

Evaluation of Autism Spectrum Disorder in Early Childhood According to the DSM-5 Diagnostic Criteria



Duygu KABA¹, Ayla SOYKAN AYSEV²

SUMMARY

Objective: The aim of this study is to investigate, the DSM5 criteria of, Autism Spectrum Disorder (ASD) and Social Communication Disorder (SCD) in young children previously diagnosed with Pervasive Developmental Disorder (PDD) on the DSM-IV-TR, and to evaluate the effects of the symptom severity, emotional-behavioral problems, and age and gender differences on the diagnoses.

Method: The study included 80 children between the ages of 18-72 months, who were diagnosed with PDD on the DSM-IV-TR criteria. The severity of autistic symptoms was measured by the Autism Behavior Checklist (ABC) and the Childhood Autism Rating Scale (CARS). The presence of behavioral and emotional problems were evaluated by the Aberrant Behavior Checklist (AbBC).

Results: Among the patients previously diagnosed with PDD, 9 (11.8%) did not meet the DSM-5 ASD criteria; 6 (7.9%) met the SCD criteria while 3 could not be assessed on the SCD criteria due to their small age and therefore not included in either diagnostic classes. The mean CARS, ABC and AbBC scores of the patients who met the ASD criteria, as compared to those who did not, were significantly higher. The two groups did not differ significantly with respect to the gender distribution and mean age.

Conclusion: The patients who had more and severe autistic symptoms had a higher likelihood of getting an ASD diagnosis based on the DSM-5 criteria. The diagnosis of the patients with subthreshold ASD symptoms may be missed on the basis of the new diagnostic criteria.

Keywords: Early childhood, autism spectrum disorder, social communication disorder, pervasive developmental disorder, DSM-IV-TR, DSM-5

INTRODUCTION

Autism Spectrum Disorder (ASD), included among the neurodevelopmental disorders of childhood, is a clinical condition with continual controversy on its diagnosis, follow up and treatment despite extensive research (Mukaddes 2013). Treatment and prevention of diseases firstly demands correct diagnosis and classification, without which research cannot be made on prevalence, etiology and the development of appropriate treatment protocols (Öztürk and Uluşahin 2011). Therefore, the reliability of diagnostic criteria and classification systems are invaluable for physicians and researchers (Saemundsen et al. 2003).

The diagnostic criteria for ASD have changed many times since their inclusion in the international classification systems of the 1967 edition of the ICD-8 up to the 2013 publication of the DSM-V.

Although DSM-IV is the most frequently used diagnostic system, it has been criticized with reasons including uncertainties of the boundaries between the autism spectrum subcategories, the different diagnoses made by different clinics on the same patient such that Asperger's Disorder (AD) can be diagnosed in adulthood in a case previously diagnosed with typical autism and the lack of specific treatments for autism subtypes (Gibbs et al. 2012, Aldridge et al. 2012, Wing et al. 2011, Worley and Matson 2012). The DSM-IV diagnostic

Received: 23.11.2018, **Accepted:** 28.06.2019, **Available Online Date:** 10.10.2019

¹M.D., Zonguldak Gynecology-Obstetrics and Pediatrics Hospital, Department of Child and Adolescent Psychiatry, Zonguldak, ²Retired Prof., Ankara University Faculty of Medicine, Department of Child and Adolescent Psychiatry, Ankara, Turkey.

e-mail: duygukaba72@gmail.com

<https://doi.org/10.5080/u23735>

criteria for PDD have been changed radically in the DSM-V on grounds of these criticisms.

In the DSM-V, the heading term ASD replaced the term PDD and the Rett syndrome was taken out of the subcategories under this heading. The diagnostic criteria for ASD were identified in two major groups of A and B; with the A group including the deficits in social communication and interaction and B including the repetitive restricted areas of interest and activities. The A group of diagnostic criteria comprise social-emotional restriction (A1), restriction in non-verbal communication (A2) and the difficulties in starting and maintaining relationships with contemporaries. The B group of diagnostic criteria comprise the stereotypic or repetitive motor movements, use of objects or talking (B1), insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (B2), highly restricted and fixated interests that are abnormal in intensity or focus (B3) and hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (B4). ASD diagnosis on DSM-5 is based on all A criteria and at least two of the B criteria (American Psychiatric Association 2013).

