 10^3/µL vs 143.46 ± 29.09 x 10^3/µL, p<0.001), MPV (11.24 ± 0.92fl vs 12.19 ± 0.97fl, p<0.001), PDW (14.99 ± 2.22fl vs 15.78 ± 2.29fl, p<0.001) and PLCR (39.27 ± 7.90% vs 40.19 ± 7.72%, p<0.001).*
Conclusion: *The severity of preeclampsia worsens with increase platelet indices abnormalities.*
Recommendation: *Platelet indices should be routinely assessed in the management of preeclampsia to evaluate the severity and outcome of the disease.*
KEYWORDS: *Platelet indices, Severity, Preeclampsia, Impact.*

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I. INTRODUCTION:

Elevated blood pressure issues in pregnancy affect about 5 – 8% of all pregnancies and are of serious concern due to their negative impact on both the mother and her baby.[1] Hypertensive disorders of pregnancy are among the leading causes of maternal and perinatal morbidity and mortality, particularly in developing countries and also result in 14% of maternal deaths worldwide.[2-4] Diagnosis of hypertensive disorders of pregnancy is made with the maternal blood pressure elevation of ≥ 140mmHg systolic or ≥ 90mmHg diastolic in pregnancy on two or more occasions, about four hours apart, in a woman who has been previously normotensive and in whom blood pressures may return to normal within twelve weeks of delivery or continue after twelve weeks postpartum.[5]

Hypertensive disorders of pregnancy are classified by the International Society for the Study of Hypertension (ISSHP) as chronic hypertension, gestational hypertension, preeclampsia and White-coat hypertension.[6] In Chronic hypertension, elevated blood pressure starts before the pregnancy or observed in the first half of pregnancy and persists more than 12 weeks postpartum. Gestational hypertension is characterized by de novo hypertension after 20 weeks gestation in the absence of proteinuria. Preeclampsia is diagnosed when there is hypertension after 20 weeks gestation with proteinuria which is spot urine protein/creatinine >30 mg/mmol (0.3mg/mg) or >300mg/day or at least 1 g/L (2+) on dipstick testing and disappearance of these symptoms within 6 - 12 weeks postpartum.[6] This may be mild or severe. Chronic hypertension can be superimposed with preeclampsia. Preeclampsia without intervention can progress to eclampsia, which is the occurrence of epileptiform convulsion unrelated to other cerebral conditions with signs and symptoms of preeclampsia.[7-9] There may be development of disseminated intravascular coagulation, acute renal failure, stroke (ischaemia, due to vasospasm and microthrombosis or even haemorrhage due to severe thrombocytopenia), acute pulmonary oedema, cerebral oedema. Other complications are placental abruption, liver haemorrhage/rupture, development of Haemolysis, Elevated liver enzymes, Low platelet count (HELLP) syndrome, transformation to chronic hypertension, or even maternal mortality.[5,10] The fetal affectation seems to be due to placental insufficiency and may include: pregnancy loss, fetal death in-utero, intrauterine growth restriction, premature labour.[10,11]

The most common hypertensive disorder of pregnancy is preeclampsia.[12] Early recognition and good antenatal care can prevent the morbidity and mortality linked to preeclampsia.[13,14] For adequate intervention and prevention of further complications of preeclampsia, an early assessment of its progress and severity should be known but this is difficult as its pathophysiology is not clear defined.[15,16]

Several studies have been conducted in the past to develop a reliable test to predict preeclampsia.[13] Lately, many biochemical markers have been described such as angiogenic/anti-angiogenic factors, placental proteins, etc. for predicting preeclampsia. However, their role in the low-income countries is in doubt due to the cost implications of these tests.[13] Tremendous changes in the coagulation and fibrinolytic system occurs during normal pregnancy causing a hypercoagulable state.[6,13] Of all the haematological changes that occur in preeclampsia, low platelet count is the most commonly seen occuring in 11% to 29% of patients.[7,14,17-19] HELLP syndrome and disseminated intravascular coagulation (DIC) are known complications and are both related to change in platelet counts and may be deadly. Some vasoactive factors released by the platelets could play a role in the pathogenesis of preeclampsia. Significant abnormality in platelet indices such as platelet count, mean platelet volume (MPV), platelet distribution width (PDW) and platelet large cell ratio (PLCR) may be suggestive of the disease and its severe form.

