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Behavior Comparison and Social Evaluation Study of Parents of Twins with Autism Spectrum Disorder

Otizm Spektrum Bozukluğu olan İkizlerin Ebeveynleri Üzerinde Yapılan Davranış Karşılaştırması ve Sosyal Değerlendirme Çalışması

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ABSTRACT

Background: Autism spectrum disorder (ASD) is the most well-known neurodevelopmental disorder. Because there is no definitive biomarker for ASD, diagnosis is made based on the assessment of the patient's behavior. The aim of this study was to reveal the effect of psychological evaluation of parents on the behavioral and social situations of individuals with autism.

Materials and Methods: A total of 94 individuals aged 3-18, consisting of 15 pairs of monozygotic (MZ) (ASD: 29, healthy: 1), 32 pairs of dizygotic (DZ) twins (ASD: 41, healthy: 23) and their parents, were included in the study. In addition to comparing autistic and healthy twins in terms of clinical and developmental data, social inadequacies, communicative limitations, repetitive interests, and limitations were evaluated in patients with MZ and DZ. While the Autism Spectrum Questionnaire (AQ) and Toronto Alexithymia Scale (TAS-20) tests were administered to the parents, Beck Depression Inventory (BDI) and World Health Organization Quality of Life (WHOQOL-BREF) tests were also administered to the mothers.

Results: According to the developmental data of the individuals, significant differences were found between ASD and healthy individuals in terms of talking (p=0.00002) and toilet training (p=0.0003). In patients, it was determined that there was a relationship between the severity of the disease, repetitive interests and limitations (p=0.046) and speech (p=0.012). While there was a relationship between the WHOQOL-BREF subcategories applied to mothers and both AQ and BDI tests, statistical significance was also determined between the TAS-20 and BDI tests (p=0.016).

Conclusion: The effect of parents' psychological states on individuals with autism has been revealed. We believe that the clinical examinations of the twins, the psychological evaluations of their families, and the psychological state of the parents in the ASD clinic are effective. Thus, it has been clearly shown that the family factor is also important in improving the clinic of individuals with autism.

Keywords: Autism spectrum disorder, social and behavioral assessment, twins

ÖZ

Amaç: Otizm spektrum bozukluğu (OSB), en iyi bilinen nörogelişimsel bozukluk türüdür. OSB için kesin bir biyobelirteç olmadığından, hastanın davranışının değerlendirilmesine dayanarak tanı konur. Araştırma ile, ebeveynlerin psikolojik açıdan değerlendirilmesinin otizmli bireylerin davranışsal ve sosyal durumlarına etkisinin ortaya konması hedeflenmiştir.

Gereç ve Yöntemler: Çalışmaya yaşları 3-18 arası 15 çift monozigotik (MZ) (OSB: 29, sağlıklı: 1), 32 çift dizigotik (DZ) ikiz (OSB: 41, sağlıklı: 23) ve bunların ebeveynlerinden oluşan toplam 94 birey dahil edildi. İkizlerde otistik ve sağlıklı bireylerin klinik ve gelişimsel veriler açısından karşılaştırılmasının yanında, MZ ve DZ hastalarda sosyal yetersizlik, iletişimsel kısıtlılık, tekrarlayan ilgi ve kısıtlılıklar değerlendirildi. Ebeveynlere Otizm Spektrum Anketi (AQ) ve Toronto Aleksitimi Ölçeği (TAS-20) testleri uygulanırken, ayrıca annelere Beck Depresyon Envanteri (BDI) ve Dünya Sağlık Örgütü Yaşam Kalitesi (WHOQOL-BREF) testleri de uygulandı.

Bulgular: Bireylerin gelişimsel verilerine göre OSB ve sağlıklı bireyler arasında konuşma (p=0,00002) ve tuvalet eğitimi (p=0,0003) açısından anlamlı fark bulundu. Hasta bireylerde ise hastalığın şiddetinin, tekrarlayan ilgi ve kısıtlılıklar (p=0,046) ve konuşma (p=0,012) arasında ilişki olduğu belirlendi. Annelere uygulanan WHOQOL-BREF alt kategorilerinin ise hem AQ hem de BDI testleri arasında ilişki bulunurken, TAS-20 ve BDI testleri arasında da istatistiksel anlamlılık belirlendi (p=0,016).

