

## Cross-sectional study on the prevalence of comorbid conditions in pediatric patients with autistic spectrum disorder

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### Abstract

**Background:** Autism Spectrum Disorder (ASD) causes repetitive behaviors and social communication issues. Many children with ASD also have Attention Deficit Hyperactivity Disorder (ADHD), anxiety, epilepsy, or intellectual disabilities. Identifying these comorbidities helps Autism Spectrum Disorder children receive comprehensive care and improve outcomes. Autism Spectrum Disorder children often have other health issues, but few studies have been done, especially in India.

**Objective:** This study examined the prevalence of co-occurring disorders in children with Autism Spectrum Disorder and the relationship between Autism Spectrum Disorder and related disorders like Attention Deficit Hyperactivity Disorder, anxiety, epilepsy, and sleep disorders.

**Method:** This 18-month cross-sectional study examined IGIMS and Patna patients from the duration of Feb-2022 to Aug-2024. One hundred Autism Spectrum Disorder -diagnosed children were sampled. Data came from clinical records, diagnostic tests, and parent interviews. Comorbidities included Attention Deficit Hyperactivity Disorder, anxiety, epilepsy, sleep, and gastrointestinal disorders. The prevalence of each comorbid condition was calculated using descriptive statistics.

**Results:** The study found that 80% of the pediatric patients with Autism Spectrum Disorder had at least one comorbid condition. The most prevalent comorbidities were anxiety disorders (40%), ADHD (35%), and epilepsy (20%). Sleep disorders and gastrointestinal issues were also common, with 25% and 10% of patients affected, respectively. Statistical analysis indicated significant associations between the presence of comorbidities and the severity of Autism Spectrum Disorder symptoms.

**Conclusion:** Comorbidities are common in pediatric Autism Spectrum Disorder patients, so early detection and multidisciplinary management are essential. Clinicians must screen children carefully because common comorbidities like anxiety, Attention Deficit Hyperactivity Disorder, and epilepsy can affect development and quality of life. Early intervention and individualized Autism Spectrum Disorder and co-occurring disorder treatment are essential to improve outcomes in this group.

**Keywords:** ASD, pediatric patients, comorbid conditions, symptoms, diagnosis, children.

### Introduction

People with Autism Spectrum Disorder complex neurodevelopmental disorder, have limited interests and behaviors and

struggle with social interaction [1]. Autism spectrum disorder symptoms can be mild, moderate, or severe and usually appear before three. Some Autism Spectrum Disorder patients have intellectual disabilities, while others are smart or above average. Autism Spectrum Disorder is diagnosed by the DSM-5 if a person has restricted and repetitive behaviors or interests and social communication and interaction issues. These symptoms must significantly impair social, occupational, or other vital functions to be diagnosed. A child's developmental history and behavioral observations confirm a diagnosis during clinical evaluation [2].

Autism Spectrum Disorder can coexist with many medical conditions, complicating diagnosis and treatment. Multiple comorbidities can affect different parts of a child's health, making management more difficult. Children with Autism Spectrum Disorder are often diagnosed with Attention Deficit Hyperactivity Disorder, exhibiting symptoms of inattention, hyperactivity, and impulsivity. Many children with Autism Spectrum Disorder experience significant levels of anxiety, including generalized anxiety disorder, social anxiety, and specific phobias. Seizure disorders are relatively common in children with Autism Spectrum Disorder, with studies suggesting that up to one-third of individuals with Autism Spectrum Disorder may have epilepsy [3]. A significant proportion of children with Autism Spectrum Disorder also have intellectual disabilities, affecting their learning abilities and adaptive behaviors. Sleep disturbances are frequently reported in children with Autism Spectrum Disorder, including difficulties with falling asleep, staying asleep, and irregular sleep-wake cycles. These comorbidities must be identified to manage and treat Autism Spectrum Disorder children. Untreated comorbidities can make life harder for autism spectrum disorder families. Early detection and treatment of comorbid conditions can improve Autism Spectrum Disorder patients' quality of life, functioning, development, and care plan. Despite the well-established link between Autism Spectrum Disorder and its co-occurring disorders in pediatric patients at Indian tertiary care centers, especially IGIMS Patna, little research has been done. Understanding comorbidities in this population is necessary to develop comprehensive care strategies tailored to its needs. Regional children with Autism Spectrum Disorder may have different healthcare needs than other populations; this study will explain why. IGIMS Patna is conducting this study to fill the gap in local data and better understand Autism Spectrum Disorder children in this region. Given its pediatric specialty care reputation, the institution is ideal for this study.

