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ORIGINAL ARTICLE

Examination of Teachers' Knowledge Level and Attitudes About Autism Spectrum Disorder

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Abstract

Introduction: Teachers are part of a child's first social environment; therefore, their knowledge is crucial to the early diagnosis of the autism spectrum. Teachers have a fundamental role in the support services and educational advancement of autistic children. This study aims to determine teachers' knowledge levels and attitudes about autism spectrum disorders (ASD).

Methods: This cross-sectional study is a descriptive, national single-center survey study. The target population is teachers who work in preschools, primary schools, and special education centers. It was aimed to reach at least 286 participants. The questionnaire contains sociodemographic data and an ASD knowledge level test.

Results: 21.2% of respondents felt competent in providing training to students with ASD, and 17.2% of them found the level of their knowledge sufficient. 70.6% of the teachers stated that inclusion is required. The rate of correct answers to the statements of teachers who participated in the training about autism was significantly higher than those who didn't.

Discussion and Conclusion: The knowledge level of teachers about ASD is sufficient, but they feel inadequate due to the large number of students to deal with in the classroom. The quality of life of these children with special needs will increase if primary care physicians provide education and counseling to teachers to increase awareness and knowledge about autism.

Keywords: Autism spectrum disorders; Early diagnosis; Pervasive child development disorders.

Autism Spectrum Disorder (ASD) is a developmental disorder characterized by persistent difficulties in social communication and interaction, and restrictive and repetitive behavioral patterns, interests, and activities. According to the latest report published by the Autism and Developmental Disabilities Monitoring Network in 2018, autism is seen in 1 in every 44 children. In the report announced 10 years ago, this rate was 1/88[1]. According to the report published by the Turkish Grand National Assembly in 2020, it is estimated that "there are around 550 thousand individuals with autism in Türkiye and the number of children with autism in the 0-14 age group in Türkiye is 140 thousand"[2]. There is no known single cause for autism spectrum disorder. Studies are showing that it is a heterogeneous disorder caused by a combination of genetic, epigenetic, and environmental factors[3]. It is common for two or more disorders to coexist in the same individual in ASD. Comorbid conditions such as multiple psychiatric disorders, anxiety, depression, attention deficit/hyperactivity disorder (AD/HD), epilepsy, gastrointestinal symptoms/problems, sleep disorders, learning disabilities, obsessive-compulsive disorder (OCD), intellectual disability, sensory problems, and immune

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disorders can occur alongside ASD[4]. Although individuals with ASD are very different from each other, the disorder is characterized by key features in two areas, regardless of culture, race, ethnicity, or socioeconomic group: social communication difficulties and restricted, repetitive sensory-motor behaviors[5]. In 2007, the American Academy of Pediatrics recommended screening for ASD at 18- and 24-month visits to increase the sensitivity of the diagnosis of ASD and reduce diagnosis age[6]. To establish a chain of early diagnosis, treatment, and intervention in autism in Türkiye; ASD Screening and Follow-up Program was established in 2017 as an activity of the Autism Action Plan and the National Mental Health Action Plan. All children between the ages of 1.5 and 6 are evaluated by family physicians in terms of autism risk factors[7]. The goals of ASD treatment are to minimize core deficits (repetitive behaviors and interests, persistent deficits in social communication and social interaction) and co-occurring associated disorders, to maximize functional independence by facilitating the learning and acquisition of adaptive skills, and to eliminate problematic behaviors that may interfere with functional skills[8].

The role of teachers in the diagnosis and follow-up of ASD is important enough to shape children's destiny[9]. Appropriate education given by teachers to children with autism at an early age has an accelerating and improving effect on the cognitive, language, and social development of children[10]. In addition to improving behavioral disorders and social relations, it provides lasting effects for children with autism in many subjects such as ensuring attendance at school, standing on their own feet in society, and positively affecting academic success[11].

Teachers are an inseparable part of a child's first social environment; their knowledge about the child is crucial to the early diagnosis of autistic children. Furthermore, teachers have a fundamental role in the support services and educational advancement of autistic children; therefore, their knowledge of ASD is critical for long-term outcomes. The aim of this study is to determine teachers' knowledge levels and attitudes about autism spectrum disorder.