With the publication of the DSM-5 in 2013, studies were made on the validity and reliability of the ASD diagnostic criteria, reporting the improved specificity but reduced sensitivity in comparison to the DSM-IV criteria (Christiansz et al. 2016, Frazier et al. 2012, Mandy et al. 2012). The reported incidence in loss of ASD diagnosis loss varied between 9% and 47% in different studies (Beighley and Matson 2014, Beighley et al. 2013, Mattila et al. 2011, McPartland et al. 2012, Taheri and Perry 2012). Studies have shown that the sensitivity was reduced particularly among those with Asperger's Disorder, with IQ >70, PDD-NOS and among young children (Barton et al. 2013, Christiansz et al. 2016, Kim et al. 2014, Worley and Matson 2012, Young and Rodi 2014).

It has been emphasized that the risk of lost or overlooked diagnosis would be high since symptoms of restricted-repetitive interest and activities could not be expressed by very young children or would emerge at later stages of development; and that the symptoms of starting and maintaining relationships with contemporaries, included in the 'social interaction and communication' category, would not be explicit in all children until the age of starting to school (Barton et al. 2013). Also, it was demonstrated that the sensitivity of the DSM-5 criteria was slightly reduced in children below the age of 7 years, with 12% remaining without diagnosis (Frazier et al. 2012). Evaluation of the DSM-5 ASD diagnostic criteria in adults and children

resulted in 36% and 47% reductions in the incidence of ASD diagnosis in, respectively, adults and 17-36 month old children (Matson et al. 2012a, Matson et al. 2012b).

The listener to the communication for the SCD diagnosis, which is included in the DSM-5 criteria for differential diagnosis of ASD, is expected to have continual difficulties in social use of verbal and nonverbal communication skills, such as directing in accordance with one's needs, waiting for one's turn, making corrections when misunderstood and to comprehend the metaphorical use of the language. Since the SCD assessed the upper level of language skills, it cannot be assessed before the age of 4-5 years (Swineford et al., 2014).

The incidence of PDD cases who met the DSM-5 diagnostic criteria for SCD but not the ASD criteria varied between 1.5 - 63.2% (Huerta et al. 2012, Wilson et al. 2013). The uncertainties in this has caused worries on treatment and service to be given to children diagnosed with SCD. The authors claimed that inclusion of SCD in a category other than the ASD, would enable these individuals to benefit from the state provided health services, public health measures and (Brukner-Wertman et al. 2016).

There are very few studies in the literature on early childhood, recognized as the most risky period for lost diagnoses. The aim of this study is to evaluate young pre-school children, with a history of DSM-IV-TR based PDD diagnosis, for ASD and SCD according on the to DSM-5 diagnostic criteria; and to determine the effects of the autism symptom severity, the emotional behaviour problems and the gender and age differences on the diagnosis made.

METHOD

The study was carried out on 80 children, consisting of 9 girls and 71 boys, aged 18-72 months, diagnosed with PDD using the DSM-IV-TR criteria and admitted to the polyclinics in the Department of Child and Adolescent Psychiatry at Ankara University, Medical Faculty Hospital. After observation of the behaviours and relationship problems by the Crowell method, those children diagnosed with PDD on the basis of the DSM-IV-TR criteria were grouped for evaluation. Adopted or institutionally cared children, children with hearing or visual impairment were excluded as reliable developmental history could not be taken. Children diagnosed with Rett Disorder, which has been taken out of the DSM ASD diagnostic criteria, were also excluded from the study.

After repeated detailed developmental history taking and psychiatric examination by the researcher, the 80 children

with confirmed PDD diagnoses were assessed on ASD and SCD on the DSM-5 criteria. The parents were asked to the parents by giving individual examples to ascertain whether or not the child met each diagnostic criterion, the unreliable information given by one of the parents was corrected by questioning the other parent, basing the diagnostic evaluation on observation and anamnesis. The DSM-IV-TR and DSM-5 based evaluations were carried out simultaneously.

A socio-demographic data form was completed by the families. The severity of the autistic symptoms was measured by the ABC and the CARS. The behavioral and emotional problems were evaluated by the AbBC. While the ABC and the AbBC were evaluated by the parents, the CARS was completed by the researcher on the basis of direct observation on the children and the information received from the family. All procedures related to the study were approved by the Ankara University Faculty of Medicine Ethics Committee by the decision numbered 46004091-302.14.06 / E.46999 of 27 September 2016.