This research seeks to determine how common co-occurring disorders are in IGIMS Patna children with Autism Spectrum Disorder. Identify the most common comorbid conditions among children with ASD. Assess the frequency of each comorbidity (e.g., ADHD, anxiety, epilepsy, intellectual disabilities, etc.). Investigate any potential associations between ASD severity and the presence of comorbid conditions. Provide recommendations for more comprehensive clinical management and interventions based on the prevalence of these comorbidities. By achieving these objectives, the study will offer valuable insights into the healthcare needs of pediatric Autism Spectrum Disorder patients and inform future clinical practices for better outcomes.

Researchers from around the world have examined the frequency of co-occurring disorders in Autism Spectrum Disorder patients. Research shows that children with Autism Spectrum Disorder have more comorbidities than the general population [4]. A study that examined ASD comorbidities across nations found that 40%–50% of children with Autism Spectrum Disorder had another mental health condition [5]. The most common co-occurring conditions were Attention Deficit Hyperactivity Disorder, anxiety, and epilepsy. The study also found that countries with more developed healthcare systems have higher comorbidity rates, possibly due to increased awareness and better diagnostic tools. After a thorough evaluation, [6] found that 70% of Autism Spectrum Disorder patients had another mental health disorder. Intellectual disabilities were more common in severe Autism Spectrum Disorder than in milder forms, which were linked to anxiety and mood disorders. [7] found a significant overlap between Autism Spectrum Disorder and anxiety disorders in over 30% of South Regional differences exist in comorbidity prevalence. Comorbid Attention Deficit Hyperactivity Disorder and epilepsy are more common, especially in children, according to UK, Australian, and European research. Low- and middle-income countries have lower prevalence rates due to underdiagnosis or misdiagnosis of comorbid

conditions due to a lack of specialized healthcare. [8] found that children with Autism Spectrum Disorder often have intellectual impairments and developmental disabilities, but underreported psychiatric comorbidities like anxiety and Attention Deficit Hyperactivity Disorder may be due to a lack of mental health funding in India. Due to their thorough diagnostic processes, tertiary care centers and specialized clinics tend to have more comorbidities. [9] found that 75% of children with autism spectrum disorder had one or more co-occurring disorders in a US tertiary hospital. This prevalence may be due to the extensive diagnostic procedures used in these specialized settings, which may not be available in primary or general healthcare facilities.

Autism spectrum children often have neurological, psychiatric, or developmental disorders. Autism Spectrum Disorder kids often have Attention Deficit Hyperactivity Disorder symptoms like impulsivity, hyperactivity, and inattention. According to [10], 30–50% of Autism Spectrum Disorder children have Attention Deficit Hyperactivity Disorder. These disorders have similar symptoms, making diagnosis and treatment harder. Both involve impulsivity and attention issues. Research shows that 30–40% of children with Autism Spectrum Disorder have anxiety disorders like generalized anxiety, social anxiety, or phobias. Thus, Autism Spectrum Disorder children often have anxiety. [11] found that anxiety disorders worsen social challenges for children with Autism Spectrum Disorder. This impacts treatment outcomes and quality of life for these children. Research shows that 30% of people with Autism Spectrum Disorder have epilepsy and have more seizures than the general population. According to [12], people with severe autism spectrum disorder or intellectual disabilities are more likely to have seizures. Seizures may require additional medical treatment, complicating Autism Spectrum Disorder management. Autism Spectrum Disorder children, especially those with severe cases, often have intellectual disabilities. [13] found intellectual disability in half of autistic children. This can significantly impact these children's learning and adaptation. More than half of children with Autism Spectrum Disorder have trouble falling asleep, staying asleep, or having irregular sleep-wake cycles. These disruptions can worsen behavioral issues and make daytime functioning harder. [14] found that Attention Deficit Hyperactivity Disorder and anxiety sufferers with sleep problems have worsened symptoms.

Much of the current knowledge comes from high-income countries, where specialists are more accessible and diagnostic resources are better. However, low- and middle-income countries like India may not report mental comorbidities like anxiety and Attention Deficit Hyperactivity Disorder due to a lack of resources for accurate diagnosis and reporting. Comorbidity prevalence data in Western countries is abundant, but Indian tertiary care centers are understudied. Comorbidities may be more common in some Autism Spectrum Disorder children due to healthcare, culture, and geography disparities. Data specific to Patna is needed to improve local care practices due to regional differences in healthcare systems and social contexts. Most studies on Autism Spectrum Disorder comorbidities have examined older children or adults. Fewer have examined younger children. Understanding co-occurring disorder symptoms in younger children is crucial to early Autism Spectrum Disorder diagnosis and intervention. Many studies have shown that other medical conditions often accompany Autism Spectrum Disorder, but few have examined how these co-occurring issues affect therapy response and quality of life. This knowledge gap must be filled for better Autism Spectrum Disorder care and treatment. This study examined tertiary care paediatric Autism Spectrum Disorder patients at IGIMS Patna and their comorbidities to fill in some gaps. This research collects region-specific data to better understand Autism Spectrum Disorder children's healthcare needs and guide clinical management practices in similar settings.

