ARTICLE / INVESTIGACIÓN

Differences between the responses of parents and teachers Anxiety screening for autistic children aged 3-5 years: a cross-sectional study

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Abstract: The Anxiety Disorder diagnosis is a common comorbidity of Children with Autism Spectrum Disorder (ASD). The early detection of Anxiety is essential to increase the quality of life of children, especially in kindergarten children. Thus, the study aimed to investigate the differences between parents and teachers in reports of Anxiety in autistic children 3–5 years old. We used the Screen for Child Anxiety-Related Disorders (SCARED) parent version for parents and teachers of Ecuadorian children with ASD. The statistical analyses were performed on two evaluations of the same children. The sample size was 34 parents and 34 teachers. The binomial logistic regression model for the SCARED rating to the responses of teachers was statistically significant for age (odds [OR], 0.16; 95% confidence interval [CI] 0.31-0.82) for 5-year-olds ($p<0.028$). The SCARED subscale for Panic Disorder, Generalized Anxiety Disorder, Separation Anxiety Disorder, and Social Anxiety Disorder is correlated with the anxiety disorder. The data are statistically significant based on teachers' responses ($p <0.05$). According to parents' responses, the SCARED rating did not find any relationship between the study variables and the anxiety disorder. Most children were classified with anxiety disorder when evaluated by teachers but not by parents. Identifying Anxiety in children with ASD in kindergarten can help adequately treat the disease and contribute to neurodevelopment and quality of life in childhood.

Key words: Anxiety Disorder, Children, Autism, Kindergarten, Ecuador.

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder with heterogeneous characteristics that depend on genetic and environmental factors[1,2]. Difficulties in social communication and restricted and repetitive behaviors are observed in children with ASD[3]. Recent studies focus their efforts on the early diagnosis of autism[4,5]. However, although risk factors are considered, the diagnosis of autism is still based on specialized medical expertise with diagnostic instrumentation[6]. Individuals with ASD are likelier to develop comorbidity such as psychiatric disorders[7,8]. Young people with ASD have higher levels of Anxiety when compared to children with typical development[8].

Anxiety disorders are among children's most common neuropsychiatric disorders and can be diagnosed in kindergarten[9-11]. However, information on the prevalence of anxiety disorders during early childhood is relatively scarce[12,13]. Prevalence rates of Anxiety among kindergarten children range in different countries from 2 to 20%[9-11]. Unfortunately, in children with ASD, the estimated prevalence rate is 40%[8].

Anxiety disorder is a negative, vague, and unpleasant emotional state derived from anticipating potential danger. Anxiety leads to the potentiation of alertness and hypervigilance behavior even without immediate danger[14]. According to the Diagnostic and Statistical Manual of Mental Illnesses[3], Anxiety can be categorized into generalized anxiety disorder, panic disorder, agoraphobia, phobias, and social anxiety disorder[15]. Anxiety during childhood, adolescence, or adulthood increases the risk of developing depressive disorders with more severe symptoms, such as resistant depressive disorders or suicide attempts[16,17]. Early identification of anxiety disorders in children is of substantial public health importance. The Screen for Child Anxiety and Related Emotional Disorders (SCARED) is a widely used questionnaire to detect early Anxiety in children[18] and children with ASD[19].

Integrating multiple responses, such as parent and child anxiety scales, may lead to a more assertive diagnosis of Anxiety in children[20,21]. However, the meaning of the different scores on the anxiety scales and how to integrate the discrepant results to generate a conclusion represent a challenge for researchers and clinicians. Several studies attempted to relate the differences between the responses of children and their parents to anxiety symptoms[21-23]. Parents commonly report fewer symptoms than their children on anxiety scales[23-25]. In kindergarten children, the alternative is to use a diagnostic anxiety scale answered by the parents[21]. To our knowledge, no data compares the responses of parents and teachers of kindergarten children with ASD. Early diagnosis of Anxiety in autistic children allows adequate and tailored intervention. Accurate diagnosis of anxiety disorder depends on multiple evaluations, especially in autistic children. Thus, our research aimed to evaluate

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Anxiety in kindergarten children and compared the responses of parents and teachers of children with ASD.

Materials and methods

Study design

We performed a prospective cross-sectional study in Ecuador, including a sample of teachers and parents of autism spectrum disorder (ASD) children clinically diagnosed with Childhood Autism[26]. Data collection occurred between September 2022 and December 2022. The manuscript was written with STROBE recommendations[27].