The Crowell Procedure

The Crowell method shows the relationship between the child and the caregiver, the child's capacity to reflect and understand emotions, interaction with toys, attachment and problem-solving patterns. Crowell procedure consists of 9 different sections including free play, toy collection, bubbles, task teaching (chapters 4, 5, 6, 7), separation and reunion. After explaining the procedure and obtaining the permission of the care giver, observation is started on a one-way mirror. This method was developed by Crowell et al. (1993), and modified by Zeanah et al. (2000).

MATERIALS

The Sociodemographic Questionnaire: The Sociodemographic Questionnaire was prepared by the researcher to determine the sociodemographic and clinical characteristics of the case by queries on gender, age, income level, psychiatric diagnoses and treatments and the family history of psychiatric disorders.

The Childhood Autism Rating Scale (CARS): The CARS was developed in 1980 by Schopler et al. to assess the severity of autism based on observations on children. The total score ranges between 15 and 60, with scores below 30 indicating non-autistic state, and scores of 30-36 and 37-60 indicating, respectively, mild and gradually increasing severity of autism. The validity and reliability of the Turkish language version was determined by Sucuoğlu et al. (1996).

The Autism Behavior Checklist (ABC): Developed by Krug et al. in 1980, this scale contains 57 items organized into the five symptom groupings on sensory, relating, body and object use, language, and social and self help skills (Robert et al. 1988). The ABC total score ranges from 0 to 159. The validity and reliability of the Turkish language version was determined by Irmak et al. (2007).

The Aberrant Behavior Checklist (AbBC): This is a test evaluating the behavioral problems of irritability, social withdrawal, stereotype, hyperactivity, and inappropriate speech in 5 subscales. The validity and reliability of the Turkish language version was demonstrated by Sucuoğlu (2003) and by Karabekiroğlu and Aman (2009).

Statistical Analysis

The IBM SPSS statistics program version 22.0 was used for the statistical analysis of the data. The categorical variables were compared using the Pearson's Chi-square Test or by the Fisher's Exact Test when more than 20% of cells had expected frequencies <5. The Shapiro-Wilk Test was carried out to evaluate whether the numerical variables were normally distributed. The Mann-Whitney U-test was used to compare the variables between the two groups. A p value <0.05 was considered to be statistically significant.

RESULTS

The 80 cases with PDD diagnoses based on the DSM-IV-TR criteria and included in the study consisted of 71 (88.8%) male and 9 (11.3%) female children. The mean age of these patients was 49.8 (± 14.3) months. The specific diagnoses on the DSM-IV-TR criteria were autistic disorder (n=75, 93.7%), PDD-NOS (n=4, 5%), and Asperger's Disorder (n=1, 1.3%). The single patient diagnosed with Asperger's Disease, 3 of the patients diagnosed with ASD and 2 of the 4 patients diagnosed with PDD-NOS (on the DSM-IV-TR criteria), met the SCD criteria. Of the 75 patient diagnosed with autistic disorder on the DSM-IV-TR; 5 (6.7 %) and 3 (75%) of the 4 patients diagnosed with PDD-NOS did not meet the ASD diagnostic criteria on the DSM-5 (Table 1).

Among the 9 children, who did not meet the DSM-5 ASD criteria, 78% (n=7) did not meet the B criteria and 22% (n=2) did not meet the A criteria. Therefore, they could not be diagnosed with ASD according to the DSM-5. The A1, A2 and A3 criteria were met by, respectively, 98.7%, 97.5% and 100% of the patients; and the B1, B2, B3 and B4 criteria were met, respectively by 97.5%, 37.5, 43.7% and 81.2%. Significant differences were not determined with respect to

Table 1. Agreement of the Diagnoses Based on the DSM-IV-TR with the Diagnoses Made on the DSM-5

DSM-IV-TR		DSM-5		p
		ASD diagnosis made n (%)	ASD diagnosis not made n (%)	
Autistic Disorder	exist	70(93.3)	5(6.7)	<0.001
	none	1(25)	4(75)	
PDD-NOS	exist	1(25)	3(75)	0.004
	none	70(92.1)	6(7.9)	
Asperger	exist	0(0)	1(100)	0.112
	none	71(89.9)	8(10.1)	

Rett Syndrome and Disintegrative Disorder were not included in the study.