## **Materials and methods**

### **Study design**

A cross-sectional study was conducted to determine the prevalence of co-occurring disorders in children with Autism Spectrum Disorder. This study was conducted at Indira Gandhi Institute of Medical Sciences, Patna after taking ethical approval from ethical approval committee of IGIMS Patna for over 18 months using a retrospective design from the duration of Feb-2022 to Aug-2024. The study will examine Autism Spectrum Disorder comorbidities using clinical visit and hospital admission data.

### Study setting

IGIMS in Patna, a tertiary care hospital with comprehensive medical services, will host the study. Due to its paediatric and neurodevelopmental disorder services, this hospital is ideal for studying co-occurring disorders in children with Autism Spectrum Disorder.

### Study population

The study will include children who has the Autism Spectrum Disorder. This study includes referral and outpatient patients from IGIMS, Patna. Children diagnosed with Autism Spectrum Disorder according to DSM-5 criteria will be sampled. These children will be 2–12 years old.

### Inclusion and exclusion criteria

#### Inclusion criteria

- Pediatric patients aged **2 to 12 years**.
- Autism spectrum disorder diagnosed by child psychologist and attending paediatrician.
- Availability of complete clinical records, including history, diagnostic assessments, and information on comorbid conditions.

#### Exclusion criteria

- Children with comorbid neurological or genetic disorders unrelated to Autism Spectrum Disorder (e.g., Down syndrome, Rett syndrome).
- Incomplete or missing medical records.

### Sample size

This study will include 100 autistic children. This sample size is determined by reviewing comparable research to ensure statistical power to identify significant associations between Autism Spectrum Disorder and co-occurring disorders.

### Duration of study

The study lasts 18 months and if data collection takes this long, many paediatric Autism Spectrum Disorder patients can be analysed.

### Data collection methods

We will review the clinical records of IGIMS, Patna paediatric Autism Spectrum Disorder patients to gather data for this study. The patient's diagnosis, treatments, and co-occurring diseases will be in the medical records. When comprehensive records are unavailable, the research will interview the child's guardians or parents to fill in health gaps, including mental or behavioral disorders. Diagnostic evaluations and questionnaires from attending clinicians will also be examined for co-morbidities.

### Statistical analysis

The collected data will be analyzed using descriptive and inferential statistics. Descriptive statistics will determine the prevalence of each co-occurring disorder in the research population. Chi-square tests will determine if co-occurring disorders affect Autism Spectrum Disorder severity. Statistical significance is determined at  $p < 0.05$ . We will also summarise the data using frequencies and percentages and look for correlations between comorbid conditions, age, gender, Autism Spectrum Disorder type, and other demographic variables. Thus, we will better understand Autism Spectrum Disorder -related comorbidity causes and prevalence trends.

### Results

#### Demographics of the sample

The study sample comprised **100 pediatric patients** diagnosed with Autism Spectrum Disorder at IGIMS, Patna. The participants included both male and female children ranging in age from **2 to 12 years**. A majority of the patients were male, with **80% (n = 80)** of the sample being male and **20% (n = 20)** female.

	Number (n)	Percentage (%)
Male	80	80%

Female	20	20%
2–5 years	30	30%
6–8 years	40	40%
9-12 years	30	30%

This demographic profile indicates a predominance of younger children and a significantly higher prevalence of Autism Spectrum Disorder in males compared to females, which is consistent with findings from previous studies.

**Prevalence of comorbid conditions**

The study found that **80%** (n = 80) of the pediatric patients with Autism Spectrum Disorder had at least one comorbid condition. The prevalence of specific comorbid conditions in the sample is summarized in the table below.

Comorbid Condition	Prevalence (%)
Attention-Deficit Hyperactivity Disorder (ADHD)	35% (n = 35)
Epilepsy / Seizure Disorders	20% (n = 20)
Anxiety Disorders	40% (n = 40)
Sleep Disorders	25% (n = 25)
Intellectual Disabilities	15% (n = 15)
Gastrointestinal Disorders	10% (n = 10)
Depression	5% (n = 5)
Obsessive-Compulsive Disorder (OCD)	3% (n = 3)

Anxiety disorders affected 40% of the sample, Attention Deficit Hyperactivity Disorder 35%, and epilepsy/seizure 20%.

**Statistical findings**

We searched for demographic-disease correlations using statistical methods. Age was associated with Attention Deficit Hyperactivity Disorder prevalence (p = 0.02), with higher rates in 2–5-year-olds than 9-12-year-olds. Epilepsy and seizure disorders were also more common in 6–9-year-olds (p = 0.03). Despite no statistically significant difference, more girls than boys had anxiety disorders (p = 0.08). As a whole, comorbid conditions were more common in younger age groups, suggesting neurological and mental health issues develop earlier. Comorbidity prevalence rates in the study population ranged from 10% to 40%, with confidence intervals. This study found that early detection and treatment of Autism Spectrum Disorder comorbidities can improve quality of life and development.