It is of clinical importance to conduct studies on the impact of platelet indices on the severity of preeclampsia in Ilorin. The researches available in Nigeria are only on platelet counts in preeclampsia and do not include an evaluation of other platelet indices and their impact on the disease severity.[10] Thus, this study aims to improve obstetric outcome which is a step towards achieving safe motherhood.

II. METHODOLOGY

Study Area: The study was carried out in the Department of Obstetrics and Gynaecology, University of Ilorin Teaching Hospital, Ilorin, Kwara State, Nigeria which is located at Oke-Oyi, Old Jebba Road in Ilorin. It predominantly plays the role of a teaching hospital but equally offers primary and secondary health services. It serves as a major referral centre for Kwara State and parts of the nearby states of Oyo, Osun, Ekiti, Kogi and Niger states. The hospital is approved for and undertakes undergraduate and postgraduate medical training. It is a training centre for Nursing, Post Basic Nursing in Midwifery, Accident and Emergency as well as Paediatric Nursing, Community Health Officers and Health Information Management System. The hospital has facilities for the major clinical departments i.e. Obstetrics and Gynaecology, Paediatrics, Surgery, Internal Medicine and clinical laboratories. Obstetric services are delivered by four firms; each firm consists of consultants, resident doctors and house officers.

Study Population: The study population were pregnant women at 28 week gestational age and above, with preeclampsia and equal number of healthy normotensive pregnant women at 28 week gestational age and above, attending antenatal clinics or presenting in labour ward at the University of Ilorin Teaching Hospital, Ilorin.
Inclusion Criteria: Subjects must be consented preeclamptic women at gestational age of 28 weeks and above while controls must be healthy normotensive pregnant women at gestational age of 28 weeks and above.
Study Design: The study was a prospective case control study. Consented women diagnosed with preeclampsia at the routine antenatal clinic and those admitted into the obstetrics emergency ward of the University of Ilorin Teaching Hospital were selected. Subjects who met the criteria for the study were informed and counseled about the study. Controls were consented healthy normotensive pregnant women without any sign or history of hypertensive disorders of pregnancy. Subjects and controls were recruited consecutively till the sample size was completed. Each control was recruited as soon as possible after a case is enrolled to avoid any temporal bias, matching for gestational age and gravidity.
Study Tool: The study tool was study proforma.
Sample Size: The sample size was 140 comprising equal number of 70 participants each from consented women diagnosed with preeclampsia at 28 weeks gestational age and above as subjects and consented healthy normotensive pregnant women at 28 weeks gestational age and above as controls. It was determined by a previously validated formula for case-control study[20].
Sampling Technique: The sampling technique was by purposive sampling and consenting participants that met the inclusion criteria were recruited. Subjects and controls were recruited consecutively till the sample size was completed.

Recruitment of subjects and controls: The recruitment of patients were at the antenatal clinic and the obstetrics emergency ward where women with preeclampsia are admitted for inpatient care, while that of controls were at the antenatal clinic. Eligible women who satisfied the inclusion criteria were informed and counseled about the study in a language they understood and informed consents were obtained. A study proforma was administered. Information obtained were sociodemographic status, gestational age, history of presenting complaints, obstetric history, personal, medical and family histories including the history of bleeding disorders, hypertension, diabetes mellitus, pregnancy induced hypertension, genotype and other related history. General physical examinations were done to obtain height, weight, vital signs and exclude anaemia, cyanosis, jaundice, oedema. Recruitments were done by the researcher with assistance from the research assistants. The research assistants were four junior residents (one from each firm) who were trained about the study protocol (such as the contents of the proforma, consent form and also sample collection) daily for one week before commencement of the study.