Setting

The study was performed in (Portoviejo, Manta and El Carmen), a coastal region in Ecuador (South America).

Eligibility Criteria and Outcomes

Teachers and parents of children with autism spectrum disorder (ASD) participated in the study. The inclusion criteria for samples were children between 3 and 5 years old. Teachers and parents of children with ASD previously diagnosed by each child's clinician were invited to participate. Only complete questionnaires were included. The final analyses were performed with completed questionnaires of the children themselves, both in the responses of parents and teachers. General Anxiety Disorder was considered the primary outcome. The range of questions and scores for Panic Disorder or Significant Somatic Symptoms, Generalized Anxiety Disorder, Separation Anxiety Disorder, Social Anxiety Disorder, and School Avoidance were considered secondary outcomes.

Data sources/measurement

The analyses included two evaluations of the same children. The statistical analyses were performed with children to whom two online questionnaires were applied (parents and teachers). The sample size was 34 parents and 34 teachers of ASD children.

Anxiety symptoms of ASD children

Parents and teachers of ASD children should indicate how often they have observed each symptom over the last 3 months. The Screen for Child Anxiety Related Disorders (SCARED) parent version assessed anxiety symptoms in kindergarten children. The SCARED is a 41-item questionnaire developed to assess different characteristics of Anxiety in children and ASD children[18,19]. It is available in self-report and parent-report formats. This questionnaire of forty-one items measures Anxiety in children: "0 for no and 2 for true". Ranges from a total score of ≥ 25 may indicate the presence of an Anxiety Disorder. Scores above 30 are more specific for anxiety disorder. Each question may correlate with scores following: Significant School Avoidance may be represented by a score of 3 on items 2, 11, 17, and 36. A score of 5 on items 4, 8, 13, 16, 20, 25, 29, and 31 may indicate Separation Anxiety Disorder. A score of 7 for the items in questions 1, 6, 9, 12, 15, 18, 19, 22, 24, 27, 30, 34, and 38 may indicate Panic Disorder or Significant Somatic Symptoms. Social Anxiety Disorder may be represented by a score of 8 on items 3, 10, 26, 32, 39, 40, and 41. Finally, the high score of 9 on questions 5, 7, 14, 21, 23, 28, 33, 35, and 37 may indicate Generalized Anxiety Disorder. The psychometric properties of the SCARED were previously tested[28] with (= 0.90) internal consistency for the parent-report version for the overall score and ranged from satisfactory (= 0.73 for school avoidance) to good (= 0.89 for social phobia) for the subscales. The measure's sensitivity for diagnosing anxiety disorders in autistic youth was 0.71, and its specificity was 0.67[28].

Sociodemographic information of students

The sociodemographic variables, age, sex, race and place of residence, were recorded, in addition to data from the information about the parents' responses to the questionnaire.

Statistical Analysis

The descriptive statistical analysis was based on continuous, categorical, or ordinal variables presented in frequencies (N) and percentages (%) to describe the sociodemographic characteristics of children. Shapiro-Wilk test was used, and univariate analyses were performed using the Chi-square test. A logistic regression was conducted to find factors predicting the presence and absence of Anxiety. Binary logistic regression was used to determine whether or not a correlation existed between the responses given by parents and teachers. The SCARED scale evaluates the anxiety disorder in a child with autism. The variables considered in the model were age, sex, place of residence (zone), school year, and disorders according to the scale mentioned above. The adjusted odds ratio (OR), 95% confidence interval (95% CI), and p-value were used to express the possible correlations. Box plots were also produced to determine general trends according to the significant variables ($p < 0.05$). The significance level was set at $\alpha=0.05$, and the statistical analyses were performed in SPSS 26 (IBM).

Results

A total of 34 parents and 34 teachers of children completed the questionnaires. This study assessed the differences between the responses of parents and teachers of autistic children with autism spectrum disorder (ASD) on the Ecuadorian coast. The Screen for Child Anxiety-Related Disorders (SCARED) was available. The complete SCARED of teachers and parents was included in the statistical analysis (Fig 1).

Descriptive data

Table 1 shows the results of different sociodemographic characteristics.

Sociodemographic characteristics

A total of 34 participants between 3 to 5 years old (mean age = 4.41 years), 8 girls (23.53%) and 26 boys (76.47%), were included in the study, and 94.12% of the study population is located in the urban area, and 73.53% is of mixed race.