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ÖZ

Sonuç: Çalışmamız neticesinde, otizmde ebeveynlerin psikolojik durumlarının otizmli bireyler üzerinde etkisi ortaya konmuştur. İkizlerin klinik muayeneleri ve ailelerinin psikolojik değerlendirmeleri ile OSB kliniğinde ebeveynlerin psikolojik durumunun etkili olduğunu düşünmekteyiz. Böylece, otizmli bireylerin kliniğinin iyileştirilmesinde aile faktörünün de önemli olduğu net bir şekilde görülmüştür.

Anahtar Kelimeler: Otizm spektrum bozukluğu, sosyal ve davranışsal değerlendirme, ikizler

Introduction

Autism spectrum disorder (ASD) refers to common neurodevelopmental disorders such as autism, Asperger's syndrome, and pervasive developmental disorder-not otherwise specified. ASD is characterized by deficits in social communication and behavioral disturbances. Repetitive interests and limitations, pragmatic communicative disorder, and different interests are symptoms associated with the disease (1). While the prevalence of the disease is approximately 5.2/1000, it is more common in boys (7.4/1000 boy births) than girls (2.8/1000) (2).

Emotional and behavioral disorders such as depression, anxiety, attention deficit and hyperactivity, tantrums, aggression, and sleep and eating disorders can be observed in individuals with ASD. Language and speech disorders, differences in cognitive functions, and aggressive behaviors are important in measuring the severity of ASD.

In the evaluation of autism-related symptoms, tools such as the Autism Diagnostic Interview-Revised, which is conducted through interviews with the families of the patients, and the Autism Diagnostic Observation Schedule, which is applied directly to individuals with autism, are used (3).

In individuals with autism, conditions such as attention deficit/hyperactivity disorder, epilepsy, depression, anxiety, and oppositional defiant disorder, as well as gastrointestinal symptoms, sleep problems, feeding problems, and toilet problems are among the comorbidities encountered in ASD (4).

Studies conducted with twin individuals on the etiology of the disease have reported that genetic and environmental factors play a crucial role in the emergence of neurological and psychiatric conditions such as ASD. Although ASD is known as a heterogenic disease with over 1000 genes, it has been reported that these genetic factors are effective in approximately 25-35% of patients (5).

As pharmaceutical therapy, risperidone and aripiprazole are US food and drug administration-approved drugs used for the treatment of ASD-related symptoms. When current treatment options are examined, it reveals the importance of personalized therapy and early treatment in individuals with autism in increasing the quality of life of patients (6).

In the literature, various tests are applied to individuals with ASD and their parents, such as Autism Spectrum Quotient (AQ), Social Communication Questionnaire (SCQ), Childhood Autism Rating Scale (CARS), Autism Behavior Checklist (ABC), Beck Depression Inventory (BDI), Toronto Alexithymia Scale (TAS-20), and World Health Organization Quality of Life (WHOQOL-BREF). While tests such as AQ, SCQ, CARS, and ABC are used to evaluate autism characteristics, BDI is used to evaluate depression status, TAS-20 is used to describe and express moods, and WHOQOL-BREF is used to evaluate quality of life (7,8,9,10,11,12).

Although there are some studies in which the psychological state of individuals is evaluated using various tests, there is no comprehensive study in the literature that specifically evaluates the emotional state and psychological condition of the parents of twin patients and their contribution to the disease. In this study, we evaluated monozygotic (MZ) and dizygotic twins (DZ) individuals with ASD in terms of clinical features such as social disability, communicative limitations, repetitive interests, and limitations, compared characteristic features and developmental aspects, and investigated the differences in clinical features between ASD and healthy individuals. In addition, we tested the parents of the twins by applying tests such as BDI, TAS-20, WHOQOL-BREF, and AQ and making psychological, social, and behavioral evaluations to examine whether the parents could influence the behavior of individuals with autism. Concordantly, we aimed to clarify whether the parents of twins with autism are psychologically healthy or not may affect the behavioral characteristics of the patients.