Table 2. Relationship Between the CARS, ABC and AbBC Scores and the DSM-5 ASD Diagnoses

	ASD diagnosis made (median min-max)	ASD diagnosis not made (median min-max)	Z	p
CARS	36.5(21-53)	27(20-44)	-3.16	0.002
ABC	50(9-116)	26(12-68)	-2.61	0.009
AbBC	38(3-133)	15(2-78)	-2.71	0.007

Mann Whitney U test; CARS: Childhood Autism Rating Scale; ABC: Autism Behavior Checklist; AbBC: Aberrant Behavior Checklist

Table 3. Incidence of Meeting the DSM-5 ASD B Subcriteria on the Basis of Age (Months)

Diagnosis		18-36 n (%)	36-54 n (%)	54-72 n (%)	Total	χ^2	p
B1	Made	19 (95)	28(100)	31(96.9)	78(97.5)	14.7	0.71 ²
	Not made	1 (5)	0 (0)	1(3.1)	2(2.5)		
B2	Made	3 (15)	7 (25)	20(62.5)	30(37.5)	1.8	0.39 ¹
	Not made	17 (85)	21 (75)	12(37.5)	50(62.5)		
B3	Made	7(35)	15(53.6)	13(40.6)	35(43.8)	0.03	0.98 ¹
	Not made	13(65)	13(46.4)	19(59.4)	45(56.3)		
B4	Made	16(80)	23(82.1)	26(81.3)	65(81.3)		
	Not made	4(20)	5(17.9)	6(18.8)	15(18.8)		

¹Pearson Chi square; ²Fisher's exact test; B:repetitive, restricted patterns of activities, behaviors or interests; B1:stereotyped or repetitive motor movements, use of objects, or speech; B2: insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior ; B3: highly restricted and fixated interests that are abnormal in intensity or focus; B4: hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment.

age ($Z=-0.42$, $p=0.67$) and gender (Chi square and Fisher's exact tests, $p=1$). When comparing the children who met and did not meet the DSM-5 ASD criteria,

Since the CARS, ABC and AbBC scores of the groups with and without ASD diagnosis according to the DSM-5 did not fit the parametric test assumptions, the median values were compared between the groups and a statistically significant difference was found between the groups (Table 2).

Since the number of cases that did not meet the A criteria was low, detailed analyses were made using the B group criteria. In our study, the relationship between the B criterion and the age, gender variables, and the CARS, ABC and AbBC scores were examined (Tables 3,4,5,6 and 7). The results showed that the incidences of meeting the B1, B2, and B4 criteria were higher with increasing age, and that the difference in the B2 criterion was statistically significant ($c2=14.7$, $p=0.001$).

Table 4. Incidence of Meeting the DSM-5 ASD B Subcriteria on the Basis of Gender

Diagnosis		Female n(%)	Male n(%)	p
B	Made	9(100)	64(90.1)	1
	Not made	0(0)	7(9.9)	
B1	Made	9(100)	69(97.2)	1
	Not made	0(0)	2(2.8)	
B2	Made	3 (33.3)	27(38)	1
	Not made	6 (66.7)	44(62)	
B3	Made	4 (44.4)	31(43.7)	1
	Not made	5 (55.6)	40(56.3)	
B4	Made	7(77.8)	58(81.7)	0.67
	Not made	2 (22.2)	13(18.3)	

Fisher's Exact Test ; B:repetitive, restricted patterns of activities, behaviors or interests; B1:stereotyped or repetitive motor movements, use of objects, or speech; B2: insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior ; B3: highly restricted and fixated interests that are abnormal in intensity or focus ; B4: hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment.

Table 5. The CARS Score Variation on the DSM-5 ASD B Sub-criteria

Diagnosis		CARS median (min-max)	Z	P
B1	Made	34.5(20-53)	-1.7	0.099
	Not made	27.2(24.5-30)		
B2	Made	37(20-53)	-0.7	0.45
	Not made	34(21.5-51)		
B3	Made	34(21-49)	-0.47	0.63
	Not made	36(20-53)		
B4	Made	37(21-53)	-1.7	0.09
	Not made	32(20-46.5)		

Mann Whitney U test ; B:repetitive, restricted patterns of activities, behaviors or interests; B1:stereotyped or repetitive motor movements, use of objects, or speech; B2: insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior ; B3: highly restricted and fixated interests that are abnormal in intensity or focus ; B4: hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment.