Materials and Methods

The study design is a descriptive cross-sectional study. This study was approved by a local Ethics Committee on 20.08.2021 with the decision numbered 2021-169. The research area is pre-school, primary school, and special education centers in the Konak district of İzmir province. The study was conducted in accordance with the Declaration of Helsinki.

According to the information on the current website of the Konak District Governorship, a total of 1113 teachers, 35 of whom are in pre-school education institutions, 1052 in primary schools, and 26 in special education schools and classes, are working in the Konak district of İzmir. The sample size was calculated as 286 using a formula for finite population sampling, taking a confidence level of 95% and an anticipated population proportion of 50%. There are 344 teachers who gave consent to participate in the survey. Data were collected through online questionnaires consisting of two parts. The first part consists of 18 questions regarding the informed consent form, sociodemographic data, introductory characteristics of the participants, and their personal experiences with ASD. In the second part, there are 19 statements prepared based on the DSM-V diagnostic criteria and a review of the literature. Participants were asked to give one of the answers to these statements, including the options "true, false, I have no idea." Since there is no scale evaluation for this part, the answers given to the statements were evaluated separately.

SPSS 25.0 (Statistical Package for the Social Sciences) program was used for the analysis of the study. Frequency, percentage, mean, and standard deviation values of descriptive data were calculated. ASD knowledge level was measured with 19 questions, and the relationship between sociodemographic characteristics and encountering people with ASD was analyzed with the chi-square test. For all analyses, $p<0.05$ was considered significant.

Results

71.8% of the participants are female, and the mean age of the whole group is 41.97±10.65 years (min. 22–max. 65). Two out of three people have children. About half of this group, all of whom are teachers, are branch teachers, and more than half of them have more than 15 years of experience in their profession. The distribution of other sociodemographic characteristics is shown in Table 1.

While 22.4% of teachers currently have a student diagnosed with ASD, 53.5% reported that they've had at least one student diagnosed with ASD throughout their professional life. One out of three teachers has a relative or a friend with ASD. 37.5% of the participants have a relative or a friend with suspected ASD. About half of the group reported that they could distinguish a child with ASD. 35.5% of the group attended training about ASD, but only 21.2% felt competent in providing training, and 17.2% found their level of knowledge sufficient. 70.6% of the teachers stated

Table 1. Socio-demographic characteristics of the respondents

	n	%
Age 41.09±10.35 (min. 22- max. 65)		
Gender		
Male	97	28.2
Female	247	71.8
Child presence		
Yes	238	69.2
No	106	30.8
Branch		
Branch teacher	182	52.9
Pre-school teacher	27	7.8
Special education teacher	35	10.2
Guidance counselor	18	5.2
Primary school teacher	82	23.8
Time spent in the profession (years)		
0-5	53	15.4
6-10	46	13.7
10-15	46	13.4
More than 15	199	57.6
Total	344	100.0

Table 2. Participants' experiences with ASD (Autism Spectrum Disorder)

	n	%
Currently a student with ASD		
Yes	77	22.4
No	267	77.6
Having experience teaching a student with ASD		
Yes	184	53.5
No	160	46.5
Feeling competent to teach a student with ASD		
Yes	73	21.2
No	176	51.2
I'm undecided	95	27.6
Participation in education about ASD		
Yes	122	35.5
No	222	64.5
Finding the ASD knowledge level sufficient		
Yes	59	17.2
No	198	57.6
I'm undecided	87	25.3
Supporting inclusion/integration in among students		
Yes	243	70.6
No	34	9.9
I'm undecided	67	19.5
Heard of the term "shadow teacher"		
Yes	187	54.4
No	157	45.6
Informed about the National Action Plan		
Yes	78	22.7
No	266	77.3
Identifying a student with autism		
Yes	184	53.5
No	45	13.1
I'm undecided	115	33.4
Having a relative or a friend diagnosed with ASD		
Yes	100	29.1
No	244	70.9
Having a relative or a friend with suspected ASD		
Yes	129	37.5
No	215	62.5
Total	344	100.0

that inclusion/integration is required in students, 54.4% heard of "shadow teachers," and 22.7% reported that they knew the National Action Plan. These findings are shown in Table 2.