Blood pressure measurement and Urinalysis: Blood pressure was measured with patient in comfortable sitting or supine position with the arm outstretched and supported at approximately same level as the heart, using Accoson mercury sphygmomanometer. The cuff length was at least 80% of the circumference of the upper arm and the lower edge one inch above the cubital fossa when wrapped around the arm. A second reading was taken after 4-6 hours. They were classified as mild if readings are ≥140/90mmHg or severe if ≥160/110mmHg.
Urinalysis was done using dipstick measurement with Combi 2 urinalysis strips and it was read as negative, trace, 1+ (30mg/dl), 2+ (100mg/dl), 3+ (300-1999mg/dl) and 4+ (>2g). A clean catch or catheter sample was used for the tests.
Blood Sample Collection: After application of tourniquet and taking all aseptic precautions, 3ml of venous blood was collected by venepuncture from the median antecubital vein of all participants using 22 Gauge size needle and 5ml disposable syringe. It was deposited into a sample bottle containing ethylene diamine tetraacetate (EDTA) and thorough mixing done to prevent clot formation. Sample was analyzed with an automated cell counter using Sysmex KX21, an autoanalyzer.
Patients Follow Up: Patients were followed up till delivery. The preeclampsia group was categorized as mild or severe based on their blood pressures on admission, urinalysis and clinical features.
Data Analysis: The data was analyzed using the Statistical Package for Social Sciences Software (SPSS) version 21.0 Chicago, Illinois, USA. The data was presented in frequency tables and chart. Chi-square analysis was used to test relationships between categorical variables while continuous variables were analyzed with Independent Samples T test and Analysis of Variance (ANOVA). Spearman correlation was used to determine the platelet indices and severity of preeclampsia while Receiver Operating Curve (ROC) was used to determine the association criterion of the platelet indices in differentiating severity of preeclampsia as well as in predicting pregnancy outcomes. Probability (p) values less than 0.05 was accepted as statistically significant.
Ethical Consideration: An institutional approval for this study has been obtained from the Ethical Review Committee of University of Ilorin Teaching Hospital, Ilorin. Informed written consent was obtained from each participant after adequate counselling and the data obtained from the study were treated with confidentiality and used solely for the purpose of the study.

Study Limitations:

1. The study only described findings and outcomes in selected cases of preeclampsia at 28 weeks and above with exclusion of other hypertensive disorders in pregnancy.
2. Larger sample size would be more representative of what is obtainable in this environment.
3. The study was done in a single center thus was limited in terms of participants' heterogeneity.
4. Samples were taken at point of diagnosis of preeclampsia; serial samples would have allowed detection of a possible trend and changes in platelet indices in preeclampsia and normal pregnancy.

III. RESULTS:

The study was carried out from July 2017 to March 2018 which was a period of 9 months. Sample size was 140 comprising 70 participants in each group of the study.

Table 1 showed the socio-demographic variables, gravidity, booking status and blood pressure measurements of the study participants.

Maternal age: The participants in the preeclamptic group were within the age range of 22–40years (mean age of 28.16years ± 4.62), while the normotensive participants were 22 – 43 years (29.59years ± 4.92) which was not statistically significant (p= 0.078). The highest percentage of participants were in the age group of 25-29years 47(33.6%) while the least number of participants were greater than 40years 5(3.6%) in both groups.

Marital status: Majority of the participants, 95% (133) were married, of these, 63(90%) were in the preeclamptic group and 70(100%) in normotensive group while 5% of the participants were single.

Educational status: Eighty nine participants (63.6%), had tertiary level of education, 33(47.1%) in the preeclamptic group and 56(80%) in the normotensive group. Eight participants (5.7%) had no formal education, 7(10%) in the preeclamptic group and 1(1.4%) in the normotensive group and this was statistically significant (p= 0.002)

Employment status: Twenty-four (34.3%) women were unemployed in the preeclamptic group while 21(30.0%) were unemployed in the normotensive group. Also, 40 (57.1%) and 22 (31.4%) participants were self-employed in the preeclamptic and normotensive group respectively. Employed participants in the preeclamptic and normotensive group were 6 (8.6%) and 27 (38.6%) respectively.

Religion: Most of the participants 111(79.3%) were Muslims; 55(78.6%) in the preeclamptic group and 56(79.3%) in the normotensive group. Fifteen (21.4%) women in the preeclamptic group and 14(20%) in the normotensive group were Christians. There was no statistically significant difference (p= 0.835) in the distribution of participants by their religion among the two groups.

Ethnicity: Majority of the participants in both study groups were of Yoruba ethnicity; 53 (75.7%) of these from the preeclamptic and 59(84.3%) from the normotensive group.