Table 6. The ABC Score Variation in the DSM-5 ASD B Sub-criteria

Diagnosis		ABC median (min-max)	Z	p
B1	Made	49(9-116)	-1.6	0.109
	Not made	26.5(26-27)		
B2	Made	40(9-116)	-0.7	0.44
	Not made	49.5(12-101)		
B3	Made	57(9-116)	-1.4	0.14
	Not made	46(12-101)		
B4	Made	49(9-116)	-0.9	0.36
	Not made	47(12-75)		

B:repetitive, restricted patterns of activities, behaviors or interests; B1:stereotyped or repetitive motor movements, use of objects, or speech; B2: insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior ; B3: highly restricted and fixated interests that are abnormal in intensity or focus ; B4: hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment.

Table 7. The AbBC Score Variation in the DSM-5 ASD B Sub-criteria

Diagnosis		AbBC median (min-max)	Z	p
B1	Made	37(3-133)	-2.1	0.31
	Not made	8.5(2-15)		
B2	Made	34.5(6-133)	-0.37	0.709
	Not made	37(2-103)		
B3	Made	33(3-133)	-0.06	0.95
	Not made	36(2-103)		
B4	Made	38(2-133)	-1.3	0.18
	Not made	28(6-78)		

B:repetitive, restricted patterns of activities, behaviors or interests; B1:stereotyped or repetitive motor movements, use of objects, or speech; B2: insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior ; B3: highly restricted and fixated interests that are abnormal in intensity or focus ; B4: hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment.

DISCUSSION

It is expected that diagnostic systems developed for a disorder such as ASD, requiring early diagnosis and intervention should have indubitable certainty of high specificity next to sensitivity so as not to miss detection of autism in children (Worley and Matson 2012).

Studies investigating the effect of gender on DSM-5 based ASD diagnosis did not report statistically significant differences between the incidences of meeting the diagnostic criteria. Maenner et al. (2014) reported that 81.4% of boys and 80% of girls; McPartland et al. (2012) found that 60.4% of boys and 60.2% of girls and Yaylacı and Miral (2017) determined that 80.2% of boys and 82.4% of girls met the diagnostic criteria of the DSM-5 for ASD. Significant differences were not observed. Similarly, in our study, 88.7% of boys and 88.9% of girls met the DSM-5 ASD criteria, and the difference was not found to be statistically significant. Also, not finding significant differences between the genders in the CARS and ABC scores was consistent with some

studies in the relevant field (Lai et al. 2011, Mayes and Calhoun 2011).

In one study, the mean CARS scores were 35.68 ± 4.65 and 27.18 ± 3.70 , respectively, in the groups with and without ASD according to DSM-5 criteria; and in the Baby and Infant Screen for Children with *Autism* Traits (BISCUIT) study the mean CARS scores were 57.49 ± 20.25 and 32.64 ± 15.23 in the groups with ASD with and without ASD on the basis of the DSM-5 criteria (Matson et al. 2012, Taheri and Perry 2012). In our analysis using the, there were significant differences between the CARS, ABC and AaBC scores of the groups with and without ASD on the criteria of the DSM-5.

Another noteworthy result of our study is the difference in the mean ages at the diagnosis of PDD of the groups with and without ASD diagnoses, the group without ASD diagnosis having a higher mean age, less severity of symptoms and therefore believed to consult the psychiatry clinic at a later age.

In our study, most of the patients who were not diagnosed with ASD did not meet the B criteria. Previous studies reported that the reason for not diagnosing some patients with ASD on the basis of DSM-5 criteria was the requirement of meeting at least 2 of the 4 B group criteria. Some authors have suggested that the cut-off value should be reduced to 2 criteria instead of 4 criteria for the symptoms of restricted and repetitive interests, activities and behaviours (Barton et al. 2013, Matson et al. 2012, Worley and Matson 2012).

The A group of criteria were met in many cases; but the incidences of meeting B2 (37.5%) and B3 (43.7%) were lower. The ranking order was found to be consistent with the results of Theri and Perry (2012) who found that B1, B2, B3 and B4 subgroup criteria were detected in respectively, in 81.7%, 19.8% 20.6% and 75.6% of the participants. It has been argued that while it is possible on the DSM-IV to make a diagnosis of ASD or PDD-NOS with the presence or the absence of the only one criterion on the symptoms of restricted and repetitive interests, activities and behaviours, the requirement in the DSM-5 of meeting two subcriteria in this area constituted a potential impediment to early diagnosis (Bent et al. 2017, Kim et al. 2014, Matson et al. 2012).

