# INTERNALIZING PROBLEMS IN CHILDREN WITH ASD AND ADHD - A PROSPECTIVE STUDY -

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**ABSTRACT**
Autistic spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD) are two of the most studied neurodevelopmental disorders. However, most studies focused on externalizing problems. The study's main objective was to assess and compare the level of emotional problems between the children with ADHD and the children with ASD, using CBCL 6-18 years. The data were collected from 60 children aged 6-14 who were diagnosed with either ADHD or ASD in the Pediatric Psychiatry Clinic from Cluj-Napoca, according to DSM 5 and ICD 10 diagnosis criteria. For every child enrolled, we obtained consent from the parents to use medical data while ensuring privacy and the subject's identity protection. We found no statistically significant difference between the two diagnosis categories in terms of the internalization problems. For the ASD group, we found a moderate positive relationship between the CARS score and affective problems, type of psychotherapy received, and anxiety, and a negative relationship between maternal age and anxiety problems. For the ADHD group, there was a negative correlation of medium intensity between the presence of comorbidities and both affective and anxiety problems and a positive correlation of medium intensity between parents' education and anxiety problems. This study underlines the necessity of screening for associated emotional problems, because of the increased incidence of comorbid mental disorders, particularly in ADHD and ASD.

**Keywords:** Autistic spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), internalizing problems

## INTRODUCTION

Internalizing disorders in young children were, for a long time, less studied than externalizing disorders. This was mainly because the latter are more evident to the family members or teachers, who recognize the disruptive behavior as abnormal instead of the more discrete, quiet internal distress, which characterizes the internalizing disorders. However, in recent years, the focus has been shifted on the former, as physicians recognize the value of their early diagnosis and treatment.

Autistic spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD) are two of the most studied neurodevelopmental disorders. However, most studies focus on the externalizing problems [1, 2].

ADHD is among the most common mental disorders affecting children [3]. The prevalence of the disorder varies worldwide, but it is estimated to be between 5.29% and 7.1% in children and adolescents and 3.4% in adults [4]. However, the prevalence in very young children (<6 years old) and older adults (>44 years old) is less well studied. Boys are more often affected than girls [5]. ADHD is characterized by three core symptoms: impulsiveness, hyperactivity, and inattention [6].

The DSM-V criteria, published in 2013 by the APA as standard criteria for the

classification of mental disorders, recognize three different subtypes of the disorder [5]: the inattentive subtype (ADD), hyperactive-impulsive subtype, and the combined subtype, where you have all the features present.

Autism spectrum disorders, or ASD, are a group of disorders characterized by impaired social interaction, behavior, interests, and communication skills. Autism, Asperger syndrome, pervasive developmental disorder not otherwise specified (PDD-NOS), and childhood disintegrative disorder, which were separate diagnoses in DSV-IV, have been united under a single diagnosis by the DSM-V. Roughly 1 in 68 children are diagnosed with ASD [7], and it is up to 3 times more prevalent in boys than girls.

During a child's development of social competence, two main behavior types are known as essential markers, and these are: "externalizing" behaviors where the child may exhibit control problems, impulsivity, and aggressiveness; and "internalizing" behaviors like anxiety, withdrawal, and depression [8, 9].

In the field of child psychology and psychiatry, there is a difference between internalizing and externalizing behavior [10]. When it comes to the internalizing behavior, like anxiety and/or depressive symptoms, traumatic stress, and social withdrawal, they affect the internal psychological setting rather than the external environment [11].

School-aged children and adolescents have a much more difficult time self-reporting their anxious or depressive symptoms. Due to these difficulties with the self-report, the diagnosis of the internalizing disorders is more difficult to establish, which delays the initiation of the treatment and gives a poorer prognosis.

According to the current criteria for the diagnosis of ADHD, disruptive behavioral and emotional symptoms do not have to be present. Nevertheless, frequently, physicians find themselves in a complicated situation in their clinical evaluation and management of ADHD when such symptoms are present [12]. The early explanations of ADHD contained descriptions of disruptive behavioral and emotional symptoms. It was observed that the most notable trait of a child diagnosed with ADHD was heightened emotionality or passion, including cruelty, dishonesty, defiance, aggression, lawlessness [13].

There was a proposed theory, back in the 1970s, of a minimal brain dysfunction that consisted of six groups of symptoms, one of them being emotions [14]. In children with ADHD, the following symptoms were described: mood liability, depression, anxiety, temper outburst, aggressive behavior, emotional reactivity, and increased anger. However, as time passed, and with the publication of the DSM-III at the beginning of 1980, the diagnostic criteria emphasized the cognitive and motor parts of the syndrome rather than the emotional components of ADHD. Comorbidities such as behavioral and emotional symptoms play a role in the treatment and prognosis of ADHD.

