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Autism spectrum disorders among adolescents and adults and comparison with schizophrenia

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ABSTRACT

Objectives: Autism Spectrum Disorders (ASD) may be commonly misdiagnosed as schizophrenia due to common symptoms and accompanying psychotic manifestations in both adolescence and adulthood. The purpose of this study is to examine and compare the autistic symptoms and positive and negative symptoms of schizophrenia in cases diagnosed as Autism Spectrum Disorder.

Methods: Twenty-one patients between ages of 16-36 who have admitted to outpatient clinic have previously been diagnosed as autism spectrum disorders (autistic disorder, Asperger Syndrome, pervasive development disorder not otherwise specified) according to DSM-IV diagnosis criteria, have an IQ of 50 or above, have been included in the study. Control group have been composed of 21 patients between ages of 21-39 who have been diagnosed as schizophrenia according to DSM-IV diagnosis criteria and have an IQ of 50 or above. Psychiatric assessment has been made with Childhood Autism Rating Scale (CARS), Scale for the Assessment of Positive Symptoms (SAPS), Scale for the Assessment of Negative Symptoms (SANS), SCID-I and WAIS.

Results: The negative symptoms of ASD are found to be higher than schizophrenia cases where as the positive symptoms of schizophrenia cases are found to be higher than ASD cases. Twenty percent (n = 4) of OSB cases do not meet autism symptoms while none of the schizophrenia cases meet autism symptoms. In one case of the ASD group, additional schizophrenia diagnosis was present.

Conclusions: In this study, it has been found that negative symptoms of schizophrenia are widely observed in adolescent and adult patients followed with ASD diagnosis. Consequently, autism spectrum disorders are manifested common symptoms with schizophrenia in adolescence and adulthood.

Keywords: Autism spectrum disorders, shizophrenia, symptom

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Pervasive Development Disorders (PDD), is a group of neuropsychiatric disorder with a course of significant retardation an deviation in social, communication and cognitive development. In literature autistic disorder, Asperger Syndrome and pervasive developmental disorder not otherwise specified are referred to as "autism spectrum disorders (ASD)". Recent studies give ASD prevalence as 60-70/10,000 [1]. ASD symptomatology in adolescence and adulthood may not be as distinctive as in childhood [2]. For this reason, it is thought that it may be confused with some psychiatric disorders when in the diagnosis spectrum of Asperger Syndrome and Pervasive Developmental Disorder Not Otherwise Specified [3]. Before the stud-

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ies in adolescence and adulthood, its coexistence and common symptoms with childhood schizophrenia has attracted attention. While studies show high incidences of PDD symptoms in childhood schizophrenia [4, 5], a recent study asserts that 25% of childhood schizophrenia cases are diagnosed with additional PDD and considers two hypotheses. One of these is that autism-like symptoms may be the early stage symptoms of schizophrenia, and the other is that autism is a risk factor for the development of childhood schizophrenia [6]. In adulthood studies, some case statements support coexistence of ASD and psychotic disorders [7], while some studies assert that schizophrenia prevalence in ASD is not different from normal population [8]. Individuals with ASD accompanied by psychotic disorders show different autism symptoms than the cases without psychotic disorders [9]. Not only the cases with accompanying psychotic disorder but frequent accompanying of other psychiatric disorders may cause these individuals to apply to clinics and may result in the first diagnosis in adolescence or the main diagnosis to go unnoticed [10]. Considering all this confusion in diagnosis, DSM 5 released in 2013 has foreseen a single diagnosis category instead of different sub groups and diagnosis age has been annulled in order to improve the specificity of the autism diagnosis. But the new diagnosis system DSM 4-TR raised concerns that individuals diagnosed with pervasive developmental disorder may not be diagnosed. It has been shown that individuals diagnosed with ASD diagnosis according to DSM-IV TR diagnosis system may show distinctive autism symptoms, but they may not be diagnosed according to DSM-5 [11, 12]. With the symptom diversity, DSM 5 was abandoned to make categorical distinction and it was aimed to make it more homogenous by changes such as grading of symptom severity. But with the new diagnosis system, concerns about the diagnosis and comparison of the disorder with other disorders are on the agenda. In this study we tried to draw attention to difficulties at the diagnosis stage of ASD and to attributes which may be confused with schizophrenia in clinical practice.