Numerous studies on MZ and DZ twins have investigated the genetic and clinical background of ASD. These studies are very useful in examining the influence of familial factors on the etiology of the disease (13). Based on this, we decided to conduct a study on MZ and DZ twins to investigate whether familial factors influence ASD patients. Because of this research, we bring individuals with more favorable living standards into society by adding the family factor to their treatment.

Materials and Methods

Study Design

Our study was conducted with concordant and discordant twins diagnosed with ASD at the Child and Adolescent Psychiatry Clinic. The number of volunteers required for the study was calculated using the G*Power program (V.3.1.9.4, Heinrich-Heine-University) (Effect size DZ: 0.343, α err prob: 0.05, Power (1-β err prob): 0.95, Total sample size: 94). Ethical approval of the project was obtained from the Clinical Research Ethics Committee of the University of Health Sciences Türkiye, İstanbul Ümraniye Training and Research Hospital (decision number: 218, date: 19/12/2018). Data of the volunteers were collected after obtaining informed consent from their parents. The study included 30 monozygotes (29 affected, 1 healthy), 64 dizygotes (41 affected, 23 healthy), and their mothers and/or fathers. The age of the individuals ranged from 3 to 18 years. The diagnosis was made by a specialist pediatric psychiatrist in accordance with the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) (1). In addition, the Turkish version of the SCQ (current version) CARS and ABC tests were used. Following clinical evaluations and autism-related tests by a specialist psychiatrist, either one or both twin pairs were diagnosed with ASD. Twin siblings who did not show any disease symptoms were included in the control group. Individuals who were not twins and whose ages were not between 3 and 18 years, as well as patients with psychotic disorders and bipolar mood disorders, were not included in the study. Care was taken to ensure that the healthy twins with ASD did not have autism symptoms or any neurodevelopmental disease.

After the diagnosis, a clinical data form including demographic data (Table 1, 2 and 3), social disability, communicative limitation, and repetitive interests and limitations (Table 4) was filled with the families of twins. Then, a set of tests was applied to examine the psychological status of their parents and to investigate the effect of this on individuals with autism. AQ and TAS-20 tests were applied to the mothers and fathers of the individuals. Additionally, BDI and WHOQOL-BREF tests were administered to mothers. The Turkish version of all the tests administered to individuals was used.

Autism Spectrum Quotient (AQ)

The AQ test, which is used to measure the autistic characteristics of individuals, consists of 50 questions divided into five categories. These categories are social skill (items 1, 11, 13, 15, 22, 36, 44, 45, 47, 48); attention switching (items 2, 4, 10, 16, 25, 32, 34, 37, 43, 46); attention to detail (items 5, 6, 9, 12, 19, 23, 28, 29, 30, 49); communication (items 7, 17, 18, 26, 27, 31, 33, 35, 38, 39); and imagination (items 3, 8, 14, 20, 21, 24, 40, 41, 42, 50). Evaluated candidates give an answer "strongly agree", "frequently agree", "sometimes agree" or "strongly disagree" for each item. Scoring system 2, 4, 5, 6, 7, 9, 12, 13, 16, 18, 19, 20, 21, 22, 23, 26, 33, 35, 39, 41, 42, 43, 45, 46. One point, 1, 3, 8, 10, 11, 14, 15, 17, 24, 25, 27, 28, 29, 30, 31, 32, 34 for each "strongly agree" or "frequently agree" answers to the items 36, 37, 38, 40, 44, 47, 48, 49 and 50 items were calculated as 1 point for "strongly disagree" or "sometimes agree" answers. The minimum score that can be obtained from the OA test is 0, and the maximum score is 50. The minimum score that can be taken from the AQ test is 0 and the maximum score is 50. The cut-off value for the test was determined as AQ≥32 (11,14).

Toronto Alexithymia Scale-20 (TAS-20)

TAS-20 consists of 20 questions divided into three categories. These categories are "difficulty identifying feelings" (items 1, 3, 6, 9, 13, 14), "difficulty describing feelings" (items 2, 4, 11, 12, 17) and "externally-oriented thinking" (5, 8, 10, 15, 16, 18, 20). Respondents were given a score of 1-5 for their answers, "never", "rarely", "sometimes", "often" and "always". According to the total score obtained, a score of ⩽51 was evaluated as "no alexithymia", 52-62 points as "probable alexithymia" and ⩾61 points as "have alexithymia" (12).

