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HEMATOLOGICAL CHANGES IN PREGNANCY WITH COVID-19.

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ABSTRACT

COVID-19 is a new illness that affects the lungs and breathing. It is caused by a new coronavirus Symptoms include fever, cough, and trouble breathing. It also may cause stomach problems, such as nausea and diarrhea, and a loss of your sense of smell or taste. COVID-19 is systemic infection with a significant impact on hemopoetic system.Variation in some haematological indices during pregnancy with COVID-19 infection was investigated. The test group comprised 55 pregnant women with COVID-19 who presented themselves at the Mugda Medical College during the period from April 2020 to August2020. The result of the blood haemoglobin, PCV/Hct, MCH, MCHCshowed a significant decrease 11.15%, 0.32%, 1.16% among the test group, while WBC, RBC, platelets count was within range. The study concluded that pregnancy in women with COVID-19 has the tendency to alter haematological indices.

KEYWORDS: Hematological changes, Pregnancy, COVID-19.

INTRODUCTION

Normal pregnancy is characterized by profound changes in almost every organ and system to accommodate the demands of fetoplacental unit.[1] In normal pregnancy, the physiological change in haemoglobin concentration [HGB] and platelet count during pregnancy are well known phenomena.[2] It is also one of the physiological conditions capable of causing remarkable and dramatic changes in haematological variables. Corona virus has profound effects on hemopoetic system causing anemia, leucopenia, thrombocytopenia and immune suppression. So the virus has adverse effects on pregnancy induced anemia and immune suppression.[3] Pregnant women with covid infection suffers from anemic heart failure and coagulatory failure more badly than pregnancy without COVID infection.Coagulation disorders are frequently encountered among pregnant women with COVID infection, especially those with serious disease.[4] Pregnancy with co-morbidity are at risk of death from COVID-19. The CDC has found that pregnant women are more likely to be admitted to the intensive care unit and to be put on mechanical ventilators than non-pregnant women.

OBJECTIVE OF THE STUDY

The objective of the study is to evaluate the values of some major haematological indices among pregnant women with COVID-19 infection. Thus this study focuses on the variation in white blood cell (WBC) count, RBC, packed cell volume (PCV), Neutrophil, lymphocyte, and platelet in the pregnancy with COVID-19 infection.

Scope of the Study

The study was carried out on the pregnant women with COVID-19 infection. Ranges of haematological indices and cases of anaemia among pregnant women were detected. Thus results of the study may be used as reference values in the assessment of the health status of pregnant women with COVID-19 infection.

MATERIALS AND PROCEDURES

The present study adopted the observational method and analysis of the haematological indices in pregnant women. The test group comprised 55 pregnant women with COVID-19 infection who admitted at the Mugda Medical college Hospital for treatment of COVID-19 complications,management of pregnancy complications and delivery.

The researchers interacted and educated the participants about the aims and objectives of the research work, and then questionnaires were distributed to those who out of their will decided to freely participate in the research process. The numbered and labeled questionnaire was, however, filled and returned immediately.

The research questionnaire for the study was purposely designed to suit the study. It comprised two sections of demographic/personal variables and information relating to their pregnancy/medical history. Participants were free to tick any of the responses that suit their condition. Results obtained from the haematological screening and questionnaire were analyzed using descriptive statistics while paired -test assuming unequal variance was used to determine the level of significant difference between the mean values at using MS Excel and SPSS.

RESULTS
Socio Demographic Profile
This observational study took place in Mugda Medical College Hospital, among the patients who admitted for the treatment of treatment of COVID-19 complications, management of pregnancy complications and delivery.

Among the 55 patients most of the patients (40%) age range was 33-37 years. The mean age was 31.22 ± 5.134.The following table shows the details.

Table 1: Age distribution of the patients.

Age	Frequency	Percentage
18-22	4	7.3%
23-27	10	18.2%
28-32	14	25.5%
33-37	22	40.00%
38-42	5	9.00%
Total	55	100

Figure 1 show that among the 55 patients 38.20% of the patients belongs to low class followed by 32.70% and middle class 29.10%.
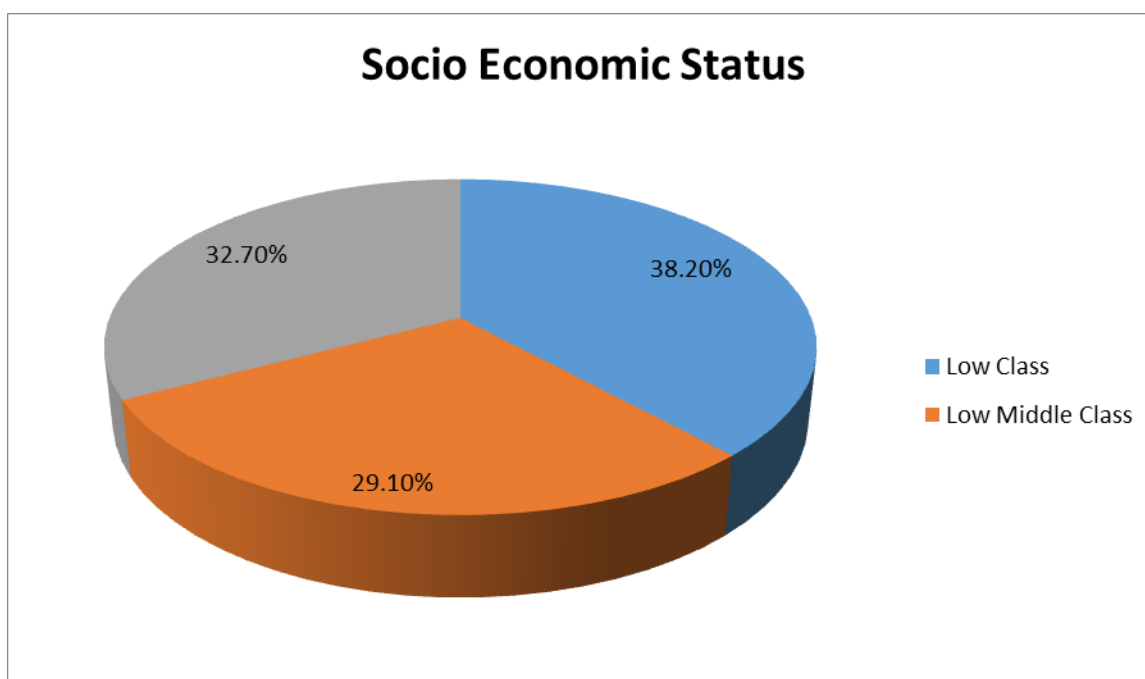