METHODS

Forty-two patients (21 schizophrenia and 21 autism spectrum disorders) who were 16-36 years old, whose IQ is 50 and above were included in this study. Ethical board approval was obtained before the study, all patients were informed on interviews and scales and that their decision to join the study will not lead to a positive or negative change in their treatment and oral and written consent were taken from patients who accepted to contribute to the study. Structured Clinical Interview Scale for DSMIV Axis-I Diagnoses (SCID-I), Scale for the Assessment of Positive Symptoms (SAPS), Scale for the Assessment of Negative Symptoms (SANS), The Childhood Autism Rating Scale (CARS), Wechsler Adult Intelligence Scale (WAIS) and sociodeographic information form were applied to the patients.

Measures

Sociodemographic and Clinic Information Form: This form is applied by the interviewer to each patient to collect information on sociodemographical features and current and past clinical status Structured Clinical Interview Scale for DSMIV Axis-I Diagnoses (SCID-I): It is a structured clinical interview scale developed by First *et al.* [13] in 1997. Its adaptation to Turkish and reliability and validity study was carried out by Özkürkçügil *et al.* [14].

Scale for the Assessment of Positive Symptoms (SAPS): The SAPS was designed to assess positive symptoms, principally those that occur in schizophrenia. The instrument is intended to complement the SANS. The assessed positive symptoms include hallucinations, delusions, bizarre behavior, and positive formal thought disorder. The SAPS was developed by Andreasen [15]. The Turkish version was reported to be reliable by Erkoç *et al.* [16]. Scale for the Assessment of Negative Symptoms (SANS):The SANS assesses five symptom complexes to obtain clinical ratings of negative symptoms in patients with schizophrenia. These are affective blunting, alogia (impoverished thinking), avolition/apathy, anhedonia/asociality, and disturbance of attention. The final symptom complex seems to have less obvious relevance to negative symptoms than the other four complexes. Assessments are conducted on a 6 - point scale (0 = not at all to 5 = severe). The instrument was developed by Andreasen [17]. The Turkish version was reported to be reliable by Erkoç *et al.* [18].

The Childhood Autism Ratıng Scale (CARS): The

Table 1. Comparison of SAPS values

SAPS	ASD	Schizophrenia	*p value*
	Mean ± SD	Mean ± SD	
Hallucinations	0.6 ± 2.8	5.9 ± 4.8	**0.001**
Delusions	1.2 ± 2.7	11.7 ± 5.9	**0.001**
Bizarre Behavior	6.9 ± 3.8	2.62 ± 2.24	**0.001**
Positive Formal Thought Disorder	4.0 ± 3.6	4.1 ± 4.4	0.664
Inappropriate Affect	1.2 ± 1.1	0.1 ± 0.4	**0.001**
Total Score	14.2 ± 10.3	24.8 ± 13.4	**0.002**

ASD = Autism Spectrum Disorders, SAPS = Scale for the Assessment of Positive Symptoms, SD = standard deviation

scale assesses behavior in 14 domains that are generally affected by severe problems in autism, plus one general category of impressions of autism, with the aim of identifying children with autism, as differentiated from the other developmental disorders. The Turkish version was reported to be reliable a group from Dokuz Eylül Universıty Faculty of Medicine Child and Adolescent Health and Diseaeses Depertment. WAIS: The WAIS was developed by David Weschsler in 1955. It is translated to Turkish by Epir and Iskit [19].

Statistical Analysis

Data is analysed with SPSS 15.0 for Windows software. Besides descriptive statistical methods (mean, standard deviation), chi-square test is used to compare categorical variables and Independent-Samples T test is used to compare continuous variables .Mann Whithney U testis is used to compare non-normal distrubition variables. For all statistical analysis, $p < 0.05$ is reported as statistically significant.

RESULTS

Twenty-one ASD (11 autistic disorder, 4 development disorder not otherwise specified, 6 Asperger Syndrome) and 21 schizophrenia cases were included in the study. Both groups consisted of 2 women and 19 men. The average age of ASD cases was 20.9 ± 6.2 years (range; 16 to 36); and the average age of schizophrenia cases was 32.4 ± 4.5 years (range; 24-38). ASD group had average IQ of 78.6 ± 14.3 (range; 52-110), and schizophrenia group had average IQ of 86.4 ± 12.0 (range; 68-111).