There is no statistically significant relationship between having a child or not and correctly answering the ASD information questions.

Participants with more than 10 years of professional experience correctly answered that a significant proportion of individuals with autism can also have different levels of mental retardation, with a significantly higher rate (p=0.027). It was determined that the other questions were not related to how experienced a teacher is. In the analysis according to the branches of the teachers, it was determined that the rate of answering the questions correctly by primary school teachers was lower.

Table 3 shows the statements that found a significant relationship between having experience teaching a student with ASD in professional life and giving correct answers. Accordingly, the rate of correct answers to questions about ASD by teachers having experience teaching students diagnosed with ASD is significantly higher.

The statements in which a significant relationship was found between having a relative or a friend with a diagnosis of ASD and responding correctly to the statements are given in Table 4. A significant correlation was found between having a relative or a friend diagnosed with ASD and giving a correct answer.

The statements in which a significant relationship was found between the respondents' participation in training/seminars about ASD and their correct answers are given in Table 5. Accordingly, the rate of correct answers of those who attended training about autism is significantly higher than those who did not attend.

Table 3. Comparison of the participants' answers according to having experience teaching students with ASD (Autism Spectrum Disorder)

Statements	Answer	Having experience teaching with ASD		p
		Yes	No	
ASD is a developmental disorder.	Correct, n (%)	96 (63.58)	55 (36.42)	0.001
	Incorrect or No idea, n (%)	88 (45.60)	105 (54.40)	
ASD is seen only in childhood. *	Correct, n (%)	131 (57.70)	96 (42.30)	0.029
	Incorrect or No idea, n (%)	53 (45.30)	64 (54.70)	
Behavioral therapy is an intervention method that is expected to be effective for children with ASD.	Correct, n (%)	141(60.00)	94 (40.00)	<0.001
	Incorrect or No idea, n (%)	43 (39.45)	66 (60.55)	
Children with ASD are very similar to each other. *	Correct, n (%)	141 (67.14)	69 (32.96)	<0.001
	Incorrect or No idea, n (%)	43 (32.09)	91 (67.91)	
Early intervention does not provide additional benefits for children with ASD. *	Correct, n (%)	161 (60.07)	107 (39.93)	<0.001
	Incorrect or No idea, n (%)	23 (30.26)	53 (69.74)	
Most children with ASD have special abilities. *	Correct, n (%)	50 (75.76)	16 (24.24)	<0.001
	Incorrect or No idea, n (%)	134 (48.20)	144 (51.80)	
In most cases, the cause of ASD is unknown.	Correct, n (%)	129 (70.88)	53 (29.12)	<0.001
	Incorrect or No idea, n (%)	55 (33.95)	107 (66.05)	
Autism in children is mostly due to parental neglect in early childhood. *	Correct, n (%)	124 (60.19)	82 (39.81)	0.002
	Incorrect or No idea, n (%)	60 (27.52)	158 (72.48)	
ASD is a disease that can be treated with medication. *	Correct, n (%)	151 (63.18)	88 (36.82)	<0.001
	Incorrect or No idea, n (%)	33 (17.84)	152 (82.16)	
There is no evidence to suggest a relationship between vaccines and ASD.	Correct, n (%)	109 (66.87)	54 (33.13)	<0.001
	Incorrect or No idea, n (%)	75 (41.44)	106 (58.56)	
Children with autism are extremely sensitive to sound.	Correct, n (%)	148 (60.91)	95 (39.09)	<0.001
	Incorrect or No idea, n (%)	36 (35.64)	65 (64.36)	
Not making and avoiding eye contact is a hallmark of autism.	Correct, n (%)	173 (59.86)	116 (40.14)	<0.001
	Incorrect or No idea, n (%)	11 (20.00)	44 (80.00)	
The eating and drinking habits of children with autism are different from their peers.	Correct, n (%)	116 (58.00)	84 (42.00)	0.048
	Incorrect or No idea, n (%)	68 (47.22)	76 (52.78)	
Autism is more common in boys than girls.	Correct, n (%)	81 (72.32)	31 (27.78)	<0.001
	Incorrect or No idea, n (%)	103 (44.40)	129 (55.60)	
Different levels of mental retardation can also be seen in a. significant portion of individuals with autism diagnosis	Correct, n (%)	99 (69.72)	43 (30.38)	<0.001
	Incorrect or No idea, n (%)	85 (42.08)	117 (57.92)	

*False statements; Chi-square test was applied.

