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Role Of Cbc Parameters And Crp Test In Assessment And Identification Of Mood Disorders

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ABSTRACT

Mood disorders, prevalent global health issues, often suffer from delayed or inaccurate diagnosis due to subjective assessments. Depression and bipolar disorder are the two most common mood disorders worldwide. The aim of this study was to investigate the potential role of CBC parameters and CRP test in the assessment and identification of mood disorders. This cross-sectional study was conducted in the Noble Clinical Lab, Baramati-413102 Maharashtra. It was found that percentage of female among cases group was 55.4% and in control group (healthy) this percentage was 51.8% in comparison to male counterpart. It was concluded that we found various inflammatory indicators associated with mood disorders. The levels of CRP independent risk factors.

Keywords: Complete blood cells, C- reactive Proteins, Mood disorders, Bipolar disorders

1. INTRODUCTION:

Mood disorders, prevalent global health issues, often suffer from delayed or inaccurate diagnosis due to subjective assessments. Recent research suggests a potential link between blood cell parameters and mood disorders, prompting this study's investigation. Focused on depression and bipolar disorder, the research employs a cross-sectional design, integrates machine learning, and considers diverse age groups. [1,2]

Mood disorders, prevalent global health issues, often suffer from delayed or inaccurate diagnoses due to subjective assessments. Recent research suggests a potential link between blood cell parameters and mood disorders, prompting this study's investigation.

Understanding the relationship between blood cells and mood disorders is essential for advancing diagnostic accuracy and treatment outcomes. Acknowledging ethical considerations and limitations, this study endeavours to advance understanding and management strategies for mood disorders. Mood disorders are defined as those disorders which affect the mental health of the patients. In such cases the patients experience extremely long periods of happiness, sadness or both. [3,4]

Depression and bipolar disorder are the two most common mood disorders worldwide. Depression could be due to pregnancy related effects, seasonal variations or due to psychosis or underlying medical conditions. Mood disorders could be caused by a large number of factors which include family history, trauma, physical illness and injuries to the brain. The detection of mood disorders is based on a large number of psychological tests. There are no specific biochemical tests that aim to target mood disorders. The human blood is a major fluid circulating in the body that provides nutrients, oxygen and removal of waste. [5,6]

Analysing the cells and their morphology during the various mood disorders could be of great importance. The aim of this study was to investigate the potential role of CBC parameters and CRP test in the assessment and identification of mood disorders.

Objectives:

1. To identify potential parameters within CBC associated with specific mood disorders.

2.To identify role of CRP test in mood disorders

2. MATERIALS AND METHODS

Study Design and Setting

This cross-sectional study was conducted in the Noble Clinical Lab, Baramati-413102 Maharashtra over one year.

Study Population

The study was done in Noble Clinical Lab, Baramati-413102 Maharashtra. Adults aged 18-65, encompassing individuals diagnosed with mood disorders (depression or bipolar disorder) and a control group without mood disorders.

Inclusion Criteria:

1 Participants aged between 18-65 years men or woman.

2. Participants meeting the DSM-5 (Diagnostic & statistical manual of mental disorders) criteria for mood disorders will be included.

The control group will comprise individuals without mood disorders.

Exclusion Criteria:

1.Individuals with known haematological disorders.

2.Medical conditions influencing blood cell parameters will be excluded.

Methodology

Clinical Interviews and Self-Report Measures:

Trained clinicians were conducted structured clinical interviews using standardized diagnostic tools to confirm mood disorder diagnoses and assess severity.

Blood Sample Collection and Laboratory Analysis:

Venous blood samples have been collected for comprehensive analysis, encompassing Complete Blood Count (CBC), inflammatory markers (e.g., CRP). Laboratory analyses adhered to standardized procedures, ensuring the reliability of blood cell parameter measurements. Blood samples were taken within the same time frame (6.00– 8.00 a.m.) among study groups.

Sample size calculation and analysis

$n=(1+r/r)^2* (Z_\alpha/2+Z_1-\beta)^2*(\sigma_1^2+ \sigma_2^2)/(\mu_2- \mu_1)^2$

$n= (1+1/1)^2* (1.96+0.84)^2*(11.84^2+ 8.83^2)/(52.16-40.58)^2$

n = 51.02 + 10% non-response = 51 + 5 = 56

n = 56 Samples / Group

Total Sample was 112 (Case Group: 56 & Control Group: 56)

Where,

$Z_\alpha/2$: Inverse probability of normal distribution at 95% confidence interval

$Z_1-\beta$: Inverse probability of normal distribution at 80% power of the test

σ1& σ2: Standard deviation of mental health parameter of both group

μ1& μ2: Mean of mental health parameter of both group

r: Sampling ratio

Data Analysis:

Data collected was analyzed in parts, proportions and percentage, graphical and tabulation used to representation of data. aerometric or non-parametric test were used T-test, z-test, Anova, technique for statistical analysis used to compare mean score. Pearson's correlation used to check the association between quantitative variables. Chi-square test used to check the dependency of one variable to other. Significance checks at 5% (If P-value < 0.05, It is considered as statistically significant. All statistical analysis has performed in SPSS and Microsoft excel software.