When we examined the relationship between age and the B criteria, finding significant differences in the incidences of meeting the B2 subcriteria with respect to age grouping support the opinion emphasized in the literature that some symptoms may emerge at later stages of life and that, therefore, the requirement of meeting at least 2 of the 4

criteria in the area of restricted area of interest and repetitive behaviours would create problems especially in the early age groups.

One of the differences introduced by the DSM-5 is the addition to the B group criteria of the B4 criterion on increased-decreased or unusual sensory response. Sensory problems in autistic children have been reported to vary between 42-88% (Tomchek and Dunn 2007). Baranek et al. (2006) reported that sensory reactivity was higher by 56% in children with ASD aged 2-7 years compared to neurotypical children. Lord et al. (1994) suggested that unusual sensory responses were found in 75-85% of children with ASD.

However, a consensus has not been made on how to evaluate objectively and measure sensorial abnormalities, especially in cases with poor verbal skills. In our study, the observation that B4 criterion was met by 81.3% of the cases, with 96.9% of these cases meeting and only 3.1% not meeting the DSM-5 ASD criteria, supports that adding the B4 criterion to the DSM-5 was justified.

It was emphasized in a meta-analysis study that the risk of diagnosis loss was higher in cases with Asperger's Disorder and PDD-NOS (Bennett and Goodall 2016). It was found by Mcpartland et al. (2012) that 10.2% of patients with autistic disorder, 16.6% of patients with Asperger's Disorder and 50% of patients with PDD-NOS, all diagnosed on the DSM IV, did not meet the DSM-5 ASD criteria. Mandy et al. (2012) found that almost all of patients with PDD-NOS according to DSM-IV did not meet the DSM-5 ASD criteria; and Matson et al. (2012) found that 24% of patients with autistic disorder and 88% of patients with PDD-NOS did not meet the DSM-5 ASD criteria. In our study, 75% (n=3) of the 4 patients with PDD-NOS, and 6.7% (n=5) of the 75 patients with autistic disorder and 1 patient with Asperger's Disorder were not diagnosed with ASD according to the DSM-5.

Despite the reports in the literature with contrary results, other studies did not report a significant effect of the mean age factor when comparing patients meeting and not meeting the DSM-5 ASD criteria (Gibbs et al. 2012, McPartland et al. 2012, Young and Rodi 2014). Our study is one of the rare studies evaluating the DSM-5 ASD criteria in early childhood. In contrast to other studies conducted with older children, the incidence of diagnosis loss was not high (11.3%), and the groups who met and did not meet the DSM-5 ASD did not differ significantly on the basis of the mean group age ($Z=-0.42$, $p=0.67$).

Although some of the studies made on the DSM-IV have reported a higher incidence of autism, the general belief is

that PDD-NOS is more prevalent in the society (Fombonne 2003, Towbin 2005). Presence of a few cases of Asperger's Disorder and PDD-NOS with milder symptoms than seen in autistic disorder in our study may be due to the failure of recognizing the symptoms in these children until starting school and, hence, less incidence of consulting the psychiatry clinic at earlier ages. As compared to other studies, the lower percentage among our patients of the children with PDD-NOS and Asperger's Disorder, which exhibit milder symptoms than autistic disorder, may be related to the less than expected incidence of diagnosis loss in the younger age groups.

Although a statistically significant age dependent difference was not found in our study between children with and without ASD diagnosis on the DSM-5 criteria, we believe that our study is important in being the first in Turkey and one of the few worldwide in evaluating the DSM-5 ASD and SCD criteria in early childhood, regarding that early diagnosis changes the course of autism which leads to progressive loss of functionality. When comparing the two diagnostic classifications, excluding the patients who did not meet the PDD criteria on the basis of DSM-IV-TR and not evaluating the patients with respect to comorbid psychiatric disorders and cognitive development are among the limitations of our study. Also, our results on pre-school children cannot be generalized to older children and adolescents or the adults.

Autism is a developmental and heterogeneous disorder that exhibits different symptoms at different stages of life. Our study is a cross-sectional study. Community-based longitudinal studies conducted with a larger number of cases in this field would give more valuable results by comparing the two diagnostic classes. Moreover, we think that identification of the early signs of autism in the newly developed diagnostic classifications and ordering the criteria so as to meet individual needs are important and necessary for early intervention in autism.