Beck Depression Inventory (BDI)

The BDI, which we use to measure the level of depression in mothers, consists of 21 items. Scores between 0 and 3 are given for the answer given to each item. The total score that can be obtained from the test is between 0 and 63. Depression grade according to the total score was evaluated as "minimal depression" between 0 and 9, "mild depression" between 10 and 16, "moderate depression" approximately 17-29 and "severe depression" between 30 and 63 (7,15,16).

WHOQOL-BREF

This test, which is used to evaluate the quality of life of mothers, consists of 27 items. Individuals' answers to each question were evaluated on a score of 1-5. The questions were evaluated by dividing into 5 sub-parameters as "general health status" (items 1, 2), "physical health" (items 3, 4, 10, 15, 16, 17, 18), "psychological" (items 5, 6, 7, 11, 19, 26), "Social relations" (items 20, 21, 22) and "Environment" (items 8, 9, 12, 13, 14, 23, 24, 25). The formula for converting the obtained scores from the "raw" score to the percentage system is as follows (8,17).

$$\frac{\text{The raw score of the patient} - \text{The lowest possible score for that sub parameter}}{\text{The score range of that sub parameter}} \times 100$$

Table 1. Characteristics of twins

	ASD		Healthy				
	Mean (min.-max.)	SD	Mean (min.-max.)	SD	p-value	CI	
						Lower	Upper
Age	7.24 (3-18)	2.961	8.04 (3-18)	4.144	0.308	-2.348	0.750
	n	%	n	%	p-value		
Gender	70		24				
Male	44	62.86	14	58.33	0.809		
Female	26	37.14	10	41.66			
Twins	70		24				
MZ	29	41.43	1	4.17	0.001		
DZ	41	58.57	23	95.83			
Diagnosis-severity	70		24				
Mild	44	62.86	-	-	0.903*		
Moderate	20	28.57	-	-			
Severe	6	8.57	-	-			
Birth time	70		24				
Pre-term (<37th week)	40	57.14	14	58.33	0.149		
Term (37-41th week)	30	42.86	10	41.67			
Post-term (≥42th week)	-	-	-	-			
Birth weight	70		24				
Very low (<1500 g)	6	8.57	2	8.33	0.817		
Low (<2500 g)	33	47.14	13	54.17			
Normal (2500-3999 g)	29	41.43	9	37.50			
High (>4000 g)	2	2.86	-	-			
Epilepsy	70		24				
Yes	4	5.71	0	0.00	0.301		
No	66	94.29	24	100.0			
History of the incubator	70		24				
Yes	37	52.86	16	66.67	0.239		
No	33	47.14	8	33.33			

*: p-value was calculated between the MZ and DZ groups for this category
ASD: Autism spectrum disorder, n: Number of volunteers, SD: Standard deviation, CI: Confidence interval, MZ: Monozygotic twins, DZ: Dizygotic twins, min.-max.: Minimum-maximum

Statistical Analysis

The SPSS (V 25.0) statistical analysis program for Windows was used to evaluate the obtained data (IBM SPSS Statistics, SPSS Inc., Chicago, IL, USA). Pearson's chi-square and Fisher's Exact tests were used to compare the characteristics and developmental information of ASD and healthy twins, diagnostic features in twins with ASD, characteristics of the families of the twins, and other parental information. Pearson correlation and One-Way ANOVA tests were used in the analysis of the TAS-20, AQ, WHOQOL-BREF, and BDI tests applied to mothers and fathers. In addition, logistic regression analysis was performed to determine the relationship between the AQ score and alexithymia in the parents. The statistical significance value found because of the comparison between variables was accepted as $p \leq 0.05$.