3. RESULTS

We studied total 112 study sample after considering inclusion and exclusion criteria. It was found that percentage of female among cases group was 55.4% and in control group (healthy) this percentage was 51.8% in comparison to male counterpart.

Table 1: Gender distribution of healthy cases and mood disorder patients

Gender	Case group		Control group	
	Frequency	Percent	Frequency	Percent
Female	31	55.4	29	51.8

Male	25	44.6	27	48.2

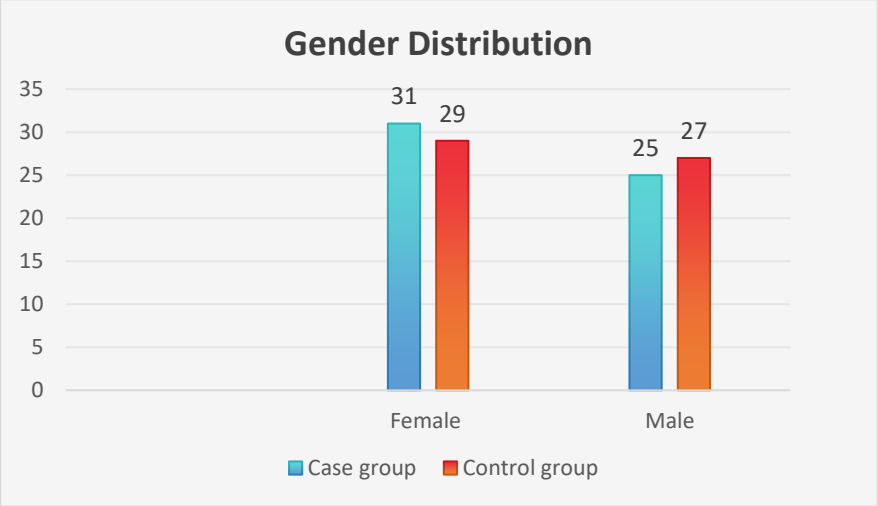

Figure 1: Gender distribution of healthy cases and mood disorder patients

In the present study on observing various possible factors, it was found that on comparison between mood disorder patients and healthy group, we discovered that WBC ($p < 0.0001$), NEU ($p < 0.0001$), RBC($p = 0.005$), CRP ($p = 0.010$), NLR ($p < 0.0001$), MLR

($p < 0.0001$), NHR ($p < 0.0001$), MHR ($p < 0.0001$), SII ($p = 0.004$), and SIRI ($p < 0.0001$) were involved in the risk of MD.

Table 2: Possible factors may be associated with healthy cases and mood disorder patients

Variables	Case group	Control group	P-value
Age (Mean +/- S.D.)	30+/-7.1	30+/-3.3	0.354
WBC (10^9 /L)	5.60(5.00–6.55)	6.50(5.30–8.20)	<0.0001
NEU (10^9 /L)	3.20(2.60–3.80)	3.80(2.80–5.13)	<0.0001
LYM (10^9 /L)	1.90(1.60–2.40)	1.90(1.50–2.40)	0.605
RBC (10^{12}/L)	4.61±0.42	4.45±0.50	0.005
HGB(g/L)	136.00(127.75–149.25)	134.00(122.75–146.00)	0.071
CRP (mg/L)	1.10(0.65–1.81)	1.46(0.58–3.84)	0.01

4. DISCUSSION

The relationship between inflammation and BD. Wei et al. [7] considered the SIRI, NHR, and MHR to be predictors to differentiate BD-M patients from healthy people and regarded the MHR as a predictor for differentiating BD-D patients from healthy people, which was inconsistent with the findings of Dadouli et al. [8] that MLR was the only risk factor for BD-M patients and no indicator was found to be related to BD-D compared with the control group. Ongoing evidence has investigated the role of inflammation in BD, yet their true and concrete relationship is not completely understood [9, 10]. As we know, few studies have assessed the inflammatory indicators between BD patients and healthy individuals based on subgroups of BD.

reactive protein (CRP) is a pentamer acute-phase protein produced by the liver and secreted into the blood. CRP plays an important role in the innate immune system, rising rapidly in response to infection and inflammation, declining sharply after the acute phase. Fernandes et al. [11] found that the level of CRP was higher in BD patients than in the health group regardless

of their mood states, while the CRP levels of BD-M patients were much higher than in other states. In addition, it has been reported that the CRP level of BD-M patients was significantly higher than in the health group before treatment, and the CRP level was significantly reduced after treatment. [12]

These results were partially similar to our findings. In our study, CRP was found to be an independent predictor of BD and BD-M patients compared with healthy cases. Notably, the same cut-off values of CRP were identified to predict BD and BD-M patients.

5. CONCLUSION

In conclusion, we found various inflammatory indicators associated with mood disorders. The levels CRP independent risk factors, our findings identified the cut-off values and optimally combined indicators which help us better assess them to manage early targeted interventions.

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