REFERENCES

- Amerikan Psikiyatri Birliđi (2013) Ruhsal Bozuklukların Tanısal ve Sayımsal El Kitabı, Beşinci Baskı (DSM-5) (Çev. ed.: E Körođlu) Hekimler Yayın Birliđi, Ankara.
- Baranek GT, David FJ, Poe MD et al (2006) Sensory Experiences Questionnaire: discriminating sensory features in young children with autism, developmental delays, and typical development. *J Child Psychol Psychiatry* 47:591-601.
- Barton ML, Robins DL, Jashar D et al (2013) Sensitivity and specificity of proposed DSM-5 criteria for autism spectrum disorder in toddlers. *J Autism Dev Disord* 43:1184-95.
- Beighley JS, Matson JL (2014) Comparing social skills in children diagnosed with autism spectrum disorder according to the DSM-IV-TR and the DSM-5. *J Dev Phys Disabil* 26:689-701.

- Beighley JS, Matson JL, Rieske RD et al (2013) Comparing challenging behavior in children diagnosed with autism spectrum disorders according to the DSM-IV-TR and the proposed DSM-5. *Dev Neurorehabil* 16:375-81.
- Bennett M, Goodall E (2016) A meta-analysis of DSM-5 autism diagnoses in relation to DSM-IV and DSM-IV-TR. *Rev J Autism Dev Disord* 3:119-24.
- Bent CA, Barbaro J, Dissanayake C (2017) Change in Autism Diagnoses Prior to and Following the Introduction of DSM-5. *J Autism Dev Disord* 47:163-71.
- Brukner Y, Laor N, Golan O (2016) Social (pragmatic) communication disorder and its relation to the autism spectrum: Dilemmas arising from the DSM-5 classification. *J Autism Dev Disord* 46:2821-9.
- Christiansz JA, Gray KM, Taffe J et al (2016) Autism Spectrum Disorder in the DSM-5: Diagnostic Sensitivity and Specificity in Early Childhood. *J Autism Dev Disord* 46:2054-63.
- Crowell JA, Fleischmann MA (1993) Use of structured resarch procedures in clinical assessments of infants. *Handbook of infant mental health*, Zeanah (Ed), New York, Guilford Press, p. 210-22.
- Fombonne E (2003) Epidemiological surveys of autism and other pervasive developmental disorders: an update. *J Autism Dev Disord* 33:365-82.
- Frazier TW, Youngstrom EA, Speer L et al (2012) Validation of proposed DSM-5 criteria for autism spectrum disorder. *J Am Acad Child Psychiatry* 51:28-40.
- Gibbs V, Aldridge F, Chandler F et al (2012) Brief report: an exploratory study comparing diagnostic outcomes for autism spectrum disorders under DSM-IV-TR with the proposed DSM-5 revision. *J Autism Dev Disord* 42:1750-6.
- Huerta M, Bishop SL, Duncan A et al (2012) Application of DSM-5 criteria for autism spectrum disorder to three samples of children with DSM-IV diagnoses of pervasive developmental disorders. *Am J Psychiatry* 169:1056-64.
- Irmak TY, Sütçü ST, Aydın A et al (2007) Otizm Davranış Kontrol Listesinin (Abc) Geçerlik ve Güvenirliğinin İncelenmesi. *Çocuk ve Gençlik Ruh Sağlığı Dergisi* 14:13-23.
- Karabekiroğlu K, Aman MG (2009) Validity of the aberrant behavior checklist in a clinical sample of toddlers. *Child Psychiatry Hum Dev* 40: 99-110.
- Kim YS, Fombonne E, Koh YJ (2014) A comparison of DSM-IV pervasive developmental disorder and DSM-5 autism spectrum disorder prevalence in an epidemiologic sample. *J Am Acad Child Adolesc Psychiatry* 53:500-8.
- Lai MC, Lombardo MV, Pasco G et al (2011) A behavioral comparison of male and female adults with high functioning autism spectrum conditions. *PloS one* 6:e20835.
- Lord C, Rutter M, Couteur A (1994) Autism Diagnostic Interview-Revised: a revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *J Autism Dev Disord* 24:659-85.
- Maenner MJ, Rice CE, Arneson CL et al (2014) Potential impact of DSM-5 criteria on autism spectrum disorder prevalence estimates. *JAMA psychiatry* 71:292-300.