Table 2. Developmental information of twins

	ASD		Healthy		
	n	%	n	%	p-value
Unsupported sitting	70		24		
Early (<7 months)	9	12.86	1	4.17	0.067
In time (7-9 month)	52	74.3	23	95.83	
Late (>7-9 month)	9	12.86	-	-	
Babbling	70		24		
Early (<3 month)	-	-	1	4.17	0.075
In time (3 month)	54	77.14	22	91.67	
Late (>3 months)	13	18.57	1	4.17	
No babbling	3	4.26	-	-	
Teething	70		24		
Early (<6 months)	6	8.57	-	-	0.199
In time (6-8 month)	50	71.43	21	87.50	
Late (>6-8 month)	14	20.00	3	12.50	
Walking	70		24		
Early (<11 months)	5	7.14	-	-	0.236
In time (11-15 month)	47	67.14	21	87.50	
Late (>11-15 month)	17	24.38	3	12.50	
No walking	1	1.43	-	-	
Talking	70		24		
Yes	33	47.14	24	100.0	0.00002
No	11	15.71	-	-	
Regression	26	37.14	-	-	
Toilet training	70		24		
Early (<2-3 years)	1	1.43	-	-	0.0003
Normal (2-3 years)	22	31.43	19	79.17	
Late (≥4 years)	23	32.86	-	-	
No toilet training	24	34.28	5	20.83	

ASD: Autism spectrum disorder, n: Number of volunteers

Results

When the clinical characteristics of twin individuals were examined, it was observed that most of the individuals with ASD consisted of males (62.86%). While the age range of the individuals ranged from 3 to 18, the average age of individuals with ASD were 7.4 (±2.961) and that of healthy individuals were 8.4 (±4.144). When the ratio of patients and healthy individuals in MZ and DZ included in the study was examined, it was observed that the number of couples in which both siblings were sick was higher in MZ individuals (p=0.001). According to the evaluation of MZ and DZ individuals in terms of the severity of the disease, there was no significant difference between the two groups (p=0.903). Moreover, it was observed that the diagnosis of the disease was mild (62.86%) in most of the individuals and a very small portion (8.57%) was severe. In addition, epilepsy was detected in one MZ couple and two separated DZ individuals with ASD disease, and the disease was not observed in any of the healthy individuals (p=0.301) (Table 1).

According to the developmental data of the individuals, significant differences were found between ASD and healthy individuals in terms of talking (p=0.00002) and toilet training (p=0.0003). It was observed that 37.14% of individuals with ASD had regression in terms of talking in certain periods of their lives (Table 2). In addition, there was a correlation between the severity of the disease and speech (p=0.012).

When the demographic data of the mothers and fathers of twin individuals were examined, there was statistical significance in terms of age (p=0.012), education level (p=0.0001), and childbearing age (p=0.001). The research revealed that more than half of the mothers (51.06%) and fathers (55.32%) used alcohol, cigarettes, or drugs (p=0.029). While the age at which mothers had twins was between 20 and 43, the age at which fathers had twins was between 25 and 44 (Table 3).

In the study, the diagnostic characteristics of the patients were examined by dividing them into social disability, communicative limitation, and repetitive interests and limitations (Table 4), and then these data were compared between MZ and DZ patients.

In the social disability category, a significant difference was found in terms of "not looking when his/her name is called" (p=0.009) and "play with certain repetitive objects" (p=0.011). Additionally, regression was found in two individuals in terms of "not looking when his/her name is called", and "play with certain repetitive objects" features (Table 4).

When the category of communicative limitations was examined, statistical significance was determined in the "no speaking" feature between the two groups (p=0.007) (Table 4). It was also observed that most patients had "communicative limitation" (78.0%), "speech delay" (91.43%), "limitations in non-verbal communication" (75.6%), and "atypical speech and prosody" (72.0%).

Because of the examination of repetitive interests and limitations in patients with MZ and DZ, a statistical significance was found in "an area of interest with abnormal intensity or focus, which has become highly restricted and unchanged" characteristic (p=0.030) (Table 4). In individuals with ASD, there was a correlation between the severity of the disease and repetitive interests and limitations (p=0.046).