**Discussion**

Over 80% of the children in this study had at least one comorbidity, suggesting that these conditions are common in children with Autism Spectrum Disorder. Anxiety disorders (40%), Attention Deficit Hyperactivity Disorder (35%), and epilepsy/seizure disorders (20%) were the most common psychiatric and neurological co-morbidities in Autism Spectrum Disorder children, consistent with previous research. As anxiety disorders were the most common, children with Autism Spectrum Disorder may be more likely to experience anxiety than the general population. Autism Spectrum Disorder children may have sensory sensitivities and social and communication challenges, which may explain this. The results also showed that epilepsy was more common in 6-10-year-olds and Attention Deficit Hyperactivity Disorder in younger children. This supports the growing body of research showing that Attention Deficit Hyperactivity Disorder is often detected in early childhood and epilepsy may develop or worsen in older children. The study group's high rates of sleep disorders (25%) and gastrointestinal issues (10%) suggest that children with Autism Spectrum Disorder may have sensory processing issues that affect digestion and sleep.

**Comparison with previous studies**

Prevalence rates in this study match those of other global studies. [15] found that 80–85% of children with Autism Spectrum Disorder have a comorbid condition, including 30–40% of Attention Deficit Hyperactivity Disorder and 35–40% of anxiety disorders. These findings support the high prevalence of Autism Spectrum Disorder in our study and link

it to the risk of neurological and mental disorders. [16] found 30% higher rates of epilepsy in children with Autism Spectrum Disorder in the US, possibly due to diagnostic procedures and the inclusion of more severe Autism Spectrum Disorder children. Since autism spectrum disorder and epilepsy are linked, many autistic children, especially those with severe intellectual disabilities, have both. Our 20% prevalence rate is in line with global trends. Low-income and non-tertiary care studies show lower comorbidity rates. This difference may be due to diagnostic capacity, healthcare accessibility, and autism spectrum disorder and related disorder knowledge.

### **Clinical implications**

Due to the high prevalence of co-occurring disorders, Autism Spectrum Disorder care for children must be holistic and interdisciplinary. Clinicians should evaluate the main symptoms of Autism Spectrum Disorder and any co-occurring disorders that may worsen symptoms or stunt growth. Early diagnosis is crucial to developing effective Attention Deficit Hyperactivity Disorder and anxiety treatment programs using behavioural therapy, medication, and family counselling. Sleep disorders and epilepsy can negatively impact a child's quality of life, cognitive development, and daily functioning, so they must be diagnosed. Health providers should work with gastroenterologists, pediatric neurologists, and psychiatrists to ensure the child's complete health.

### **Limitations of the study**

Some restrictions apply to this research. First, this study only included 100 paediatric patients from one Patna tertiary care centre, so its findings may not apply to all Indian children with autism spectrum disorder. A larger, multicentric study with different settings may yield more generalizable results. The retrospective study design uses secondary data, which may be biased or missing important information. Clinicians' evaluation consistency and patient medical records can also affect comorbidity diagnoses. Comorbidities may change over time, and the 18-month study is short. Cultural and parental reporting differences may make Autism Spectrum Disorder comorbidities harder to detect and diagnose.

### **Recommendations for future research**

1. Future studies could track co-occurring disorders in Autism Spectrum Disorder children using a longitudinal design. This information clarifies comorbidities and their effects on child development.
2. Researching comorbidities in diverse populations across multiple centers in different regions and settings would be helpful.
3. Tics, sensory processing disorders, and motor coordination issues are less common co-occurring disorders with Autism Spectrum Disorder, but future research could examine them.
4. Researching the genetic and environmental factors that cause the high prevalence of comorbid conditions in children with Autism Spectrum Disorder would help us understand the mechanisms and develop more targeted interventions.

### **Conclusion**

In this study, 80% of children with Autism Spectrum Disorder had anxiety disorders (40%), Attention Deficit Hyperactivity Disorder (35%), and epilepsy (20%). These findings emphasize the importance of identifying and treating co-occurring disorders in children with Autism Spectrum Disorder for better health and development. Due to the high prevalence of neurological and psychiatric disorders, early and thorough diagnostic evaluations are needed to detect and treat comorbidities. Clinicians treating Autism Spectrum Disorder and related disorders should use neurological, developmental, and psychological approaches. Medical professionals should prioritise thorough screenings for co-occurring disorders in Autism Spectrum Disorder children because early intervention improves quality of life and function.

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