Table 2. Comparison of SANS values

SANS	ASD	Schizophrenia	*p valu*
	Mean ± SD	Mean ± SD	
Affective Flattening or Blunting	16.0 ± 6.1	2.2 ± 4.4	**0.001**
Alogia	10.0 ± 4.7	6.7 ± 2.4	**0.024**
Avoliton-Apathy	7.1 ± 3.8	7.4 ± 2.8	**0.667**
Anhedonia-Asociality	14.5 ± 3.0	10.8 ± 3.4	**0.001**
Inattention.	4.2 ± 2.3	1.1 ± 1.3	**0.001**
Total Score	51.8 ± 17.5	35.5 ± 10.0	**0.002**
Total Score	51.8 ± 17.5	35.5 ± 10.0	**0.002**

ASD = Autism Spectrum Disorders, SANS = Scale for the Assessment of Negative Symptoms, SD = star deviation

The first application age of ASD cases was 7 ± 5.4 years, and those of schizophrenia cases were 24 ± 3.2 years. In the family histories of ASB group, 1 case had schizophrenia history, 1 case had pervasive developmental disorder history, 2 cases had mood disorder (depression) history, 3 cases had mental retardation history; in schizophrenia group, 6 cases had schizophrenia history, 2 cases had mood disorder history. ASB group had 3 cases with epilepsy history, while schizophrenia group had no cases with epilepsy or systemic disease history.

When we look at the SAPS values, general total score of schizophrenia group was significantly higher than ASD group (24.8 ± 13.4versus 14.2 ± 10.3) (Table 1); SANS values of ASD group was significantly higher than schizophrenia group (51.8 ± 17.5 versus 35.5 ± 10.0) (Table 2).

CARS values of ASD group was significantly higher than schizophrenia group (32.4 ± 4.4 versus 21.4 ± 1.3). In ASD group 5 cases (23.8%) did not meet the diagnostic criteria of autism according to CARS, 11 cases (52.4%) were mild to moderate autistic, 5 cases (23.8%) were highly autistic. In schizophrenia group none of the cases met the diagnostic criteria of autism (Table 3).

DISCUSSION

In this research study, adolescent and adult ASD and schizophrenia cases have been compared with respect to sociodemographic attributes, autism and schizophrenia symptoms. In this study, while the ASD group showed more indications of autism, none of the

Table 3. Comparison of CARS values

CARS	OSB	Schizophrenia	*p value*
	Mean ± SD	Mean ± SD	
Relating to People	2.9 ± 0.4	2.3 ± 0.3	**0.001**
Imitation	1.0 ± 0.4	1.0 ± 0	0.317
Emotional Response	2.6 ± 0.4	1.8 ± 0.3	**0.001**
Body Use	2.4 ± 0.6	1.2 ± 0.3	**0.001**
Object Use	2.0 ± 0.6	1.07 ± 0.2	**0.001**
Adaptation to Change	1.7 ± 0.8	1.1 ± 0	**0.001**
Visual Response	2.6 ± 0.5	1.7 ± 0.3	**0.001**
Listening Response	2.1 ± 0.5	1.3 ± 0.3	**0.002**
Taste, Smell, Touch	1.5 ± 0.8	1.0 ± 0	0.658
Fear or Nervous	1.8 ± 0.6	1.9 ± 0.3	**0.001**
Verbal Communication	2.2 ± 0.8	1.2 ± 0.2	**0.001**
Nonverbal Communication	2.3 ± 0.5	1.5 ± 0.3	0.083
Activity Level	2.2 ± 0.6	1.9 ± 0.2	**0001**
Level & Consistency of Intellectual Response	1.9 ± 0.4	1.1 ± 0.3	**0.001**
General Impression	2.6 ± 0.6	1.0 ± 0	**0.001**
Total Score	32.4 ± 4.4	21.4 ± 1.3	**0.001**
	n (%)	n (%)	
No Autism	5 (23.8)	21 (100)	
Mild-Moderate Autism	11 (52.4)	0	
Severe Autism	5 (23.8)	0	

ASD = Autism Spectrum Disorders, CARS = Childhood Autism Rating Scale, SD = standard deviation

patients in the schizophrenia group was diagnosed with autism. In the ASD group 5 patients who showed no symptoms of autism, had Asperger Syndrome. Although Asperger Syndrome is a variant of high functioning autism disorder by some clinicians, a definitive differentiation of these two disorders has not been clarified yet. While the discussion is ongoing, DSM 5 aims a scaling of the disorder based on severity rather than a categorical approach, and so a more sensitive definition. In our study, the first reason of having cases with no autism symptoms in the ASD group is that the CARS scale (although applicable in all pervasive development disorders) is a specific for autistic disorder, and the second reason is the mild course of symptoms of pervasive development disorders in adolescent and adult cases, especially with high IQ levels. It is known that in adolescence symptoms related to social interaction, and in adulthood symptoms related to rituals and limited area of interests tend to have a milder course [2]. In CARS scale, no meaningful difference was observed in the imitation, taste, smell and touch reactions subscale which are frequent symptoms of autism; this can be explained by the regression of autism symptoms and improved self-control of cases (especially with high IQ levels) in adulthood. The lack of difference in nonverbal subscales can be explained by the fact that this attribute is related to the negative symptoms of schizophrenia. According to CARS scale, the only subscale which is significantly higher in schizophrenia cases than ASD cases is fear and nervousness subscale. In schizophrenia, especially delusion of persecution results in high detections of this subscale.

