



A Clinical Study to Assess the Neuropsychiatric Comorbidity in Established Cases of Autism Spectrum Disorder

Kristi Baruah¹, Suresh Chakravarty²

¹ Senior resident, Department of Psychiatry, Gauhati Medical College and Hospital.

² Professor, Department of Psychiatry, Gauhati Medical College and Hospital.

OPEN ACCESS

Corresponding Author:

Kristi Baruah

Senior resident, Department of Psychiatry, Gauhati Medical College and Hospital.

Received: 13-01-2026

Accepted: 30-01-2026

Available online: 17-02-2026

Copyright © International Journal of Medical and Pharmaceutical Research

ABSTRACT

Background: Children with Autism Spectrum Disorders (ASD) may present with multiple neuropsychiatric comorbidities which may invariably influence the symptoms of the primary diagnosis and may affect treatment plans and outcomes. Despite the profound effect of comorbidities on ASD children, information regarding the occurrence and relation of neuropsychiatric comorbidities with severity of ASD is limited.

Aim: In view of this, the present study was aimed 1) To assess the occurrence and pattern of comorbid neuropsychiatric condition in children with ASD, 2) To assess the relation between the severity of ASD and its neuropsychiatric co-morbidities. **Methods:** It was a cross sectional study with a sample size of 50 children attending psychiatry OPD or admitted in psychiatry ward of the institute. Univariate analyses were used to examine associations between neuropsychiatric comorbidities and dependent variable (severity of ASD) using chi square test.

Results: 72 % of the children in our study had one comorbid illness or the other. The most common neuropsychiatric comorbidity was intellectual disability (58.33%) followed by ADHD (33.3%) and Childhood onset psychosis (19%) respectively. A significant association was found between ADHD and severity of ASD and the value of chi-square was 6.049 which was significant ($p=0.045 < 0.05$).

Conclusion: The presence of neuropsychiatric comorbidities invariably affect the clinical presentation of ASD children. Comorbid ADHD presents additional risk in children with ASD and these findings may encourage clinicians to thoroughly assess ADHD symptomatology in ASD children for better outcome in treatment.

Keywords: Autism spectrum disorder (ASD), Neuropsychiatric co morbidities, Severity of ASD, Intellectual disability (IDD), Attention Deficit Hyperkinetic disorder (ADHD).

INTRODUCTION

Autism spectrum disorder (ASD) is a complex neurodevelopmental disorder, usually diagnosed at a young age. Autism spectrum disorder includes a range of conditions characterized by persistent deficits in social communication and social interaction and restricted, repetitive patterns of behaviour, interests or activities which starts from early childhood and limit everyday functioning.^[1] These disorders include autism, pervasive developmental disorders not otherwise specified and Aspergers syndrome. The diagnostic rate for autism spectrum disorders has increased over the last two decades from 1 in 500 in 1999 to currently 1 in 54 children in 2020 in the United States. ^[2] Studies from Asia, Europe, and North America have reported prevalence rates for ASD in the range of 1% to 2% for ASD ^[3] and studies from India report a prevalence for around 3.2% .^[4]

Recent studies indicate that rates of problematic psychiatric symptoms are increasing in ASD than in the general population and that comorbid psychiatric disorders can significantly impair functioning and interfere with therapeutic and scholastic progress. However, the identification and appropriate management of psychiatric comorbidity in ASD was likely hindered by diagnostic restrictions set out in the previous edition of the Diagnostic and Statistical Manual of

Mental Disorders (DSM-IV-TR), which precluded conferring a combined diagnosis of both ASD and certain psychiatric disorders, such as ADHD or social anxiety disorder (social phobia). Changes in diagnostic criteria in the 2013 edition (DSM-5) removed previous barriers to diagnosing comorbid psychiatric disorders in this population.^[5] This same principle applies to concurrent diagnosis of ASD and other developmental co-ordination disorders, anxiety disorders, depressive disorders and other comorbid diagnosis. Moreover, co-occurring mood problems have a significant impact on the wellbeing and outcomes of autistic people, contributing to reduced quality of life across developmental stage and increased mortality through suicide in those without intellectual disability.^[6-8]

ASD is frequently associated with intellectual impairment and structural language disorders. About 30% of children with ASD function in the intellectually disabled range. Of those, about 30% of children function in the mild –moderate range and about 45-50% is severe to profoundly intellectually disabled. Moreover, EEG abnormalities and seizure disorders occur with greater than expected frequency in individuals with ASD. 4-32% of individuals with ASD have grand mal seizures at some time and about 20-25% show ventricular enlargement in CT scan.^[2] Children with ASD with other neuropsychiatric comorbidities had worse functions at school, peer, and home than with ASD without co morbidities at follow-up assessment. Examining comorbidity in clinical samples is important because they may influence the symptoms of the primary diagnosis and may affect treatment plans and outcomes. Furthermore, knowing which comorbid disorders are (more) likely to exist in a particular clinical sample, may lead to (early) screening activities and (the development of) prevention program.^[9]