Anxiety disorder in kindergarten children with ASD

Table 2 shows that the scores according to the SCARED rating for teachers and parents do not have significant differences, which means they agree on the responses based on the child's behavior. However, it can be highlighted that more than 50% of the participants in this study have

emotional disorders.

Anxiety disorder for parents and teachers of kindergarten children with ASD

The results of binary logistic regression analysis predict optimistic results for anxiety disorders in kindergarten children. The SCARED scale was responses from parents and teachers of kindergarten children. The binomial logistic regression model for the SCARED rating according to the responses of teachers was statistically significant for age (odds [OR], 0.16; 95% confidence interval [CI] 0.31-0.82) for 5-year-olds (p<0.028). This result shows a positive correlation between higher child age and higher Anxiety. Our results found differences in the school year (odds [OR], 6.22; 95% confidence interval [CI] 1.212-31.937) referring to initial sublevel 1 (p <0.029). These results represent the different types of Anxiety concerning each school year evaluated.

On the other hand, School Avoidance was not correlated with the anxiety disorder of children with ASD. It should be noted that the SCARED subscale for Panic Disorder, Generalized Anxiety Disorder, Separation Anxiety Disorder, and Social Anxiety Disorder are correlated with anxiety disorder, and the data are statistically significant based on the responses of teachers (p <0.05) (Table 3). Curiously, according to the parent's responses, the binomial logistic regression for the SCARED rating did not find any relationship between the study variables and the anxiety disorder (Table 3).

According to the binomial logistic regression analysis, there are statistically significant differences for Anxiety evaluated by teachers with the SCARED scale (p <0.05). The diagrams in each box represent significant values (***) for panic disorder, generalized anxiety disorder, separation anxiety disorder, and social anxiety disorder when directly correlated with anxiety disorder. However, according to parents' responses, there is no correlation between the SCARED subscales.

Discussion

This study aimed to provide information about anxiety disorder in kindergarten children with ASD. We compared the SCARED responses from parents and teachers of children with ASD. Our results showed that anxiety disorder levels increase in older kindergarten children compared to younger ones (3 to 5 years old, respectively). In the scoring, SCARED Panic disorder or Significant Somatic Symptoms, generalized anxiety disorder, Separation Anxiety Disorder, Social anxiety disorder, and Anxiety disorder were significant for teachers' responses about kindergarten children with ASD. Interestingly, none of the SCARED scores subscales for Anxiety were positive for parents of the same kindergarten children with ASD evaluated.

Anxiety disorders in children and adolescents are associated with high morbidity rates and psychiatric disorders in adult life[29,30]. Anxiety is among the most common disorders in people with ASD[31]. Approximately 40% of children with ASD are diagnosed with at least one comorbid anxie-

Sociodemographic characteristics	(N=34)	X^2, gl, p-value
Age		**9.59; 2; <0.0083**
3	3 (8.82%)	
4	14 (41.18%)	
5	17 (50.00%)	
Sex		**9.53; 1; <0.0020**
Female	8 (23.53%)	
Male	26 (76.47%)	
Place of Residence		**34.47; 3; <0.001**
El Carmen	4 (11.76%)	
Guayaquil	1 (2.94%)	
Manta	6 (17.65)	
Portoviejo	23 (67.65%)	
Zone		**26.47; 1; <0.001**
Rural	2 (5.88%)	
Urban	32 (94.12%)	
School year		**21.06; 3; <0.001**
Preparatory high school	17 (50.00%)	
Initial sublevel 1	3 (8.82%)	
Initial sublevel 2	14 (41.18%)	
Race		**43.63; 3; <0.001**
Afro-Ecuadorian	3 (8.82%)	
White	5 (14.71%)	
Mestizo	25 (73.53%)	
Montubio	1 (2.94)	

Table 1. Sociodemographic data of kindergarten autism children. Frequency (percentage), Note: χ2 = check chi-square; gl = degrees of freedom; p = statistical significance.

	Teachers (N=34)	Parents (N=34)	X^2; gl; p-value
Anxiety disorder	23 (67.65%)	25 (73.53%)	415.08; 399; 0.2791
Panic disorder or significant somatic symptoms	23 (67.65%)	29 (85.29%)	151.38; 144; 0.3203
Generalized anxiety disorder	17 (50.00%)	11 (32.35%)	60.12; 63; 0.5795
Separation anxiety disorder	21 (61.76%)	23 (67.65%)	52.19; 48; 0.3144
Social anxiety disorder	22 (64.71%)	21 (61.76)	51.65; 49; 0.3705
School avoidance	18 (52.94%)	20 (58.82%)	19.90; 16; 0.2249

Table 2. SCARED responses from parents and teachers of kindergarten children. Frequency (percentage), Note: χ2 = check chi-square; gl = degrees of freedom; p = statistical significance.