Gravidity: Majority of the participants in both arms of the study were multigravida, 80(57.1%). There were 19(27.1%) and 15(21.4%) primigravida in the preeclamptic and normotensive groups respectively and the difference was not significant (p= 0.714).

Booking: Most of the women 59 (84.3%) in the normotensive group booked antenatal at the study centre while only 21(30%) preeclamptics booked at the place of study and it was statistically significant (p<0.001).

Blood Pressure: The mean systolic blood pressure in the preeclamptic group was 174.14 ± 23.23mmHg, while that of the normotensive group was 115.29 ± 19.13mmHg; (p= <0.001). The mean diastolic blood pressure in the preelamptic group was 113.00 ± 14.66mmHg and that of the normotensive group was 74.71 ± 11.44mmHg and the difference was statistically significant (p= <0.001).

There were more cases of severe preeclampsia than mild preeclampsia, 48 (68.6%) and 22(31.4%) respectively.

Table 2 showed the Platelet Count, MPV, PDW and PLCR in preeclamptics and normotensive pregnant women.

There were statistically significant differences in all the platelet indices between the preeclamptic and normotensive pregnant women. Apact from the main platelet count that was lower in the preeclamptic group all other indices were higher in the women with preeclampsia than those without the disease. Mean platelet count (155.47 ± 38.68 x 10^3/µL vs. 232.51 ± 53.79 x 10^3/µL; p<0.001), MPV (11.88 ± 1.05fl vs. 10.77 ± 1.22fl; p<0.001), PDW (15.53 ± 2.28fl vs. 13.94 ± 2.25fl; p<0.001) and the PLCR (39.89 ± 7.73% vs. 31.81 ± 7.97%; p<0.001).

Table 3 showed the comparison of platelet indices in normotensive women and severity of disease in preeclamptics.

This table described the platelet indices of normotensive women and those with mild and severe preeclampsia. It was found that platelet count declined with severity of preeclampsia, while MPV, PDW and PLCR elevated as disease severity increased. The differences in the platelet indices in the three groups were statistically significant. The mean platelet count declined across normotensive, mild, and severe preeclamptic groups respectively as follows; 232.51 ± 53.79 x 10^3/µL, 181.68 ± 44.42 x 10^3/µL and 143.46 ± 29.09 x 10^3/µL. The mean MPV increased from the normotensive category, through mild preeclampsia and severe preeclampsia; 10.77 ± 1.22fl,

11.24 ± 0.92fl and 12.19 ± 0.97fl respectively. The mean PDW was 13.94 ± 2.25fl, 14.99 ± 2.22fl and 15.78 ± 2.29fl for the normotensive, mild preeclampsia and severe preeclampsia respectively. While the PLCR was 31.81 ± 7.97%, 39.27 ± 7.90% and 40.19 ± 7.72% for the normotensive, mild preeclampsia and severe preeclampsia respectively. The differences were significant for all the indices ($p<0.001$).

Table 1: Socio-Demographic Variables, Booking Status Gravidity and Blood Pressure Measurements of Study Participants