Discussion

Only 21.2% of the teachers participating in our study feel competent in teaching students with ASD, and only 17.2% find their own level of knowledge sufficient about ASD. Studies on this subject in the literature have generally similar results to our study. In a qualitative study conducted on 117 teachers in Kadıköy, participants stated that they felt inadequate in teaching students with autism[12]. In a study conducted with 498 special education teachers, the participants graded their level of knowledge about ASD 2.89 out of 5, and in another study preschool teachers graded themselves 3.7 out of 7[13,14]. The study findings by the University of Manchester with 53 teachers showed that only 38 of the participants stated that they felt competent in teaching students with ASD[15]. In a study preschool teachers attended in Sweden, 38.1% of the participants evaluated their ASD knowledge level as minimal, 57.1% as sufficient, and 4.8% as excellent[16].

One of the factors expected to affect the level of knowledge of ASD is the branches of teachers. In a study conducted in 2016, the level of knowledge of special education teachers about the characteristic features of autism was found to be significantly higher than that of guidance counselors, preschool, and primary school teachers, while no significant difference was found between the other three branches[17]. In Park's study, no difference was found between the ASD

Table 4. Comparison of the participants' answers according to having a relative/friend diagnosed with ASD (Autism Spectrum Disorder)

Statements	Answer	Having a relative/ friend diagnosed with ASD		p
		Yes	No	
ASD is a developmental disorder.	Correct, n (%)	54 (35.76)	97 (64.24)	0.016
	Incorrect or No idea, n (%)	46 (23.83)	147 (76.17)	
ASD is seen only in childhood.*	Correct, n (%)	76 (33.48)	151 (66.52)	0.012
	Incorrect or No idea, n (%)	24 (20.51)	93 (79.49)	
Behavioral therapy is an intervention method that is expected to be effective for children with ASD.	Correct, n (%)	79 (33.62)	156 (66.38)	0.006
	Incorrect or No idea, n (%)	21 (19.27)	88 (80.73)	
Children with ASD are very similar to each other.*	Correct, n (%)	70 (33.33)	140 (66.67)	0.029
	Incorrect or No idea, n (%)	30 (22.39)	104 (77.61)	
Early intervention does not provide additional benefits for children with ASD.*	Correct, n (%)	86 (32.09)	182 (67.91)	0.021
	Incorrect or No idea, n (%)	14 (18.42)	62 (81.58)	
In most cases, the cause of ASD is unknown.	Correct, n (%)	63 (34.62)	119 (65.38)	0.016
	Incorrect or No idea, n (%)	37 (22.84)	125 (77.16)	
Autism in children is mostly due to parental neglect in early childhood. *	Correct, n (%)	72 (34.95)	134 (65.05)	0.003
	Incorrect or No idea, n (%)	28 (20.29)	110 (79.71)	
There is no evidence to suggest a relationship between vaccines and ASD.	Correct, n (%)	59 (36.20)	104 (63.80)	0.006
	Incorrect or No idea, n (%)	41 (22.65)	140 (77.35)	
Children with autism are extremely sensitive to sound.	Correct, n (%)	79 (32.51)	164 (67.49)	0.029
	Incorrect or No idea, n (%)	21 (20.79)	80 (79.21)	
Not making and avoiding eye contact is a hallmark of autism.	Correct, n (%)	91 (31.49)	198 (68.51)	0.024
	Incorrect or No idea, n (%)	9 (16.36)	46 (83.64)	
The eating and drinking habits of children with autism are different from their peers.	Correct, n (%)	70 (35.00)	130 (65.00)	0.004
	Incorrect or No idea, n (%)	30 (20.83)	114 (79.17)	
Autism is more common in boys than girls.	Correct, n (%)	35 (31.25)	77 (68.75)	0.536
	Incorrect or No idea, n (%)	65 (28.02)	167 (71.98)	
Different levels of mental retardation can also be seen in a significant portion of individuals with autism diagnosis.	Correct, n (%)	50 (35.21)	92 (64.79)	0.035
	Incorrect or No idea, n (%)	50 (24.75)	152 (75.25)	