ADHD is most often associated with symptoms of emotional liability, with symptoms like hot temper, low frustration tolerance, irritability, anger, and sadness [15-18]. Emotional liability predicts a poorer social outcome and peer rejection in people with ADHD [16], where the treatment of the core symptoms of ADHD leads to the improvement of the emotional liability symptoms [19].

Even though emotional liability has been found in the changing definition of ADHD and its diagnostic criteria, it is still considered a feature implicated in the disorder [19]. However, the symptoms of emotional liability are not specific to ADHD and occur in many other psychiatric disorders such as bipolar disorder, personality disorders, anxiety, depression, and dementia [20]. Furthermore, symptoms of emotional liability may also be associated with temperamental traits such as

the personality trait of neuroticism [21] and negative emotionality [22].

Just like externalizing behaviors, internalizing behaviors are frequently seen in school-aged children and adolescents with ASD. One of the most common comorbidities or co-existing syndrome in ASD is depression, particularly in individuals with a higher level of functioning [23,24]. Anxiety is also common in patients with ASD [25].

Individuals diagnosed with ASD are at risk for a wide range of problems besides the symptoms of their condition. Children with ASD have high levels of anxiety and depression [26-28]; they also exhibit oppositional behavior and aggression [29], irritability, and self-injurious behavior [30]. A great majority of children with ASD also have neuropsychological deficits, sleep disturbances, and symptoms of ADHD.

Many children who have ASD will receive another diagnosis later in life. A study performed in 2008 showed that 70% of a small sample of children aged 10 to 14 diagnosed with ASD had also been diagnosed with another psychiatric condition [31]. Studies have shown that children diagnosed with ASD suffer from more severe phobias, compulsions, obsessions, and social phobia than any other group of children. Anxiety is a significant factor in the day-to-day life of many children with ASD, and it can make it nearly impossible for children to do anything from taking public transportation to making new friends [32]. Similar behavior can be identified in other anxiety disorders, but that can also be seen in ASD. For instance, compulsions and obsessions that are stereotypical for Obsessive-Compulsive Disorder (OCD), can also be seen in ASD.

## METHOD

### Sample

The data were collected from 60 children aged 6-14 years who were diagnosed with either ADHD or ASD in the Paediatric Psychiatry Clinic in Cluj-Napoca, according to DSM 5 and ICD 10 diagnosis criteria. The participants were divided into two groups: one group of children diagnosed with ADHD and another diagnosed with ASD. The ADHD group included 30 children (10 girls and 20 boys), and the ASD group included 30 children (seven girls and 23 boys). For every child enrolled, we obtained consent from the parents to use medical data while ensuring privacy and the subject's identity protection.

Inclusion criteria for the study were: boy or girl aged six to 14 years with the diagnosis of ADHD or ASD, according to the DSM 5 and ICD 10 diagnosis criteria; caregivers' agreement to participate in the study after having been explained and having understood the purpose of the study and the clinical protocol.

Exclusion criteria were: children under six years old, adopted children or children in foster care, children with a known significant somatic disease.

### Instruments

The caregivers were asked to fill in the Child Behavior Checklist 6-18 years (CBCL 6-18). CBCL is a component of the Achenbach System of Empirically Based Assessment (ASEBA). ASEBA is a collection of questionnaires used to assess adaptive and maladaptive behavior and overall functioning in individuals. Besides CBCL, which is intended to be filled in by the caregivers, the other components of ASEBA are the Youth Self Report Form (YSR), used for children to rate their behavior, and the Teacher Report Form (TRF), used by teachers to rate their pupil's behavior.

There are eight empirically-based syndrome scales scored from the CBCL/6-18, TRF, and YSR, and they are based on factor analyses coordinated across the forms. These syndromes are: Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems,

Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior.

The demographic data about the patient (sex, age, age at diagnosis, psychotherapy or pharmacotherapy) Furthermore, data concerning the family (parents' age, marital status, education level, occupation) were obtained from a questionnaire filled in by the parents.

**Design**

The study, which was carried out between January and December 2016, is a cross-sectional one. Participation consent was obtained for the patients eligible for inclusion in the study. Psychiatric and somatic assessments have been performed in order to confirm the diagnosis. The psychiatric assessment consisted in obtaining a complete medical history, performing a psychiatric exam, clinical observation, and the parents' interview. The participants in the clinical groups met DSM 5 diagnosis criteria for ADHD or ASD. Medical data were completed with the data collected from the observation charts of the patients and their medical documents.

