

Neutrophil-Lymphocyte Ratio And Platelet-Lymphocyte Ratio In Schizophrenia

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ABSTRACT

Background: Immunity and Inflammation have significant role in the pathophysiology of Schizophrenia and Affective illness. NLR and PLR, are applied inflammatory indicators that foretell inflammatory conditions. **Aim:** To investigate NLR and PLR in Schizophrenia. **Methodology:** 57 healthy controls and 47 patients with Schizophrenia diagnosed as per ICD-11 criteria participated in this study. All individuals had their neutrophil, lymphocyte, and platelet counts tested, and both groups' NLR and PLR values were computed and compared. **Results:** Cases and the healthy controls did not differ significantly. **Conclusion:** It has been demonstrated that psychiatric diseases are linked to inflammatory activity by changes in the NLR and PLR levels which are used as signs of inflammation. To verify these results, extensive research is needed.

KeyWords: Schizophrenia, Neutrophil Lymphocyte Ratio, Platelet Lymphocyte Ratio

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Introduction

Leukocyte being chief cell of the immune system secretes multiple cytokines [1-3]. It is well recognized that inflammatory illnesses like autoimmune diseases are associated with elevated neutrophil-lymphocyte ratio. Neutrophil-lymphocyte ratio (NLR) and platelet-lymphocyte ratio (PLR), are reproducible biomarkers of inflammations that are used routinely [4]. Through the biological mechanisms the immune system does effect brain and behaviour [5]. It's seen that the chief pro-inflammatory cytokines like IL1, IL6, TNF and CRP are raised during depression and mental tension [6-8]. Latest research has given attention to inflammatory reactions, the act of immune system in etiopathogenesis of many psychiatric illnesses like Schizophrenia, bipolar disorder and major depression. The present study was focused on finding out the relation between biological inflammatory markers specifically, NLR and PLR in Schizophrenia as there is a lack of Indian studies.

Material and Methods

The cross-sectional research was done from Sept 2020 to Sept 2021. Clearance from ethics committee of our institute was taken prior to beginning of this research and consent was taken from the subjects in Hindi, Marathi and English. All subjects gave written informed consent.

Sample

All the patients diagnosed with Schizophrenia as per ICD 11 who attended OPD and IPD during this period and who gave written willingness for the study were included.

Inclusion Criteria

- All the patients having Schizophrenia as per ICD 11.
- Those who provided the study with their consent.

Exclusion Criteria

- Those not willing to give consent.

- Co-morbid medical or psychiatric illness which prevents patients from participating in study.

Tools

Socio-Demographic Proforma

This proforma was used for recording age, gender, marital status of all subjects as well as duration of illness of patients with Schizophrenia.

PANSS

PANSS is a scale for rating the intensity of Schizophrenia symptoms. Seven of the PANSS's thirty items are Positive Scales, seven are Negative Scales, and the remaining sixteen are General Psychopathology Scales. This results in a bipolar index that has a range from -42 to +42 and its the change in score indicates how dominant one syndrome is in comparison to the other.

Neutrophil count, platelet count, lymphocyte count from laboratory investigations were calculated on the Beckman Coulter 7-part automatic analyzer for accurate results.

Procedure

All the patients diagnosed with Schizophrenia were approached for study. Aim and objective of the study was explained to them. Normal subjects coming for their routine health check-ups were approached and their blood investigation report was obtained for the study. Among all the participants fitting the criteria, a consent was obtained from all of them. PANSS scale then was applied to each patient during interview. Haemogram consisting of lymphocyte count, neutrophil count and platelet count was obtained.

Statistical Analysis

The analysis was carried out using SPSS 20 (IBM, USA). The Mann-Whitney U test, Pearson's correlation, chi-square test, and t-test were used wherever necessary.

Results

The study included 47 cases of Schizophrenia and 57 controls who did not have any psychiatric illness at the time of study. Out of 47 cases, 21 were females and 26 were males. In the control group, out of 57, 32 were males and 25 were females. Average age of all cases was 31.38 compared to 30.62 years in Control group. In both cases and controls 26 were married. No major dissimilarity observed in the age, sex, marital status among cases and controls (Table 1). The average duration of illness in cases was 4.68 years and the mean PANSS score of the cases was 20.10. No statistically dissimilarity between the groups were found in mean neutrophil count, platelet count, lymphocyte count, NLR, PLR in our study (Table 2). The PANSS score was positively correlated to neutrophil, platelet, lymphocyte count, and NLR, PLR (Table 3).