S Pillai et al.,^[10] 2021 in their study illustrated the demographic profiles and comorbidities of autistic children. In their study, the most common comorbidity was ADHD (43%) followed by 17% of participants with intellectual impairment and concomitant epilepsy or seizures were present in 15% of study participants. Sleep disturbances and behavioural disorders were present in 11% of study participants, respectively. Learning difficulties and anxiety disorders were the least identified comorbidities in their study. A study by Meng Chwan Lai et al.,^[11] 2019 have mentioned about co occurring psychiatric comorbidities in autism. From their meta analysis, prevalence estimates for ADHD-28%, anxiety disorders-20%, sleep wake disorders -13%, disruptive impulsive control & conduct disorders-12%, depressive disorders-9%, OCD-9%, bipolar disorders-5%, schizophrenia spectrum disorders- 4% were found.

In India, there is a need to understand the burden of ASD as well as the health and social needs of patients and their families so as to address services for improved care. Hence, the purpose of this descriptive study was to study the occurrence and pattern of comorbid neuropsychiatric condition in children with ASD and to assess the association between the severity of ASD and its neuropsychiatric co-morbidities. Also a very few study has been conducted on the same subject in north eastern part of India which has got a very diverse ethnic and racial population. Gauhati Medical College and Hospital caters not only Assam but the entire NE states, and with time the number of patients attending and consulting the psychiatric outpatient department is increasing. Considering all these perspectives the present study has been undertaken.

METHODOLOGY

Participants and settings

The study was conducted in Gauhati Medical College and Hospital, Guwahati, Assam, India from 1st May 2021 to 30th April 2022. It was a cross sectional study with a sample size of 50 children attending psychiatry OPD or admitted in psychiatry ward of the institute. The study was approved by the Institutional Ethical Committee of Gauhati Medical College and Hospital. Children with age group – 3- 18 yrs of both male and female gender and diagnosed with ASD with written informed consent (from parents) were included in the study. Those with serious neurological disorder (tuberous sclerosis, neurofibromatosis, fragile X syndrome) and those reporting head injury were excluded from the study. A total of 50 children who fulfilled the above mentioned criteria attending the outpatient and inpatient ward of psychiatry department has been included. Written and informed consent was taken from the parents of the children before including them in the study.

Instruments

- 1) Semi Structured Socio-Demographic Proforma And Clinical Proforma : A semi structured pro forma was prepared to document the socio-demographic data and other neuropsychiatric conditions of the children.
- 2) DSM -5: Both ASD and other neuropsychiatric disorders were diagnosed as per DSM-5. Code 299.00 defines Autism Spectrum disorder.
- 3) Indian Scale For Assessment Of Autism (ISAA): ISAA is an objective assessment tool for children with autism which uses observation, clinical evaluation of behaviour, testing by interaction with the subject and also information supplemented by parents or caretakers in order to diagnose autism. ISAA consists of 40 items rated on a 5-point scale ranging from 1 (never) to 5 (always). The 40 items of ISAA are divided under six domains as Social Relationship and Reciprocity, Emotional Responsiveness, Speech - Language and Communication, Behaviour Patterns, Sensory Aspects and Cognitive Component.
- 4) Modified Kuppaswamy Socio-Economic Scale (Updated For 2020)

Data analysis

The characteristics of the sample are described by frequencies for qualitative variables and by mean and standard deviation for quantitative variables. Distribution of each neuropsychiatric comorbidities was demonstrated individually. Univariate analyses were used to examine associations between neuropsychiatric comorbidities and dependent variable (severity of ASD) using chi square test. The level of bilateral significance was 0.05. The statistical analysis was performed using SPSS software version 26.

RESULTS

Sociodemographic Profile Of Children With ASD:

Mean age at diagnosis was 8.5 years with a male preponderance of 88%. Majority children (28%) under the study were studying in class 1-6 and 54% of all children were from upper middle socio-economic status. 70 % of children lived in nuclear family and mean maternal and paternal age were found to be 26 years and 31 years respectively. Developmental milestones were delayed in 88% of children with 82% being first born child. Among demographic variables, a significant association was found between upper socio-economic status and severity of Autism Spectrum Disorder ($p=.039<.05$) whereas other sociodemographic variables did not show any association. The sociodemographic profiles are presented in Table 1. Most of the children were functioning in the moderate ASD range (66%) followed by mild (28%) and severe(6%) respectively which is shown in Table 2.