The screening test CBCL 6-18 years was administered to the children's caregivers. CBCL 6-18 years was used to assess the internalizing/externalizing problems. The questionnaire was analyzed according to the instructions specified by the authors.

**Data analysis**

The statistical software used for data analysis was the SPSS 17 program. We used univariate statistical analysis to describe the studied population and CBCL 6-18 years data (mean, median, frequency tables). Bivariate statistical analysis (correlation, t-test) was used to identify significant associations between the groups.

**Ethical aspects**

We carried the study abiding by the laws concerning the conduct of clinical trials, both national and international ethical standards, as stated in the Helsinki Declaration of Human Rights. Patients and their parents who participated in the study have signed the informed consent.

## RESULTS

Information on child characteristics (age, gender, education level, type of therapy) and family characteristics (parents' age, marital, educational, and employment status) were obtained from the patients' parents (Table 1).

The majority of the patients were boys. The mean age was 7.2 years for the ASD group and 8.06 years for the ADHD group. Only a small number of the children received special education, while most received either psychotherapy or pharmacotherapy.

The mothers' mean age was 34.36 for the ASD group and 34.86 years for the ADHD group, while the fathers' mean age was higher (38.36 and 37.6, respectively). Most parents from both groups were married at the time of the study. Also, most parents had at least a high school education and were employed.

While most children from the ADHD group had a normal development for their age, intellectual and/or language delay was more frequent in the ASD group. Also, only 20% of the children had one or more comorbidities (see Table 1).

Furthermore, the CARS scale was administered to the children in the ASD group. Of the 30 children with ASD, 15 had mild autism, ten had moderate autism, and five had severe autism.

Out of the 36 patients who received psychotherapy, most of them received behavioral therapy (23 from the ASD group and seven from the ADHD group), two children from each group received cognitive behavioral therapy, and two ADHD patients had other types of therapy.

Twenty-four patients did not receive any psychotherapy (see Table 1).

| | ASD (N=30) | ADHD (N=30) |
|---|---|---|
| Age mean (SD) | 7.2 (1.86) | 8.06 (2.24) |
| Gender N (% male) | 23 (76.6) | 20 (66.66) |
| Psychotherapy N (%) | 25 (83.33) | 11 (36.66) |
| Behavioral therapy | 23 (76.66) | 7 23.33) |
| Cognitive behavioral therapy | 2 (6.66) | 2 (6.66) |
| Other | 0 (0) | 2 (6.66) |
| None | 5 (16.66) | 19 (63.33) |
| Education level N (%) | | |
| Kindergarten | 13 (43.33) | 7 (23.33) |
| Special kindergarten | 4 (13.33) | 1 (3.33) |
| School | 7 (23.33) | 18 (60) |
| Special education | 2 (6.66) | 0 (0) |
| None | 4 (13.33) | 4 (13.33) |
| Family characteristics | | |
| Mother's age (SD) | 34.36 (5.74) | 34.86 (6.51) |
| Father's age (SD) | 38.36 (5.78) | 37.6 (6.07) |
| Parents' marital status N married (%) | 26 (86.66) | 22 (73.33) |
| Parents' employment status Employed N (%) | 26 (86.66) | 19 (63.33) |
| Parents' education N (%) | | |
| 8 grades | 2 (6.66) | 7 (23.33) |
| Highschool | 11 (36.66) | 15 (50) |
| University | 14 (46.66) | 6 (20) |
| Post university | 3 (10) | 2 (6.66) |
| Comorbidities N (%) | 6 (20) | 6 (20) |
| Development level N (%) | | |
| Normal for age | 11 (36.66) | 26 (86.66) |
| Intellectual delay | 0 (0) | 2 (6.66) |
| Language delay | 3 (10) | 1 (3.33) |
| Intellectual and language delay | 16 (53.33) | 1 (3.33) |

Using the CBCL 6-18 years scale, we measured the intensity of the internalization disorders (anxiety and depression).

In the ASD group, 20 children did not have affective problems, four had problems of subclinical intensity, and six had affective problems of clinical intensity.

In the children with ADHD group, 17 children did not have affective problems, seven had problems of subclinical intensity, and six had affective problems of clinical intensity (see Table 2).

In terms of intensity of anxiety problems as measured by CBCL 6-18 years, in the ASD group, 19 children did not have anxiety problems, four had problems of subclinical intensity, and seven children had anxiety problems of clinical intensity.