Figure 1: Socio economic status of the patients.

Obstetric History
Among the 55 participants whose blood samples were eventually accepted for haematological analysis most of the patients (45.46%) had their third trimester followed by second trimester 40.6%.

Table 2: Obstetric History.

Status	Number	Frequency
First trimester	08	14.54%
Second trimester	22	40.00%
Third trimester	25	45.46%s
Total	55	100

Personal History
It was observed from the data found in the questionnaire that, of all the 55 participants whose blood samples were eventually accepted for haematological analysis, none of the women had a history of smoking, Alcohol and Betelnut, while about 46 (38.3%) of the participants were having their first pregnancy. The mean height and weight was4.982 ±.3302 and 64.93± 5.692.

Table 2: Mean and SD of Height and Weight.

General Examination	Mean ± STD
Height	4.982 ±.3302
Weight	64.93± 5.692

Parameter Pregnant Women Hematological Referencerange
The result of the blood haemoglobin, PCV/Hct, MCH, MCHC showed a significant decrease 11.15% , 0.32%, 1.16% among the test group , while WBC, RBC, platelets count was within range. The following table Table 3 shows the detail.

Table 3: Pregnant women Hematological Indices.

Hematological indices	Mean ± STD	Reference Range	Δ
PCV (%)	31.007±2.5278	34.9–43.7%	11.15%(Decrease)
MCV	84.17 ± 6.36	80-100 fL	With in range
MCH	27.41 ± 2.341	27.5-33.2 pg	0.32% (Decrease)
MCHC(%)	33.01±2.170	33.4–35.5 %	1.16% (Decrease)
RWD-CV	14.655±1.80	12.2-16.1	With in range
WBC (Thousand)	10.00±1	4.5- 11	With in range
Lymphocytes (%)	21.02±6.601	15.7–46	With in range
Neutrophil (%)	73.19±7.762	45–74	With in range
Platelet (thousand)	202.177±48.75	150–450	With in range
Eosinophil(%)	1.46 ± 1.400	0.0-6.0	With in range
Basophil(%)	0.00	0.5-1.0	With in range

All results are presented as mean±SD values. Results followed by∗∗weresignificant at$P$<0.0

DISCUSSION
The aim of the present study was to evaluate the haematological changes/variation that occurs during pregnancy with COVID-19 infection. From the result presented in Table 4, it was discovered that there was a significant decrease(P<0.0) in the PCV of the test group (11.15%). This finding is in line with those of James et al.[5] The decrease in PCV may be due to increase in plasma volume during pregnancy which causes haemodilution, and increased rate of infection especially, hormonal changes, and conditions that promote fluid retention and iron deficiency.

The result of the blood MCH showed a significant difference (P<0.0) between the test (0.32%) g/dL and MCHC (1.16%) while lymphocytes, Neutrophil, and platelets showed no significant differences, although the white blood cell count (WBC) showed no significant difference, there was an increased level ; thus the observation of a no significant difference in the total WBC count is in variance with the studies of Osonuga et al.[6], who observed a significant variation in the total WBC count of test groups compared to control. The observation of the various significant variations between the lymphocytes, granulocytes, and platelets has also been observed in previous studies by Wahed et al.[7]

White blood cells are responsible for body defense during pregnancy, WBC was reported to be elevated in this study, and the lymphocyte and granulocyte count were significantly higher in the test group compared to those of the controls. This agrees with previous work by Luppi[8], who asserted that a total lymphocyte count rising in early pregnancy will remain elevated through pregnancy. This may be as a result of the body building the immunity of the fetus and it is achieved by a state of selective immune tolerance, immunosuppression, and immunomodulation in the presence of a strong antimicrobial immunity. There is also downregulation of potentially dangerous T-cell-mediated immune responses, while activating certain components of the innate immune system, such as neutrophils. This unique dysregulation between different components of the immune system plays a central role in the maternal adaptation to pregnancy.

CONCLUSION
It can be concluded that pregnancy in women with COVID-19 alters haematological indices such as PCV, MCH, MCHC and that during normal pregnancy.

General Comments
The quality of anhaematological parameter as used in this study refers to the stability of the sum of all the haematological parameters while the quantity of haematological parameter refers to the stability of an individual haematological parameter.We acknowledge the importance of the haemoglobin genotypes to this study; our study however did not put into consideration this factor.The Source of the haematological reference range used for this study is the automated haematological analyzer reference range as produced by Shenzhen Mindray Bio-Medical Electronics Co. Ltd., China, the manufacturers of the haematological analyzer used for our study.

Supplementary Materials
The research questionnaire for the study was purposely designed to suit the study. Attached to it is a letter of introduction of the study and a consent form which the study participants used in indicating their consent to participate in the study. The questionnaire comprised two sections of A and B which collected data on the participants' demographic/personal variables such as age, level of education and marital status. Section B collected information relating to their pregnancy/medical history which aided in the scrutiny of the study participants.

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