The positive symptoms of schizophrenia patients included in our study are detected to be higher that those of the ASD group. But the ASD group was significantly higher than the schizophrenia group in bizarre behavior - and inappropriate affect subscale. The reason for this can be the core symptoms of ASD being recurrent, sometimes obsessive and sometimes bizarre behavior. However inappropriate affect does not allow diagnosis of paranoid schizophrenia. Surprisingly, there is no significant difference between the two groups in positive formal thought disorder subscale. While core symptoms of ASD as insufficient communication skills, undeveloped language skills, occasional difficulties in building sentences or use of pronouns, occasional inability of accentuation in speech, may all reflect as positive formal thought disorder; it can also be explained with the high IQ levels, and accordingly higher education and better language and communication skills of ASD cases. When we look at the negative symptoms; while ASD group is significantly higher in blunted affect, alogia, anhedonıa and social withdrawal, and attention subscales, there is no significant difference in avoliton-apathy subscale. Reduced gestures, emotional unresponsiveness, inability in accentuation, lack of eye contact in the blunted affect subscale are all frequent symptoms of ASD. Also, poor conversational content of the ASD group, which is due to inability of communication and social skills or limited areas of interest, may lead to significantly high alogia scores. Inability to make friends, inability of intimacy, lack of interest in entertainment or inability to express and share topics of interest, which are quite important for ASD diagnosis may lead to rise in anhedonia-asociality subscale. The fact that problems related to attention and ADHD is one of the most frequent comorbidities of ASD for especially children and adolescents; and that inability to socially recognize surroundings is a core symptom of ASD, may lead to rise in attention subscale. In ASD negative symptoms are on the forefront rather than positive symptoms [20, 21]. Nevertheless, although none of the schizophrenia cases in our study show autistic disorder diagnosis, there are studies showing autism symptoms in schizophrenia, which are frequently related to negative symptoms [22, 23]. Especially recent studies assert that schizophrenia accompanied with autistic symptoms is different in demographical, psychopathological and cognitive aspects; although positive symptoms are not on the forefront social withdrawal inability of executive functions are on the forefront; and that this is related to ASD symptoms [24].

In our study group 1 out of 21 cases (approximately 1%) is additionally diagnosed with schizophrenia. Various studies affirm coexistence of varying degrees of schizophrenia and psychotic disorder in adolescent and adult ASD groups [8, 25-28].

Limitations

There are limitations to our study. The cases assessed in this study, are cases followed up at the

child, adolescent and adult psychiatry clinics of a training research hospital. Individuals with ASD are frequently followed up at rehabilitation units and when they apply to clinics due to accompanying psychiatric complaints, more severe symptoms are expected and so it is difficult to generalize the collected data. Also, the fact that ASD group cases are adolescent and adults, may have affected the frequency and distribution of psychiatric problems which have not emerged yet. In consideration of ASD core symptoms, it might be more significant to use disorganized schizophrenia cases as control group. Low number of cases is also a limitation of the study. As the psychiatric assessment is cross sectional, we believe that a longitudinal study will be more useful.

CONCLUSION

Consequently, this study shows high incidence of negative symptoms of schizophrenia in adolescents and adults diagnosed with ASD. Accordingly, it is important to distinguish adolescent and adult ASD patients at the clinic and to take into consideration the confusion of diagnosis to common symptoms with other psychiatric disorders. Also, applicant to clinic with other psychiatric problems, having difficulties in social and communal interactions, NOS-PDD, AS, and HFA which are groups of autism with milder symptoms especially in adolescents, must be considered for diagnosis. Schizophrenia and ASD are to separate neurodevelopmental disorders with different courses, and it is clinically useful to understand the differences in accordance with the latest categorization of disorders. Although the border between the two disorders are not yet clear, there are studies showing neurobiological, epidemiological, cognitive and clinical relations [29, 30]. When we consider coincident symptoms and the probability of being seen together, clarity of diagnosis in clinical practice becomes even more important. For this, long term follow-ups, family studies, genetics and advanced neuroimaging are necessary.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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