Sociodemographic background	**Teachers (Anxiety disorder)**			**Parents (Anxiety disorder)**		
	Odds Ratio	**95% CI**	**p-value**	**Odds Ratio**	**95% CI**	**p-value**
Age						
Reference (3)			0.091			1.000
4	346.6	0.000	1.000	215.7	0.000	1.000
5	**0.16**	**0.310-0.825**	**0.028**	215.7	0.000	1.000
Sex						
Reference (Female)			**0.044**			1.000
Male	4.375	0.466-41.067	0.196	0.000	0.000	1.000
Zone						
Reference (Rural)			**0.044**			1.000
Urban	0.455	0.026-8.023	0.590	107.76	0.000	1.000
School Year						
Reference (High school)			**0.039**			1.000
Initial sublevel 1	**6.222**	**1.212-31.937**	**0.029**	0.000	0.000	1.000
Initial sublevel 2	21.490	0.000	1.000	1.000	0.000	1.000
SCARED rating scale						
Panic disorder	**0.005**	**0.000-0.080**	**0.001**	0.143	0.007-2.766	0.198
Generalized anxiety disorder	**0.044**	**0.005-411**	**0.006**	0.000	0.000	1.000
Separation anxiety disorder	**0.202**	**0.043-0.942**	**0.042**	0.000	0.000	1.000
Social anxiety disorder	**0.033**	**0.005-0.235**	**0.001**	0.000	0.000	1.000
School avoidance	35.540	0.000	1.000	0.000	0.000	1.000

Table 3. Binary logistic regression analysis for anxiety disorder using SCARED and sociodemographic data from responses of teachers and parents of kindergarten children with ASD.
Note: OR = odds ratio; 95% CIs = 95% Confidence Intervals; Statistically significant effects ($p < .05$) are in bold. Panic disorder or Significant Somatic symptoms PD; Generalized Anxiety disorder= GAD; Separation Anxiety Disorder= SAD; Social anxiety disorder = SF; School Avoidance= SA; Anxiety disorder = AD.

ty disorder, such as generalized anxiety disorder or social anxiety[32]. One hypothesis that explains children with ASD have a neurobiological predisposition to cause ASD-related difficulties. The neurobiological factors, in combination with environmental factors such as bullying and parenting, may increase the potential anxiety disorder[32]. In particular, Anxiety in ASD younger people is associated with further social impairment, self-injurious behavior, depressive symptoms, gastrointestinal problems, and increased stress in parents with ASD[33-35]. Already in adults, the diagnosis of ASD is correlated with an increased risk of Anxiety and depressive disorder[36].

In our study, the older kindergarten children obtained higher scores on Anxiety than younger children with ASD in the teacher's evaluation. Early diagnosis and treatment of Anxiety in children with ASD are essential to children's social interaction in the school environment. Difficulties in social cognition in children and adolescents with ASD can