Table1: Sociodemographic profile and clinical severity of sample population

Sociodemographic variables		Severity of ASD			Total	Percentage(%)	P value
		Mild	Moderate	Severe			
Age	Early childhood(3-7yrs)	4 (15.4%)	20 (76.9%)	2 (7.7%)	26	52	0.254
	Late childhood(8-12 yrs)	6 (46.2%)	7 (53.5%)	0 (0.0%)	13	26	
	Adolescence (13-18yrs)	4 (36.4%)	6 (54.5%)	1 (9.1%)	11	22	
Gender	Male	12 (27.3%)	30 (68.2%)	2 (4.5%)	44	88	0.443
	Female	2 (33.3%)	3 (50.0%)	1 (16.7%)	6	12	
Religion	Hindu	12 (27.3%)	39 (65.9%)	3 (6.8%)	44	88	0.976
	Islam	1 (33.3%)	2 (66.7%)	0 (0.0%)	3	6	
	Christian	1 (33.3%)	2 (66.7%)	0 (0.0%)	3	6	
Education	Illiterate	3 (23.1%)	9 (69.2%)	1 (7.7%)	13	26	0.555
	Special school	1 (9.1%)	9 (81.8%)	1 (9.1%)	11	22	
	Play group	1 (25.0%)	3 (75.0%)	0 (0.0%)	4	8	
	Preparatory	0 (0.0%)	2 (100.0%)	0 (0.0%)	2	4	
	Class1-6	7 (50.0%)	7 (50.0%)	0 (0.0%)	14	28	
	Class 7-10	2 (33.3%)	3 (50.0%)	1 (16.7%)	6	12	
Socio economic status	Upper	1 (20.0%)	2 (40.0%)	2 (40.0%)	5	10	0.039
	Upper middle	7 (25.9%)	20 (74.1%)	0 (0.0%)	27	54	
	Lower middle	3 (30.0%)	6 (60.0%)	1 (10.0%)	10	20	
	Upper lower	3 (37.5%)	5 (62.5%)	0 (0.0%)	8	16	
Family type	Nuclear	9 (25.7%)	23 (65.7%)	3 (8.6%)	35	70	0.590
	Joint	5 (38.5%)	8 (6.5%)	0 (0.0%)	13	26	
	Extended nuclear	0 (0.0%)	2 (100.0%)	0 (0.0%)	2	4	
Family history	Present	1 (25.5%)	3 (75.5%)	0 (0.0%)	4	8	0.849
	Absent	13 (28.3%)	30 (65.2%)	3 (6.5%)	46	92	
Maternal age	20-25 yrs	7 (28%)	17 (68%)	1 (4%)	25	50	0.954
	26-30 yrs	4 (23.5%)	11 (64.7%)	2 (11.8%)	17	34	
	30-35 yrs	2 (33.3%)	4 (66.7%)	0 (0.0%)	6	12	
	35-40 yrs	1 (50.0%)	1 (50.0%)	0 (0.0%)	2	4	
Paternal age	25-30 yrs	3 (42.9%)	4 (57.1%)	0 (0.0%)	7	14	0.450
	30-35 yrs	1 (9.1%)	8 (72.7%)	2 (18.2%)	11	22	
	35-40 yrs	4 (22.2%)	13 (72.2%)	1 (5.6%)	18	36	
	40-45 yrs	4 (40.0%)	6 (60.0%)	0 (0.0%)	10	20	
	45-50yrs	2 (50.0%)	2 (50.0%)	0 (0.0%)	4	8	
Delayed development milestones	Delayed	11 (24.4%)	13 (68.9%)	3 (6.7%)	45	90	0.231
	Not delayed	3 (60.0%)	2 (40.0%)	0 (0.0%)	5	10	
Academic performance	Good	7 (53.3%)	6 (46.2%)	0 (0.0%)	13	26	0.171
	Poor	2 (20.0%)	7 (70.0%)	1 (10.0%)	10	20	
	Not applicable	5 (18.5%)	20 (74%)	2 (7%)	27	54	

First birth order	Yes	13 (31.7%)	25 (61.0%)	3 (7.3%)	41	82	0.266
	No	1 (11.1%)	8 (88.9%)	0 (0.0%)	9	18	