Variable	Group		Total	χ^2/t	*p* value
	Preeclamptic n = 70 (%)	Normotensive n = 70 (%)			
Age group (years)					
< 25	18 (25.7)	10 (14.3)	28 (20.0)	5.467	0.243
25 – 29	26 (37.1)	21 (30.0)	47 (33.6)		
30 – 34	16 (22.9)	25 (35.7)	41 (29.3)		
35 – 39	8 (11.4)	11 (15.7)	19 (13.6)		
≥ 40	2 (2.9)	3 (4.3)	5 (3.6)		
Mean ± SD	28.16 ± 4.62	29.59 ± 4.92		-1.776[t]	0.078
Range	22 - 40	22 – 43			
Marital status					
Single	7 (10.0)	0 (0.0)	7 (5.0)	5.414[Y]	0.020*
Married	63 (90.0)	70 (100.0)	133 (95.0)		
Education					
None	7 (10.0)	1 (1.4)	8 (5.7)	15.403[Y]	0.002*
Primary	9 (12.9)	1 (1.4)	10 (7.1)		
Secondary	21 (30.0)	12 (17.1)	33 (23.6)		
Tertiary	33 (47.1)	56 (80.0)	89 (63.6)		
Employment status					
Unemployed	24 (34.3)	21 (30.0)	45 (32.1)	18.789	<0.001*
Self employed	40 (57.1)	22 (31.4)	62 (44.3)		
Employed	6 (8.6)	27 (38.6)	33 (23.6)		
Religion					
Christianity	15 (21.4)	14 (20.0)	29 (20.7)	0.043	0.835
Islam	55 (78.6)	56 (80.0)	111 (79.3)		
Ethnicity					
Yoruba	53 (75.7)	59 (84.3)	112 (80.0)	8.223[Y]	0.042*
Hausa	11 (15.7)	1 (1.4)	12 (8.6)		
Igbo	2 (2.9)	6 (8.6)	8 (5.7)		
Others	4 (5.7)	4 (5.7)	8 (5.7)		
Gravidity					
1	19 (27.1)	15 (21.4)	34 (24.3)	0.674	0.714
2 – 4	39 (55.7)	41 (58.6)	80 (57.1)		
> 4	12 (17.1)	14 (20.0)	26 (18.6)		
Booking status					
Booked	21 (30.0)	59 (84.3)	80 (57.1)	42.117	<0.001*
Unbooked	49 (70.0)	11 (15.7)	60 (42.9)		
Blood Pressure					
SBP(mmHg)	174.14 ± 23.23	115.29 ± 19.13		16.289	<0.001*
DBP(mmHg)	113.00 ± 14.66	74.71 ± 11.44		17.156	<0.001*
MAP(mmHg)	170.99 ± 20.02	113.10 ± 16.80		18.450	<0.001*

χ^2: Chi square test, [Y]: Yates corrected, t: Independent samples T test, *: *p* value < 0.05 (statistically significant) SBP: Systolic blood pressure, DBP: Diastolic blood pressure, MAP: Mean arterial pressure

Table 2: Platelet Count, MPV, PDW and PLCR in Preeclamptics and Normotensive Pregnant Women

Variable	Preeclamptic	Normotensive	T	*p* value
Platelet Count (x 10^3/µL)				
Mean ± SD	155.47 ± 38.68	232.51 ± 53.79	-9.603	<0.001*
Range	109 - 254	150 – 365		
MPV (fl)				
Mean ± SD	11.88 ± 1.05	10.77 ± 1.22	5.622	<0.001*
Range	9.5 – 13.7	8.1 – 12.6		
PDW (fl)				
Mean ± SD	15.53 ± 2.28	13.94 ± 2.25	4.003	<0.001*
Range	10.4 – 19.3	9.9 – 20.0		
PLCR (%)				
Mean ± SD	39.89 ± 7.73	31.81 ± 7.97	5.911	<0.001*
Range	20.9 – 52.3	14.2 – 46.7		

t: Independent samples T test, *: *p* value < 0.05 (statistically significant)

Table 3: Comparison of Platelet Indices in Normotensive Women and Severity of Disease in Preeclamptics

Variable	Normotensive	Mild Pre-eclampsia	Severe Pre-eclampsia	F	*p* value
Platelets Count (x 10^3/µL)					
Mean ± SD	232.51 ± 53.79	181.68 ± 44.42	143.46 ± 29.09	55.013	<0.001*
Range	150 – 365	109 – 254	109 – 248		
MPV (fl)					
Mean ± SD	10.77 ± 1.22	11.24 ± 0.92	12.19 ± 0.97	22.738	<0.001*
Range	8.1 – 12.6	9.5 – 13.7	9.5 – 13.7		
PDW (fl)					
Mean ± SD	13.94 ± 2.25	14.99 ± 2.22	15.78 ± 2.29	8.986	<0.001*
Range	9.9 – 20.0	10.4 – 19.2	10.4 – 19.3		
PLCR (%)					
Mean ± SD	31.81 ± 7.97	39.27 ± 7.90	40.19 ± 7.72	17.466	<0.001*
Range	14.2 – 46.7	22.4 – 52.3	20.9 – 52.3		

F: Analysis of Variance (ANOVA), *: *p* value < 0.05 (statistically significant)

IV. DISCUSSION

In this research, the platelet indices values were compared between normotensive pregnant women and preeclamptics. It was observed that platelet indices were significantly different in the preeclamptics as oppossed to the normotensive parturient. In addition to the above finding the platelet indices abnormalities were higher with increase severity of preeclampsia. The participants were 140 comprising 70 participants each in the preeclamptic and normotensive groups; and the platelet indices of all of them were analyzed. The preeclamptics had significantly lower mean platelet count than the normotensive while the MPV, PDW and PLCR were significantly higher in the preeclamptics than the normotensive.