Table 3. Characteristics of parents of twins

	Mother		Father		
	Mean (min.-max.)	**SD**	**Mean (min.-max.)**	**SD**	**p-value**
Age	37.94 (25-54)	6.34	41.40 (30-57)	5.34	0.012
Childbearing age	30.45 (20-43)	5.28	33.91 (25-44)	4.40	0.001
	n	**%**	**n**	**%**	**p-value**
Educational level	47		47		
Elementary school	12	25.53	10	21.28	0.0001
Middle school	3	6.38	2	4.26	
High school	16	34.04	13	27.66	
Bachelor's degree	12	25.53	17	36.17	
Associate degree	4	8.51	5	10.64	
Alcohol, smoking, or drug use	47		47		
Yes	24	51.06	26	55.32	0.029
No	23	48.94	21	44.68	

n: Number of volunteers, SD: Standard deviation, min.-max.: Minimum-maximum

Table 4. Diagnostic features in twins with ASD

	No		Few		Yes		Yes, Then No/		Getting better with special education		Regression		
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	***p-value**
Not looking when his/her name is called	15	21.43	12	17.14	14	20.00	24	34.29	4	5.71	1	1.43	0.009
Play with certain repetitive objects	33	47.14	4	5.71	23	32.86	8	11.43	1	1.43	1	1.43	0.011
No speaking	60	85.71	-	-	10	14.29	-	-	-	-	-	-	0.007
Speech delay	6	8.57	-	-	64	91.43	-	-	-	-	-	-	0.069
Inability to understand what is being said	42	60.00	12	17.14	14	20.00	1	1.43	1	1.43	-	-	0.603
An area of interest with abnormal intensity or focus that has become highly restricted and unchanged	40	57.14	-	-	30	42.86	-	-	-	-	-	-	0.030

*: P-values were calculated between the MZ and DZ groups
ASD: Autism spectrum disorder, n: Number of volunteers

Table 5. TAS-20 and AQ evaluations in the mother and father of twins

MOTHER				**FATHER**			
	Mean (min.-max.)	**SD**	**p-value**		**Mean (min.-max.)**	**SD**	**p-value**
AQ	18.42 (7-31)	5.521	0.168	AQ	20.64 (7-33)	5.645	0.083
	n	**%**			**n**	**%**	
TAS-20	**45**			TAS-20	**34**		
No alexitimia	16	35.56		No alexitimia	13	33.33	
Possible alexitimia	22	48.89		Possible alexitimia	10	25.64	
Have alexitimia	7	15.56		Have alexitimia	16	41.03	

Comparison between TAS-20 and AQ
AQ: Autism spectrum questionnaire, TAS-20: Toronto alexithymia scale-20, n: Number of volunteers, SD: Standard deviation, min.-max.: Minimum-maximum

The statistical significance between the TAS-20 and AQ tests applied to mothers and fathers was examined consequently; as a result, no significance was found in the tests of both mothers (p=0.168) and fathers (p=0.083) (Table 5). When the relationship between the parents' AQ score and the results of alexithymia were examined by logistic regression analysis, no significance was observed for any category (p>0.05). However, in the TAS-20 test performed on mothers, it was observed that most of the individuals had "possible alexithymia" (48.89%), while fathers had "have alexithymia" (41.03%). In addition, with the AQ test score applied to the fathers, it was determined that two individuals exceeded the cut-off value. When the results of the WHOQOL-BREF and BDI tests applied to the mothers were evaluated, it was determined that there was statistical significance in all WHOQOL-BREF raw scores and percentage system results when compared with the BDI test (Table 6). However, the results were not significant in terms of the BDI subgroups (p=0.058).

When examining whether there is a relationship between the results of the AQ and WHOQOL-BREF test applied to mothers, a correlation was found between Physical health (p=0.002), Psychological (p=0.001), Social relations (p=0.006) and Environment (p=0.001) scores, and AQ, respectively. According to the comparison between the TAS-20 and BDI test results, statistical significance was determined between the groups (p=0.016).