- Mandy WP, Charman T, Skuse DH (2012) Testing the construct validity of proposed criteria for DSM-5 autism spectrum disorder. *J Am Acad Child Psychiatry* 51: 41-50.
- Matson JL, Belta BC, Horovitz M et al (2012) Comparing symptoms of autism spectrum disorders in a developmentally disabled adult population using the current DSM-IV-TR diagnostic criteria and the proposed DSM-5 diagnostic criteria. *J Dev Phys Disabil* 24:403-14.
- Matson JL, Kozlowski AM, Hattier MA et al (2012) DSM-IV vs DSM-5 diagnostic criteria for toddlers with autism. *Dev Neurorehabil* 15:185-90.
- Mattila ML, Kielinen M, Linna SL et al (2011) Autism spectrum disorders according to DSM-IV-TR and comparison with DSM-5 draft criteria: an epidemiological study. *J Am Acad Child Psychiatry* 50: 583-92.
- Mayer SD, Calhoun SL (2011) Impact of IQ, age, SES, gender, and race on autistic symptoms. *Res Autism Spectr Disord* 5:749-57.
- McPartland JC, Reichow B, Volkmar FR (2012) Sensitivity and specificity of proposed DSM-5 diagnostic criteria for autism spectrum disorder. *J Am Acad Child Psychiatry* 51:368-83.
- Mukaddes NM (2013) Otizm Spektrum Bozuklukları Tanı ve Takip. *İstanbul, Nobel Tıp Kitapevleri*, p. 5.
- Öztürk MO, Uluşahin A (2011) *Ruh sağlığı ve Bozuklukları*, 11. Baskı, Ankara, Nobel Tıp Kitapları, p. 218.
- Robert J, Reichler R, Rothen B (1988) *Practice DVD on Using the CARS*, Western Psychological Services.
- Saemundsen E, Magnússon P, Smári J et al (2003) Autism Diagnostic Interview-Revised and the Childhood Autism Rating Scale: convergence and discrepancy in diagnosing autism. *J Autism Dev Disord* 33:319-28.
- Sucuoğlu B, Oktem F, Akkok F et al (1996) A study of the scales for the assessment of the children with autism. *Psikiyatri, Psikoloji, Psikofarmakoloji (3P)* 4:116-21.
- Sucuoğlu B (2003) Sorun davranışlar kontrol listesi Türkçe formunun psikometrik özelliklerinin incelenmesi. *Türk Psikoloji Dergisi* 18:77-91.
- Swineford LB, Thurm A, Baird G et al (2014) Social (pragmatic) communication disorder: a research review of this new DSM-5 diagnostic category. *J Neurodev Disord* 6:41.
- Taheri A, Perry A (2012) Exploring the proposed DSM-5 criteria in a clinical sample. *J Autism Dev Disord* 42:1810-7.
- Tomchek SD, Dunn W (2007) Sensory processing in children with and without autism: a comparative study using the short sensory profile. *Am J Occup Ther* 61:190-200.
- Towbin KE (2005) Pervasive developmental disorder not otherwise specified. *Handbook of Autism and Pervasive Developmental Disorders*, 3th Ed. FR Volkmar, R Paul, A Klin, D Cohen (Ed), New York, Wiley, p. 165-200.
- Wilson CE, Gilla N, Spain D et al (2013) Comparison of ICD-10R, DSM-IV-TR and DSM-5 in an adult autism spectrum disorder diagnostic clinic. *J Autism Dev Disord* 43:2515-25.
- Wing L, Gould J, Gillberg C (2011) Autism spectrum disorders in the DSM-V: better or worse than the DSM-IV? *Res Dev Disabil* 32:768-73.
- Worley JA, Matson JL (2012) Comparing symptoms of autism spectrum disorders using the current DSM-IV-TR diagnostic criteria and the proposed DSM-V diagnostic criteria. *Res Autism Spectr Disord* 6:965-70.
- Yaylaci F, Miral S (2017) A Comparison of DSM-IV-TR and DSM-5 Diagnostic Classifications in the Clinical Diagnosis of Autistic Spectrum Disorder. *J Autism Dev Disord* 47:101-9 .
- Young RL, Rodi ML (2014) Redefining autism spectrum disorder using DSM-5: The implications of the proposed DSM-5 criteria for autism spectrum disorders. *J Autism Dev Disord* 44:758-65.
- Zeanah CH, Larrieu JA, Heller S et al (2000) *Infant-parent relationship assesment*. *Handbook of infant mental health*, 2th Ed. Zeanah (Ed), New York, Guilford Press, p. 222-35.