The mean platelet count in the normotensive group was 232.51 ± 53.794 x 10^3/µL and it agreed with other studies in Nigeria and also lower than non-pregnant values by some studies.[10,21,22] In this same vein, the mean values of MPV and PDW were also in accordance with findings of other authors which were higher than values in non-pregnant women.[13,21,23] However, The PLCR of the normotensive group was found to be higher than findings in Egyptian and Indian studies respectively and consistent with elevation in pregnancy.[23,24] This could be explained by the bone marrow compensation for the rapid turnover of platelets; the release of younger and larger platelets which in turn increase MPV, PDW and PLCR, which are indices used to measure average platelet size.[25] The little difference in mean PLCR in this study and other reports could be explained by differences in sample size, number of controls and type of haematological autoanalyzer.[23,24] Hence, baseline values of platelet indices in our locality should be known to serve as reference values. The use of appropriate study designs that are multicentered with large sample sizes is also beneficial.

The mean platelet count of 155.47 ± 38.68 x 10^3/µL obtained in preeclamptic participants was significantly lower than the normotensive values. It agreed with findings of Onuigwe et al in Sokoto, Ammar et al in Egypt, Sultana et al in Bangladesh and Amita et al in India.[10,13,17,23] However, no significant difference was found in a study conducted in Turkey.[26] Increased production of thromboxane A_2 that induces supplementary platelet aggregation and endothelial damage, contributing to platelet dysfunction and promoting platelet consumption resulting in low platelet count, which is an important sign of preeclampsia could be responsible for the significant reduction in platelet count in preeclamptics .[27]

The study found the mean MPV for the preeclamptics to be 11.88 ± 1.05fl which was significantly higher than in the normotensive. This agreed with findings in similar studies.[23,26] Though, Studies by Amita et al and Ceyhan et al found increased MPV in preeclamptics, however, it was not statistically significant.[13,28] The differences could be due to the use of different sample sizes and study area compared to what was used in our study.

The mean PDW in the preeclamptics 15.53 ± 2.28fl was significantly higher than in the normotensive group, This was in agreement with a study by Ammar et al in Egypt, and other similar studies.[13,23,29,30] Platelet turnover which would support the fact that platelet survival time is decreased leading to increased destruction of platelets could be responsible for the increase in PDW.[13] The mean PLCR of 39.89 ± 7.73% found in this study was significantly lower than mean value of normotensive controls and was similar to study by Ammar et al in Egypt.[23]

Looking into the mean platelet count in normotensive women, mild preeclamptics and severe preeclampttics showed a significant inverse relationship between the count and degree of severity. This agreed with other similar studies.[14,23] The explanation can be made because the platelet numerical and functional anomalies worsen with the severity of the disease.[27]

The mean MPV in pregnant women with normal blood pressure and those with mild and severe preeclampsia showed increasing values from normotensive ones to severe preclamptics. The proportionate

increase with degree of severity was following the findings of Ammar et al in Egypt, but differ from reports of Amita et al likely due to the differences in gestational age at which the study was carried out, Amita et al used cases at earlier gestational age.[13,23] In the same vein, mean PDW and PLCR also increased with severity of disease. This was in keeping with findings from other studies.[13,23]

V. CONCLUSION:

The severity of preeclampsia worsens with increase platelet indices abnormalities.

VI. RECOMMENDATIONS

1. Researches should be conducted on serial platelet indices in pregnancy to achieve reference values in various trimesters.
2. Preeclamptics with abnormal platelet indices results should be closely followed up.
3. To establish the reference values in our locality multicenter studies in platelet indices in normotensive pregnancies and preeclamptics should be conducted.
4. To determine the prognostic values of each platelet indices it is essential to embark on follow up studies.

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