

**CONCLUSION:** Our study has the characteristic of a situation determination associated with cases who attended child psychiatry and were diagnosed with MR. The most important limitation of our study is that the evaluation was made retrospectively. The relatively large size of the sample is the most important advantage. There is a need for studies with more detailed information, designed as a prospective, multicenter study with a large sample size, to draw up a way of health policies related to children and adolescents with MR in Turkey. This type of studies in the future will provide a more comprehensive evaluation of cases with MR and intervention attempts which should continue lifelong from the early stages.

**Keywords:** mental retardation, children, psychotropic medication use

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**Bulletin of Clinical Psychopharmacology 2015;25(Suppl. 1):S7-S9**

#### [Abstract:0224] *Schizophrenia and other psychotic disorders*

### Evaluation of neutrophil-lymphocyte ratio in first-episode psychosis

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**INTRODUCTION:** Schizophrenia (SCZ) is a multi-factorial mental disorder affecting approximately 1% of the world population. Recent studies on pathophysiology of schizophrenia revealed the impact of immunological and inflammatory mechanisms on disease predisposition, onset and progression.

The neutrophil-lymphocyte ratio (NLR) is a simple, inexpensive and reliable method to evaluate the extent of stress and systemic inflammation<sup>1</sup>. Although NLR has been extensively studied in animal studies as well as in clinical fields such as oncology, cardiovascular surgery, and cardiology, there have been only two studies published examining the relationship between NLR and neuropsychiatric diseases<sup>2,3</sup>. Two studies investigating the NLR in carotid endarterectomy patients and Alzheimer's disease regarded the relationship between NLR and cognitive functioning in these diseases. However, no studies have examined the relationship between psychiatric disorders and NLR. The aim of this study is to assess the relationship between first-episode psychosis and NLR and to investigate if there is a relation between NLR and severity of disease.

**METHODS:** Patients admitted to the psychiatry inpatient clinic of Konya Training and Research Hospital between January 2011 and June 2014 with the diagnosis of psychotic disorder were reviewed retrospectively. In this retrospective study, we analyzed the medical records of 3258 patients with psychotic disorder. 277 of these patients were identified as antipsychotic-naive sufferers from first-episode psychosis. We considered as "antipsychotic-naive" those patients who had not taken antipsychotic medication before admission. Patients were excluded if they met the following criteria: alcohol or substance abuse, hypertension, diabetes mellitus, heart disease, hepatic or renal failure, clinical evidence of active infection, active or chronic inflammatory or autoimmune diseases and treatment with anti-inflammatory or immunosuppressive medication. After applying the exclusion criteria, 219 FEP were excluded and 58 first-episode psychosis patients were included. Parameters including neutrophil count, lymphocyte count, hemoglobin, hematocrit, white blood cell count, Brief Psychiatric Rating Scale (BPRS) scores, and demographic data of the patients were obtained from the medical records of 58 FEP. NLR was found by dividing absolute neutrophil count by absolute lymphocyte count. NLR values of 58 patients with FEP were calculated and compared to NLR of 37 healthy controls of similar age and gender distribution. The control group consisted of healthy individuals who applied to family medicine for routine examination before marriage. The study complied with the Declaration of Helsinki, and was approved by the institutional ethics committee of Selçuk University.

**Statistical Analysis:** Statistical analyses were performed using software (SPSS 21 SPSS Inc., Chicago, IL). In this study, two group comparisons for categorical variables were assessed using Pearson's chi-square test. Normally distributed variables were compared using

the Independent T-Test, abnormally distributed variables were compared using Mann-Whitney U test. Correlation coefficients and their significance were calculated using the Spearman test.  $p < 0.05$  was considered as statistically significant.

**RESULTS:** There were no differences between first-episode psychosis patients and healthy controls in age and gender. Mean NLR was significantly higher in patients compared to control group ( $2.22 \pm 1.25$  vs.  $1.63 \pm 0.38$ ,  $p = 0.041$ ). Neutrophil count was not different between patients and healthy control ( $4.03 \pm 0.70$  vs.  $4.20 \pm 1.48$ ,  $p = 0.525$ ), but lymphocyte count was significantly lower in patients ( $2.56 \pm 0.55$  vs.  $2.19 \pm 0.77$ ,  $p = 0.013$ ). The NLR was significantly higher in female patients than female healthy controls ( $1.61 \pm 0.36$  vs.  $2.16 \pm 0.90$ ,  $p = 0.033$ ). However, there was no significant difference between male patients and male controls ( $1.65 \pm 0.41$  vs.  $2.28 \pm 1.54$ ,  $p = 0.437$ ).

Red blood cell count and percentage of hematocrit and hemoglobin were significantly higher in male patients than female patients. Platelet count was significantly higher in female patients than male patients, NLR and white blood cell count were similar between male and female patients.

In the first-episode psychosis patients, NLR was not significantly correlated with severity (BPRS score) ( $n = 58$ ;  $r = 0.060$ ,  $p = 0.655$ ).

**DISCUSSION:** In the present study we found that NLR was higher in FEP compared to healthy controls. There was no relationship between NLR and disease severity. To our knowledge, this is the first study to evaluate NLR in FEP.

A growing body of evidence indicates relations between inflammation and immune function and risk of schizophrenia. Over 40 cytokine alterations studies examining the changes in IL-6 levels, soluble IL-2 receptor and TNF-alpha levels in schizophrenia suggest higher values in first-episode psychosis patients and relapsed patients compared to than healthy controls<sup>4</sup>.

NLR is a simple, noninvasive marker of systemic inflammation. Semiz et al. have evaluated NLR in 156 schizophrenic patients and have found that NLR was higher in patients compared to healthy controls. They have also observed an insignificant correlation between elevated NLR levels and psychopathology severity. These results are in line with our findings<sup>5</sup>.

Halazun et al. have found that higher NLR is associated with a three-fold increased risk of cognitive dysfunction 1 day after carotid endarterectomy. They have mentioned that systemic inflammation increases atherosclerosis and neuronal injury<sup>3</sup>. In line with this result, Kuyumcu et al. (2012) have evaluated NLR in 241 patients with Alzheimer's disease and found that NLR was significantly higher than in the normal cognitive function group<sup>2</sup>. In light of previous researches mentioning that neurodegeneration may play a role in the pathophysiology of schizophrenia, elevated NLR levels may indicate a neurodegenerative process.

The study has several limitations. First, this was a single-center study with retrospectively collected data. As a result, we could not reach all of the data from the records of patients, and we could not compare NLR levels after antipsychotic treatment. Second, we also excluded some comorbid conditions that may increase NLR levels, and there may be some other confounders that we could not measure. Third, we could not evaluate the data of other inflammatory and immune markers (i.e., C-reactive protein, sedimentation, cytokines) to verify if NLR is an independent marker in the pathogenesis of schizophrenia.

**CONCLUSION:** To the best of our knowledge, this is the first study investigating NLR levels in FEP. Our findings suggest that NLR levels are increased in drug-naive first-episode psychosis patients compared to physically and mentally healthy individuals and inflammation may play a role in the pathogenesis of schizophrenia. Further larger prospective trials are necessary to determine the relationship between NLR and schizophrenia and the effect of drugs on NLR.

**Keywords:** first episode psychosis, neutrophil-lymphocyte ratio, schizophrenia

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**Bulletin of Clinical Psychopharmacology 2015;25(Suppl. 1):S9-S10**