*False statements; Chi-square test was applied.

knowledge level of special education teachers and general education teachers[18]. In our study, the knowledge level of primary school teachers about ASD was found to be significantly lower than other teachers.

In our study, the rate of correct answers to questions about ASD by teachers having experience teaching students diagnosed with ASD throughout their professional life was found to be significantly higher. Consistent with this finding, Liu's research has shown that teachers with prior professional experience with children with special needs are significantly more knowledgeable about ASD and childhood development in general than those without. Possibly, such face-to-face interactions can increase understanding of a child's development in general and enable teachers to better distinguish between typically developing children and children with special needs[19]. Similarly, Ballantyne et al.[20] found that the level of ASD knowledge of teachers who work with students with ASD in their professional life is significantly higher than teachers who do not have experience in this field. Contrary to these studies, in the study conducted with preschool teacher candidates in 2019, no significant difference was found between the relationship between the pre-service teachers' working status with students with ASD and their ASD knowledge levels[21].

The family and relatives of the person diagnosed with ASD are inevitably affected by this situation. Providing education to families and relatives as well as individuals with ASD contributes to the correct and effective management of the process. In a study conducted in Türkiye in 2020, participants with a family member with autism answered 18 of 20 questions correctly at a significantly higher rate

Table 5. Comparison of the participants' answers according to attending training/seminars about ASD (Autism Spectrum Disorder)

Statements	Answer	Attending training/ seminars about ASD		p
		Yes	No	
ASD is a developmental disorder.	Correct, n (%)	77(50.99)	74(49.01)	<0.001
	Incorrect or No idea, n (%)	45(23.20)	149 (76,80)	
ASD is seen only in childhood. *	Correct, n (%)	73 (39.04)	114 (60.96)	<0.001
	Incorrect or No idea, n (%)	49 (31.21)	108 (68.79)	
Behavioral therapy is an intervention method that is expected to be effective for children with ASD.	Correct, n (%)	99 (43.61)	128 (56.39)	<0.001
	Incorrect or No idea, n (%)	23 (19.66)	94 (80.34)	
Children with ASD are very similar to each other.*	Correct, n (%)	107 (45.53)	128 (54.47)	<0.001
	Incorrect or No idea, n (%)	15 (13.76)	94 (86.24)	
Early intervention does not provide additional benefits for children with ASD.*	Correct, n (%)	93 (44.29)	117 (55.71)	<0.001
	Incorrect or No idea, n (%)	29 (21.64)	105 (78.36)	
Most children with ASD have special abilities. *	Correct, n (%)	109 (40.67)	159 (59.33)	<0.001
	Incorrect or No idea, n (%)	13 (17.11)	63 (82.89)	
In most cases, the cause of ASD is unknown.	Correct, n (%)	46 (69.70)	20 (30.30)	<0.001
	Incorrect or No idea, n (%)	76 (27.34)	202 (72.66)	
Autism in children is mostly due to parental neglect in early childhood. *	Correct, n (%)	82 (40.20)	122 (59.80)	0.003
	Incorrect or No idea, n (%)	40 (28.57)	100 (71.43)	
Autism is a mental illness. *	Correct, n (%)	86 (41.75)	120 (58.25)	0.008
	Incorrect or No idea, n (%)	36 (26.09)	102 (73.91)	
ASD is a disease that can be treated with medication. *	Correct, n (%)	110 (38.60)	175 (61.40)	<0.001
	Incorrect or No idea, n (%)	12 (20.34)	47 (79.66)	
There is no evidence to suggest a relationship between vaccines and ASD.	Correct, n (%)	106 (44.35)	133 (55.65)	<0.001
	Incorrect or No idea, n (%)	16 (15.24)	89 (84.76)	
Children with autism are extremely sensitive to sound.	Correct, n (%)	79 (48.47)	84 (51.53)	<0.001
	Incorrect or No idea, n (%)	43 (23.76)	138 (76.24)	
Not making and avoiding eye contact is a hallmark of autism.	Correct, n (%)	103 (42.39)	140 (57.61)	<0.001
	Incorrect or No idea, n (%)	19 (18.81)	82 (81.19)	
The eating and drinking habits of children with autism are different from their peers.	Correct, n (%)	117 (40.48)	172 (59.52)	<0.001
	Incorrect or No idea, n (%)	5 (9.09)	50 (90.91)	
Autism is more common in boys than girls.	Correct, n (%)	89 (44.50)	111 (55.50)	<0.001
	Incorrect or No idea, n (%)	33 (22.92)	111 (77.08)	
Different levels of mental retardation can also be seen in a significant portion of individuals with autism diagnosis.	Correct, n (%)	68 (60.71)	44 (39.28)	<0.001
	Incorrect or No idea, n (%)	54 (23.28)	178 (76.72)	