Discussion

Relation of Schizophrenia and inflammation is well known, as it is associated with various infective and autoimmune diseases. Studies have found that neutrophilia and lymphopenia are body's response to trauma and stress, thus higher NLR values are seen in all inflammatory illnesses [4].

When compared to the control group, it was discovered that NLR, PLR, and MLR (Monocyte-to-lymphocyte ratio) - criterion of inflammation-were higher at the time of worsened symptoms while PLR and MLR were considerably increased during the remission. Major dissimilarity between the three groups in terms of MLR and PLR raised the possibility that they might be important indicators of the illness. Major changes in number of lymphocytes during both the worsening and respite on comparison with those with no such illness but with no difference spanning the two times, assert that a characteristic marker for the disease might be the number of lymphocytes. The NLR was raised during relapses; otherwise, it was found to be comparable to controls during respite [9].

It was also observed that in the patients with Schizophrenia,

Table 1 : Socio-demographic Data

		NLR & PLR in Schizophrenia patients	NLR & PLR in Normal controls	t/chi square	p
Age	Mean	31.38	30.62	0.618	0.538
	SD	6.43	5.55		
Sex	Male	26	32	0.007	0.933
	Female	21	25		
Marital Status	Married	26	26	0.9705	0.324
	Unmarried	21	31		

Table 2 : Inflammatory markers in schizophrenia patients and normal control subjects

		Schizophrenia patients	Normal controls	Mann-Whitney U test	p
Neutrophils	Mean	3930.64	3960.96	1100	0.973
	SD	572.08	605.35		
Lymphocytes	Mean	1939.19	1964.4	1090	0.913
	SD	357.24	367.75		
Platelets	Mean	222446.81	225010.64	1083.5	0.873
	SD	41249.93	42235.36		
NLR	Mean	95.62	128.49	882.000	0.086
	SD	351.9	426.67		
PLR	Mean	249.53	174.66	935.000	0.196
	SD	598.14	550.5		

Table 3: Correlations of duration of illness, PANSS score, Neutrophil count, Platelet count, Lymphocyte count, NLR and PLR

		Duration of illness	PANSS score	Neutrophil	Platelet	Lymphocyte	NLR
PANSSs core	Pearson Correlation	-0.290*					
	Sig. (2-tailed)	0.048					
Neutrophil count	Pearson Correlation	-0.491**	0.373**				
	Sig. (2-tailed)	0.000	0.010				
Platelet count	Pearson Correlation	-0.246	0.372*	0.220			
	Sig. (2-tailed)	0.095	0.010	0.138			
Lymphocyte count	Pearson Correlation	-0.135	0.378**	0.559**	0.267		
	Sig. (2-tailed)	0.365	0.009	0.000	0.069		
NLR	Pearson Correlation	-0.283	0.323*	-0.144	-0.217	-0.126	
	Sig. (2-tailed)	.054	0.027	0.333	0.144	0.398	
PLR	Pearson Correlation	-0.147	0.349*	-0.005	0.229	-0.056	-0.084
	Sig. (2-tailed)	0.325	0.016	0.972	0.122	0.707	0.575

the higher the PANSS score of the patient, the higher would be their neutrophil count, lymphocyte count, platelet count, NLR and PLR. There was one study in the past which has used PANSS score in their study but that was to assess the remission parameters of the patients of Schizophrenia on follow up. In their study they found their mean PANSS score to be 39.25 as against 20.10 of ours though no correlation was done in that study between the PANSS score and the inflammatory parameters [9].

Though inconclusive, this study was an attempt to establish a relation between NLR, PLR and Schizophrenia.

Limitation

The sample was taken from patients visiting psychiatry OPD and IPD of our tertiary care hospital. Since most of the patients were already known cases of Schizophrenia on treatment, the lack of newly diagnosed sample size could have been the cause of bias in our study.

Conclusion

The study found poor association between Schizophrenia, PLR, and NLR. However additional future research with larger sample sizes and newly diagnosed cases will be required to study action of inflammatory markers which perhaps would foretell utilization of anti-inflammatory drugs to treat people with psychiatric illnesses.

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Ethics:	There is no ethical violation as it is based on voluntary anonymous interviews
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