Discussion

Table 6. WHOQOL-BREF and BDI evaluations in mothers of twins

	Mean (min.-max.)	SD	p-value
WHOQOL-BREF raw score			
General health status	6.49 (3-9)	1.520	0.0003
Physical health	26.00 (12-35)	5.011	0.001
Psychological	21.26 (7-29)	4.541	0.0008
Social relations	9.28 (4-13)	2.438	0.016
Environment	25.95 (14-36)	5.256	0.052
WHOQOL-BREF percentage system			
General health status (%)	56.09 (12.5-87.5)	18.99	0.0003
Physical health (%)	67.85 (17.9-100.0)	17.89	0.0008
Psychological (%)	63.57 (4.2-95.8)	18.91	0.0000002
Social relations (%)	52.35 (8.3-83.3)	20.32	0.015
Environment (%)	56.11 (18.8-87.5)	16.42	0.052

Comparison between WHOQOL-BREF and BDI
BDI: Beck depression inventory, WHOQOL-BREF: World Health Organization Quality of Life, SD: Standard deviation, min.-max.: Minimum-maximum

Various neuroanatomical changes in the human brain are crucial for developing behaviors during the first years of life. Along with the enlargement of the brain volume of individuals with autism, it was observed that white matter increased in the frontotemporal regions related to social cognition and language and decreased in the frontal region when viewed regionally (18).

It has been detected that non-verbal, cognitive, and social skills are also important for language development in individuals, besides speech-related disorders that frequently occur in individuals with ASD (19). Although speech delay is seen in most patients, situations such as not being able to speak have been detected in some individuals. In addition, situations such as meaningless words and echolalia are also known as encountered speech disorders in individuals with autism (20). When the ABC scores were compared in individuals with autism who speak and do not speak, it was reported that dumb individuals in terms of autistic behavior come into prominence more according to speakers. In addition, when expressive language skills were excluded from scoring, dumb individuals had a higher degree of autism severity (21). While speech delay was detected in most of our patients in our study too (91.43%), inability to speak situation (14.29%) was also observed in some individuals. repetitive behaviors are common in phenomena associated with developmental disorders and ASD. When this situation was compared according to age in individuals with autism, it was seen that it occurs less frequently and in severity in elderly individuals. Therefore, it is thought that the severity of autism symptoms in the phenotype is related to age (22). In a study comparing children with ASD with individuals who have developmental disorders and typical development in terms of repetitive behaviors and limitations, it has been revealed that situations such as sensorimotor and insistence on sameness are more common in children with ASD, but there is no relationship in terms of the severity of disease (23). In this study, it was understood that this kind of behaviors were seen more clearly in the phenotype with the severity of disease by detecting the correlation between repetitive interest and limitations. In light of this information, a statistically significant difference was detected among the severity of disease and inability to speak (p=0.007) and repetitive interests and limitations (p=0.046).

When the risk factors that cause ASD were evaluated, while considering mother's smoking in her gestation period, it was reported that grandmother's smoking may also be effective in the emergence of ASD in her grandchild via mother (23). However, there are studies in which smoking is not related to autism (24). In addition, there is no sufficient evidence that alcohol use can cause autism (25). Although

there are studies in the literature about how smoking and alcohol use during pregnancy can cause common neurodevelopmental disorders such as autism, there is no study in which mothers and fathers evaluated these risk factors except gestation. In addition, exact information could not be obtained in terms of smoking and alcohol use during pregnancy causing ASD. In our study, in consequence of the evaluation of parents in terms of smoking, alcohol, and drug use, it was determined that approximately half of both mothers (51.06%) and fathers (55.32%) used at least one of these potential risk factors (p=0.029).

In the social deficiency category, a statistically significant difference was detected in our patients in terms of symptoms such as "not looking when his/her name is called" (p=0.009), "being passive, reaching the desired toy with the help of the caregiver" (p=0.042), and just "playing specific objects continually" (p=0.011). Although autism is a disease characterized by mood disorders, symptoms of which are seen in the early period of an individual's life, and especially social deficiency is prominent, the mechanisms causing these situations are still being investigated. When social behaviors in two-year-old individuals with ASD were examined, it was observed that the lack of eye contact was correlated with an excess level of social deficiency, and it was suggested that this behavior could be a clinical marker for the early detection of the disease (26).

Brain volume overgrowth is associated with the emergence of autistic social disorders. This situation demonstrates that early brain changes occur during the period in which autistic behaviors first emerge (27). In this study, which we conducted with twin individuals, consistent results with the literature were obtained in the wake of the evaluation of individuals regarding social disability, especially in terms of eye contact deficiency. In addition, it has been determined that there is a decrease in social disability with special education given to individuals from an early age.