As it can also be seen in Table 2, the children with ADHD registered more anxiety problems; 13 children did not have anxiety problems, 10 had problems of subclinical intensity, and seven children had anxiety problems of clinical intensity.

**Table 2. Intensity of affective and anxiety problems**

| INTENSITY OF AFFECTIVE PROBLEMS | ASD N (%) | ADHD N (%) |
|---|---|---|
| None | 20 (66.66) | 17 (56.66) |
| Subclinical | 4 (13.33) | 7 (23.33) |
| Clinical | 6 (20) | 6 (20) |
| **INTENSITY OF ANXIETY PROBLEMS** | | |
| None | 19 (63.33) | 13 (43.33) |
| Subclinical | 4 (13.33) | 10 (33.33) |
| Clinical | 7 (23.33) | 7 (23.33) |

To compare the internalization problems as measured by CBCL 6-18 years for children diagnosed with ASD and ADHD, we used the t-test for independent samples.

The independent variable was considered the diagnostic category, and the dependent variable, the intensity of internalization problems: intensity of affective problems and intensity of anxiety problems.

The statistically significant difference was tested at a significance threshold of $p < 0.05$ (see Table 3).

The statistical analysis revealed no statistically significant differences between the two categories of diagnosis in terms of the internalization problems: intensity of affective problems, $t(58) = 0.63$ $p > 0.05$, and intensity of anxiety problems, $t(58) = -0.93$ $p > 0.05$.

Different factors evaluated in the study were tested in relation to the intensity of internalization problems, separately for ASD and ADHD groups. In the tables below, we present the correlations of each variable, compared for the two diagnosis categories, ASD and ADHD (see Table 4).

For the ASD group (see Table 3), the significant correlation to the intensity of the affective problems was the CARS score that measures the ASD symptoms severity ($r = 0.40$, $p < 0.05$), the relationship being moderate. Regarding the ADHD group, we found a statistically significant correlation only with the presence of comorbidities ($r = -0.44$, $p < 0.05$), a medium intensity correlation.

In this context, it was interesting to analyze whether there are statistically significant

**Table 3. Relation of different factors with the intensity of affective problems for ASD and ADHD groups**

| Variables | TSA | ADHD |
|---|---|---|
| Gender | -.07 | .23 |
| Age | .21 | -.06 |
| Type of therapy | .03 | .00 |
| Pharmacological treatment | -.21 | -.01 |
| Educational status | .01 | .15 |
| CARS scores | .40* | |
| Developmental level | .08 | -.00 |
| Comorbidities | -.02 | -.44* |
| Mother's age | -.35 | -.21 |
| Father's age | -.10 | -.25 |
| Parents educational level | -.25 | -.24 |
| Marital status parents | .22 | -.09 |
| Professional status parents | .16 | .00 |
| Chronic health problems mothers | .17 | -.30 |
| Chronic health problems fathers | .17 | |

*Significant correlations at $p < 0.05$

**Table 4. Relation of different factors with the intensity of anxiety problems for ASD and ADHD groups**

| Variables | TSA | ADHD |
|---|---|---|
| Gender | -.11 | .00 |
| Age | -.00 | -.08 |
| Type of therapy | .59** | .18 |
| Pharmacological treatment | -.16 | -.23 |
| Educational status | .27 | .19 |
| CARS scores | .10 | |
| Developmental level | .13 | -.08 |
| Comorbidities | .05 | -.44* |
| Mother's age | -.42* | -.21 |
| Father's age | -.24 | -.18 |
| Parents educational level | -.09 | -.37* |
| Marital status parents | -.04 | .04 |
| Professional status parents | .26 | .19 |
| Chronic health problems mothers | .03 | -.34 |
| Chronic health problems fathers | .19 | |

* Significant correlations at p<0.05, **significant correlations at p<0.01

differences between the correlation coefficients obtained on the two groups. The significant difference was tested using the t-test for the interaction effect between each studied factor and the two groups on the intensity of affective problems.

The results of this analysis revealed the lack of a statistically significant difference between the two groups for the presence of comorbidities (t = 0.00, p> 0.05).

For the ASD group (see Table 4), the significant correlations for the intensity of anxiety problems were the type of therapy (r = 0.59, p <0.01) and maternal age (r = -0.42, p <0.05), the relationships being moderate. As for the ADHD group, statistically significant correlations were found to be only the presence of comorbidities (r = -0.44, p <0.05) and the patients' parents educational level (r = -0.37, p <0.05), correlations being of medium intensity.