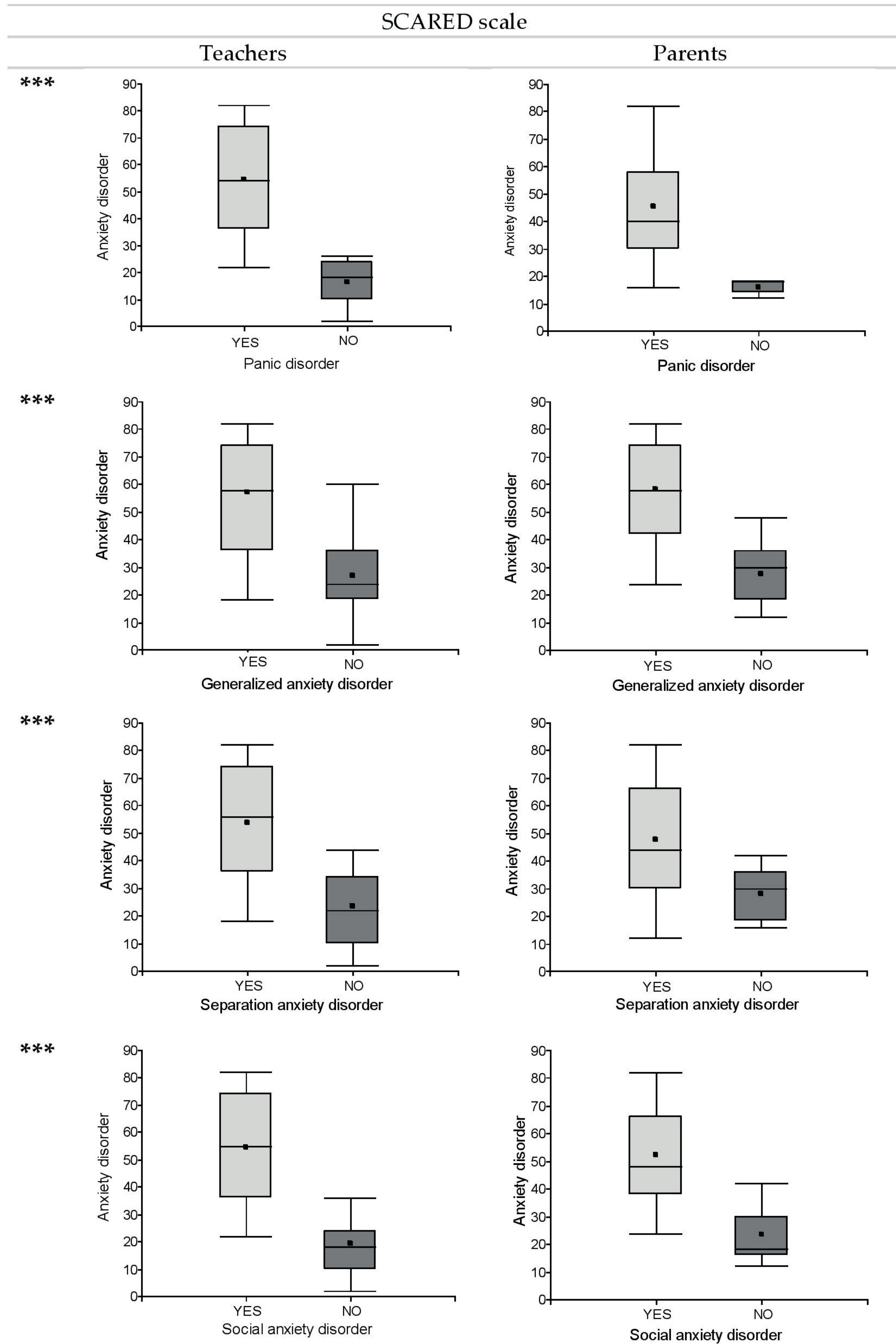

Figure 1. Boxplot to compare parent responses according to the SCARED scale. The red line represents the scores to determine each disorder: Generalized Anxiety Disorder (score of 9), Social Anxiety Disorder (score of 8), and School Avoidance (score of 3).

increase Anxiety in social situations[21,37,38]. In addition, Anxiety coupled with poor social skills can worsen interactions with peers, reducing the child's quality of life[32,39].

Children with ASD exhibit abnormal behaviors, including impairments in social interaction, communication, and repetitive behavior patterns[40,41]. We found increased social Anxiety in the responses of teachers of children with ASD in kindergarten. Previous studies report that children with ASD usually have few friends and are disconnected from the social environment at school[42,43]. Children and adolescents with ASD commonly experience social and academic challenges within the school environment in addition to possible cognitive, motor, and language deficits[44]. Increased social Anxiety in children with ASD in kindergarten can hinder the ability to interact in the school environment. In fact, in patients with ASD, social anxiety disorder causes qualitative impairments in communication and social interaction in the early stages of life[3].

Children with ASD have high levels of social anxiety disorder[39,45]. Children with ASD have sensory hypersensitivity, difficulties taking perspective, and limited socializing ability[3]. Social isolation and quietness in social situations are characteristic features of social anxiety disorder and expected behaviors in ASD children[46]. Another hypothesis is that the experience of repeated rejection in a child with ASD[47,48] could result in social Anxiety and avoidance[49]. In our study, kindergarten children have high social anxiety scores when evaluated by teachers.