Tests such as AQ, BDI, TAS-20, and WHOQOL-BREF are applied in the investigation of the relationship between the conditions observed in individuals and the occurrence of the disease by measuring the mental and physical health of parents of children with ASD. In a study that evaluated individuals' life quality, it was detected that the life quality of parents with individuals with autism is lower than those who have healthy and physically disabled children (p<0.01) in all categories, with WHOQOL-BREF scale evaluation (28). In a similar study in which quality of life and depression levels were measured with WHOQOL-BREF and BDI tests, it was reported that while there was a negative correlation between depression level and quality of life scores in Turkish mothers with children with Down syndrome, cerebral palsy, and ASD, it has also been revealed that age, education, and income level are also effective on depression and life expectancy on the quality of life because of the evaluation of these tests with demographic data (29). When depression and anxiety situations are examined in parents of autism patients, while depression situations are not detected in fathers, it has been seen that mothers' anxiety and depression levels are higher than those of fathers. Therefore, it is determined that psychologic problems are mostly seen in individuals' mothers (30). In our study, while mild and moderate depression was determined in mothers, it was found that quality of life had a negative correlation with depression level, in line with the literature (p=0.001). As it has been thought that parents with children with autism may have autistic characteristics, in some studies, the AQ survey was applied to mothers and fathers apart from children to examine this situation. Because of the comparison of mothers and fathers with and without children with ASD, it has been reported that parents with diseased children have a higher AQ score. Although there are studies supporting this result in the literature (14), a similar study reported that there was no significant difference between individuals in terms of AQ scores (31). While there was no significant result supporting this study in our study's results, it was found that the AQ score exceeded the cut-off value in only two fathers. With these evaluations, it has not been conclusively demonstrated that the AQ score of the parents is effective in determining a relationship in terms of having a child with autism.

Because of the examination of TAS-20 and BDI scores in individuals with children with autism, the subcategories of "complexity in identifying emotions" and "difficulty in identifying emotions" in mothers were associated with depression measurement results (32). In our study, with the comparison of these two tests administered to the mothers of autism patients, it was determined that there was a relationship between the results of the two tests. When we evaluated the alexithymia situation among mothers and fathers, we found that most of the mothers were in the "possible alexithymia" category, and most of the fathers were in the "have alexithymia" category. In another study, it was determined that while the TAS-20 scores of the parents of individuals with ASD were higher than those of the control group, it was reported that the children of fathers with high alexithymia scores had higher repetitive behavioral symptoms scores (33). In another study evaluating the relationship between depression, anxiety, and alexithymia in the parents of individuals with neurodevelopmental disorders and the severity of the disease in children, it was reported that alexithymia symptoms were higher in the parents of individuals with autism, whereas depression and anxiety situations in mothers were higher than those in fathers. It was also revealed a correlation among alexithymia,

anxiety, and depression in parents as a consequence of research (34). When we evaluated the relationship between alexithymia and depression, we found a relationship between alexithymia and depression in accordance with the literature, according to the comparison between TAS-20 and BDI test results (p=0.016).

Study Limitations

Studies on the importance of familial factors in autism clinics are very limited. Because ASD is a disease characterized by limitations in social communication, the attitudes and behaviors of the individual, especially the close people, are considered to be a factor in the development of the disease.

Conclusion

In addition to the evaluation of social and behavioral abnormalities in autism, considering the psychological status and quality of life of the parents of the patients sheds light on the etiology of the disease. This research is important in revealing the role of parents' psychological states in neurodevelopmental diseases such as ASD. Such studies are especially important for determining the emergence and prognosis of diseases related to behavioral disorders like autism.

Ethics

Ethics Committee Approval: Ethical approval of the project was obtained from the Clinical Research Ethics Committee of the University of Health Sciences Türkiye, İstanbul Ümraniye Training and Research Hospital (decision number: 218, date: 19/12/2018).

Informed Consent: Data of the volunteers were collected after obtaining informed consent from their parents.

Authorship Contributions

Concept: E.C., Design: E.C., H.Y., Data Collection or Processing: H.Y., P.A.D., Analysis or Interpretation: E.C., H.Y., Literature Search: E.C., H.Y., Writing: E.C., H.Y., P.A.D.

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