In this context, it was interesting to analyze whether there are statistically significant differences between the correlation coefficients obtained on the two groups. The significant difference was tested using the t-test for the interaction effect between each studied factor and the two groups on the intensity of anxiety problems. The results of this analysis revealed the lack of a statistically significant difference between the two groups for the presence of comorbidities (t = 0.00, p> 0.05) and maternal age (t = -0.31, p> 0.05).

The only variables whose relationship to the intensity of anxiety problems was moderated by the diagnostic category were the type of therapy (t = -4.8, p = 0.00) and the patients' parents' educational level (t = 2.3, p = 0.02). The correlation with the type of therapy is significantly higher for the ADHD group, a negative relationship, meaning that the less used the therapy is, the more severe anxiety problems are. The correlation with the parental educational level is significantly higher for the ASD group; a positive relationship, expressed by the higher educational level of the parents is, the higher the reported levels of anxiety problems are.

## DISCUSSIONS

### Main findings

A study performed in the United States that observed 342 children with ADHD,

aged 6-18, recruited from pediatric and behavioral clinics found that the most prevalent diagnosis co-occurring with ADHD was Oppositional Defiant Disorder (ODD), appearing 41% of the time. Minor Depression/ Dysthymia (MDD) was in second place with a rate of 22%, and the third was Generalized Anxiety Disorder (GAD), appearing 15.2% of the time [33]. The percentage for MDD is similar to our result, but as seen above, a similar percentage of the children with ADHD had affective problems of subclinical intensity.

The comorbid relationship of ADHD and Bipolar Disorder (BPD) is remarkably high, with estimated rates of BPD of 10% to 22% in children with ADHD and rates of ADHD ranging from 57% to 98% in children with BPD [34-36]. Several studies conducted to look at the rates of comorbidity associated with the two disorders produced varied results. The rates of comorbidity ranged from 9% to 94 %. This broad diversity is due to the various methods utilized. Bird et al. reported in 1988 a comorbidity rate of 17%, Winokur et al. reported in 1993 a rate of 21.3%, West et al. in 1995 reported a rate of 57%, Wozniak et al. reported a rate of 95 %, and Woolston et al., in 1989 reported a rate of 51% [37].

Although distinguishing the two disorders can be difficult due to the considerable symptom overlap (for example, inattention, distractibility, impulsivity, psychomotor agitation, and poor sleep are frequently observed in both ADHD and BPD) [38], studies suggest that the comorbid relationship is unlikely to be due to symptom overlap of diagnostic uncertainty.

Children with ASD frequently experience co-occurring internalizing symptoms such as anxiety, depression, or somatic symptoms. Rates of co-occurring internalizing symptoms in children with ASD are reported to range from 40 to 80% [39,40,41]. Reported rates vary depending on a given study's age range, inclusion criteria, and referral method. Of the three main symptom clusters of internalizing problems, depression and anxiety symptoms occur most frequently in children with ASD (42). A study reported the percentages of co-occurring anxiety or depression endorsed at syndromal or subsyndromal levels in an ASD sample (M age=9.2 years): 24% indicated symptoms of depression, 5% generalized anxiety, 19% separation anxiety, and 10% social phobia [39]. Due to the high frequency of depression and anxiety symptoms in children with ASD, exploring the factors that influence these associations is essential.

The association between diagnostic status and internalizing symptoms has been widely documented in previous literature, strongly suggesting that children with ASD (particularly those with average or above-average intellectual functioning) experience higher rates of internalizing symptoms compared to individuals who are not on the autism spectrum or those with ASD and below-average intellectual functioning [43,44,45].

Our study revealed similar results, with 20% of the children with ASD having affective problems of clinical intensity and 13.3% of subclinical intensity, confirming the high comorbidity with affective disorders in this group.

**Study limits**

One of this studies' limits is the relatively small sample size. Also, data were collected from questionnaires filled only by the patients' parents, who may miss some of the symptoms. Furthermore, the prevalence of children with moderate/severe autism could influence the results obtained in assessing the internalizing problems.

## CONCLUSIONS

We found no statistically significant difference between the two diagnosis categories in terms of the internalization problems. For the ASD group, we found a moderate

positive relationship between the CARS score and affective problems, type of psychotherapy received, and anxiety, and a negative relationship between maternal age and anxiety problems. For the ADHD group, there was a negative correlation of medium intensity between the presence of comorbidities and both affective and anxiety problems and a positive correlation of medium intensity between parents' education and anxiety problems.

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