The SCARED allows the assessment of Panic disorder or Significant Somatic Symptoms. Panic disorder represents physiological and cognitive symptoms for the patient. The anticipatory Anxiety and phobic avoidance clusters associated with recurrent and unexpected panic attacks are some of the symptoms experienced by the patient[3,50]. Previous studies report that the structure of the amygdala in the brain is related to the pathophysiology of panic disorder[51,52]. Anxiety disorder in children with ASD is associated with alterations in the structure of the amygdala in the brain[53]. Regarding the work on the Rating Scale about Panic Disorder or Significant Somatic Symptoms in kindergarten children, we showed high levels in teachers' evaluation and no positive scores in parents' evaluation.

The SCARED scale applied to parents and children appears trustworthy[54]. SCARED is commonly used to quantify anxiety symptoms during childhood and adolescence[55,56]. The SCARED generally shows moderate correlations between child- and parent-reported scores, especially for the social Anxiety subscale[18,20,25,57,58]. Parents may report observable behaviors such as ritual, restlessness, insomnia, and discomfort in social situations as anxiety[59]. We assessed the responses of parents and teachers and found disagreement in the scores for SCARED.

Teachers' reports of the clinical picture of generalized Anxiety can make the diagnosis reliable and valid[60]. Teachers and parents perceive externalizing symptoms of ADHD similarly when asked to rate children with ASD, but they agree less when rating internalizing symptoms such as anxiety[61,62]. In our study, the SCARED scores on four of the five sub-items evaluated were higher when teachers evaluated the children than when parents did. When it comes to general psychiatric symptoms, a previous study showed that teachers tend to report rates in students with ASD[63].

Strengths and limitations

This study has several limitations. Firstly, the sample must be more significant (increase sample) to generalize the results and may underestimate the effect of statistical data. Secondly, the scale applied does not allow for confirming the diagnosis of Anxiety. In addition, the type of study, an observational cross-sectional, does not provide information about the influence of anxiety levels in kindergarten over time. Other studies must be performed to enlarge the sample and monitor the anxiety levels of students with ASD in kindergarten and contribute to the neurodevelopment of these children.

On the other hand, the homogeneity of our sample provides an excellent external value. The kindergarten children aged between 3 to 5 years have been assessed. It should be noted that we found significant differences when we compared teachers' responses to children's Anxiety and no difference when the responses were from the children's parents. We evaluate responses from parents and teachers of the same children about Anxiety Disorder, which may contribute to the correct diagnosis. Additionally, we used the SCARED Rating Scale previously reported in ASD children to explore the quality of life, neurobiological underpinnings, and treatment[19,64-66]. The anxiety disorder in autistic children may affect their neurodevelopment, social participation, and educational outcomes. Despite the impact of anxiety disorders on autistic children, few studies report on Anxiety in preschool children[8,19]. We also include two different assessments of the children. This study provides parents' and teachers' responses to anxiety disorder in autistic children. Few studies compare responses of parents and teachers about Anxiety in preschool children[20,24,35]. Our findings highlight the importance of using comprehensive assessments to help diagnose Anxiety in autistic children. Although a small sample, the study contributes to the literature with data from the Ecuadorian population of children with autism. In addition, we provided a double assessment of the same child, highlighting the importance of assessing the teacher's opinion of the student's anxiety level.

Conclusions

In conclusion, these findings support the notion that early diagnosis of anxiety disorder is essential for kindergarten children with ASD. This is the first study about Anxiety in autistic children aged 3-5 years in Ecuador. In addition, we reinforce the importance of parents and teachers having a rating scale for children's anxiety symptoms. The discrepancy between the responses of teachers and parents may be responsible for underdiagnoses of Anxiety Disorder with severe consequences in the neurodevelopment of children with ASD.

Author Contributions

Conceptualization, Siteneski A; methodology, Siteneski A; formal analysis, Montes Escobar K; investigation, Loor Robles. VA; data curation, Montes Escobar K; writing—original draft preparation, Siteneski A. and Loor Robles. VA; writing—review and editing, Siteneski A and Montes Escobar K.; visualization, Zambrano Acosta JZ and Meza Intriago H.; supervision, Zambrano Acosta JZ.; funding acquisition, Zambrano Acosta JZ and Meza Intriago H.

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Informed Consent Statement

In our study, each child was assigned a number. The teacher and parents of the participants in the survey provided written informed consent. The University Technical of Manabí's ethical committee of CEISH-UTM-INT-ART_23-4-26_VALR approved this study.

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Conflicts of Interest

The authors declare no conflict of interest.

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