*False statements; Chi-square test was applied.

than those without[22]. In a study conducted in Northern Ireland, 60% of the group with high autism awareness stated that they had a family member or friend with ASD[23]. Similarly, in our study, a significant relationship was found between having a relative diagnosed with ASD and giving the correct answer.

It is aimed to increase the knowledge level of the employees by organizing in-house trainings on special subjects from time to time in occupational groups. In a study in which 288 teachers participated in Greece, it was determined that the level of knowledge of teachers who received training on ASD was higher than those who did not[24]. In a study conducted with teachers in 2017, a significant relationship was found between being educated about ASD and giving correct answers[25]. Similarly, in our study, the rate of correct answers to questions about ASD by teachers who participated in training about ASD was significantly higher. The fact that training on ASD increases the level of knowledge beneficially is an encouraging finding for the authorities to organize more training on this issue.

47.4% of the participants in our study thought that vaccines are not related to ASD, while 48% of them had

no idea about it. In a study conducted with healthcare professionals in 2022, 59.1% of participants agreed with the proposition, "Measles vaccine can cause autism"[26]. In other studies, more than half of the participants stated that they think that vaccines can cause autism[27,28]. This false belief results in children not being vaccinated and harms their health. In order to eliminate the hesitations about the vaccine, first of all, awareness of health workers should be given importance.

The sociocultural impact of media tools is a known fact. Although individuals with ASD are portrayed as having special abilities in movies, TV series, and popular media, this is an incorrect assumption. In a study conducted in the USA in 2019, 64.4% of the participants stated that they thought children with ASD had special abilities[29]. In a study conducted in Denmark in 2015, 40% of the participants stated that they thought that individuals with ASD were more intelligent than the average of society[30]. 58.7% of the participants in our study stated that "Most children with ASD have special abilities or special skills." In today's social media platforms, which have strong mass effects, it should be ensured that accurate information is shared in a way that will positively affect the general knowledge and attitude of the society about ASD.

Conclusion

As a result of this study, it can be said that the knowledge level of teachers about autism spectrum disorders is sufficient. However, teachers feel inadequate due to the problems encountered in practice, parental attitudes, appropriate educational environment, and difficulties arising from the ASD itself. We believe that the quality of life of these children with special needs will increase with the support of primary care physicians to teachers and parents in order to develop applicable methods and skills. The determination that participating in training on ASD increases the level of knowledge is encouraging in terms of steps to be taken in this regard.

The strength of our study is that it is the first study to evaluate the knowledge level of teachers about autism from a physician's point of view.

Limitations

The limitations identified in our study include that it only encompasses teachers working in pre-school and primary schools in a single district. We think that studies conducted in multiple centers with larger sample groups will yield stronger results.

Ethics Committee Approval: This study was approved by a local Ethics Committee on 20.08.2021 with the decision numbered 2021-169.

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