Table 2: Showing distribution of the children according to severity of ASD

Severity of ASD	Frequency	Percentage	Mean	SD
Mild (70 -106)	14	28.0%	99.2143	7.79722
Moderate (107 - 153)	33	66.0%	124.2121	12.94159
Severe (>153)	3	6.0%	157.6667	4.72582
Total	50	100.0	119.2200	18.65617

Occurrence and pattern of comorbid neuropsychiatric conditions in children with ASD

72 % of the children in our study had one comorbid illness or the other. 55.6% of the children had only one comorbid illness whereas 36.1% and 8.3% of children had two and three comorbid illness at the same time respectively. 14 out of 50 children with ASD were without any comorbidity. Among comorbidities, intellectual disability was present in majority 52.8% of patients followed by 33.3% ADHD patients. Psychosis was present in 19.4% patients. Seizure, restrictive food intake disorder and social anxiety disorder were present in 16.7%, 11.1% and 8.3% patients. Down syndrome, catatonia and TICS were present in 2.8% of the patients each. Majority of the children viz. 19.4% had both ADHD along with intellectual disability followed by 11.1% patients having only intellectual disability. The occurrence and pattern of comorbid neuropsychiatric conditions has been shown in Table 3.

Table 3: Distribution of neuropsychiatric comorbidities of ASD children

Comorbid Illness	Frequency	Percentage
Intellectual disability	21	58.33
ADHD	12	33.3
Psychosis	7	19.4
Seizure	6	16.6
Restrictive Food Intake Disorder	4	11.1
Social Anxiety Disorder	3	8.3
Depression	2	5.56
Down Syndrome	1	2.8
Catatonia	1	2.8
TICS	1	2.8

Association of severity of ASD with its neuropsychiatric comorbidities

Table 4 is made to test the association between severity of ASD and presence or absence of comorbid illness. Among the children having comorbid illness, 33.3%, 63.9% and 2.8% had mild, moderate and severe level of ASD. Among children not having comorbid illness, 14.3%, 71.4% and 14.3% had mild, moderate and severe level of ASD. Chi-square test was performed and the result showed that the association is not significant ($p=.164 >.05$). Hence, no significant association was found between severity of ASD and presence of neuropsychiatric comorbidities.

But on studying the statistical association of each and every neuropsychiatric comorbidity with severity of ASD, a significant association was found between ADHD and symptom severity. Out of children who had ADHD present in them, 8.3% and 91.7% had mild and moderate level of ASD respectively. No children with ADHD had severe ASD. Among the children not having ADHD, 45.8%, 50% and 4.2% had mild, moderate and severe level of ASD respectively. Chi-square test was performed to see the relation between severity of ASD and ADHD and the value of chi-square was 6.049 which was significant ($p=0.045 < 0.05$) which has been depicted in table 5. Thus it can be inferred that possibly presence of ADHD may have an influence on the severity of ASD among the children.

Table 4 : Showing the association between severity of ASD and neuropsychiatric comorbidities

Comorbid Illness	Severity of ASD			Total	p-value
	Mild (70 -106)	Moderate (107 - 153)	Severe (>153)		
Present	12 33.3%	23 63.9%	1 2.8%	36 100.0%	.164 (NSs)
Absent	2 14.3%	10 71.4%	2 14.3%	14 100.0%	

NS: Not Significant

Table 5: showing the association between presence of ADHD and severity of ASD

ADHD	Severity of ASD			Total	p-value
	Mild	Moderate	Severe		
Absent	11	12	1	24	.045*

	45.8%	50.0%	4.2%	100.0%
Present	1	11	0	12
	8.3%	91.7%	0.0%	100.0%
Total	12	23	1	36
	33.3%	63.9%	2.8%	100.0%

*: Significant at 5%

DISCUSSION

Sociodemographic Profile Of Children With ASD:

The average age of participants was 8.5 years when they received a confirmed diagnosis of ASD, which is comparable to a study by David S. Mandell et al.,^[12] 2005 where the mean age of diagnosis of children with Aspergers syndrome was 7.2 years. Most children were boys corresponding to other studies.^[13] Out of the total ASD children in our study, 13(26%) of them were not attending any kind of school which could be due to co-existing intellectual disability of the ASD children. Most of the patients i.e., 54% were from upper middle socio – economic status which corresponded to a study done in Indian population by Adak et al.,^[14] 2017 where higher estimation and prevalence rate was observed in urban areas. Also a significant association was found between upper middle socioeconomic class and severity of ASD (p=0.39). Mean maternal and paternal age were found to be 26 years and 31 years respectively. This was similar to a Danish study by Larsson et al.,^[15] 2005 which reported no statistically significant association between risk of autism and either maternal or paternal age after adjusting for other perinatal factors and parental psychiatric history. Most of the children (92%) did not present with a family history of autism or any other mental illness. 70% of children belonged to dual-income family where both parents went for work and the child was left alone with care taker. In our study, it was observed that ASD children with comorbid intellectual disability had a history of global developmental delay in all four types of milestones. However, ASD children without intellectual disability showed regression in verbal and non-verbal communication but not in motor milestones. ASD children without intellectual disability had age appropriate development of fine and gross motor milestones. Parents reported more of regression of milestones at around 2 years of age than delayed onset of development of speech. These findings were similar to a study by Davidovitch et al.,^[16] 2009 where out of 40 children, nineteen children (47.5 %) regressed in verbal and non-verbal communication and social but not in motor abilities. In our study, 82%, of the children were found to be first born child which was similar to a study by Ugur et al.,^[17] 2019. This could be because of the rate of difficulties during labour was determined to be higher in the ASD group than that of the general population. Another possible reason could be that parents may be worried of having another child after their first-born child was autistic. This phenomenon has been described by Gardener as the “stoppage rule”.^[18] Overall 66% of children had moderate level of clinical severity similar to a study by Balachandra et al.,^[19]2021.

Occurrence and pattern of comorbid neuropsychiatric conditions in children with ASD

In our study, 36 (72%) of the ASD children had one or more neuropsychiatric comorbidities. The most common neuropsychiatric comorbidity was intellectual disability(58.33%), out of which mild ID was predominant. The second most common comorbidity was ADHD which was present in 12 ASD children (33.3%) followed by Childhood onset psychosis (19%) respectively. Seizure was fourth most common (16.6%). Restrictive Food Intake and Social anxiety disorder were present in 11.1% and 8.3% of total ASD children. And least common were tics, catatonia and Down syndrome (2.8% each). In our study, 4 children had restrictive food intake behaviours out of which two had colour preferences of food and two had hypersensitivity towards particular food textures. Kiselev et al.,^[20] 2020 mentioned in their study out of the children who received an initial ASD diagnosis in 2014, 64.8% had one or more co-occurring neuropsychiatric diagnosis which was very much similar to the findings in our study.

In our study, 42% of ASD children had intellectual disability which was similar to a study done in Italy by Postorino et al.,^[21]2016 where 47.6% of ASD were found to have comorbid intellectual disability. For estimation of IQ score, children were referred to clinical psychologist for IQ assessment but out of 50, 8 children did not turn up. Earlier studies report about 30% of children with ASD is intellectually disabled. Cognitively, children with ASD are frequently more skilled in visual-spatial tasks than in tasks requiring skill in verbal reasoning. Intellectual disability is one of the most important factor that contributes to the heterogeneity in the clinical presentation of ASD children. Compared to children with only ASD, those with comorbid ID exhibited increased symptom severity. Moreover, literature studies have proven that intelligence in autism is a good predictor for adult outcome, thus essential in clinical practice in order to choose the most appropriate intervention (Begovac et al.,^[22] 2009).

Our findings were similar to a study by S Pillai et al.,^[10] 2021 where ADHD was the most common comorbid condition (43%) followed by ID (17%) and Epilepsy (15%) respectively. ADHD is a behavioural disorder with a familiar association with ASD and produces high academic dysfunctionality, exacerbates the academic and social needs of children who present comorbidity with ASD. In the same study by S Pillai et al.,^[10] 2021 concomitant epilepsy or seizures were present in 15% of study participants which parallels our study findings(16.6%) and also showed that epilepsy and epileptiform activity on EEGs occur more commonly in children with ASD than in children without ASD. 19% of ASD children had psychosis, out of which 4 had a brief psychotic disorder and 3 had a longstanding psychotic

illness. The duration of illness reported by individuals with ASD in this study generally did not meet the duration criteria for DSM-5 (minimum of 6 months' disturbance with 1 month of active symptoms), indicating a more acute, transient course. Our results observed that individuals with ASD who had developed a comorbid psychotic illness differ significantly in their autistic phenotypic profile from individuals with ASD alone. In our study, they presented more of self-injurious behaviour, more self-stimulating emotions (self-muttering, self-giggling) and unprovoked anger outburst, wandering behaviour, disorganized behaviour, poor self-care rather than hallucinations and delusions. The results indicate that the spectrum of psychotic illness experienced by adults with ASD may be different from that experienced by the population without a diagnosis of ASD. Larson et al.,^[23] 2017 proposed the existence of an underlying neurodevelopmental vulnerability to developing psychosis in some people with ASD. There is currently little standardised stressful life-event data from ASD population, and this is an important area of future research. Our study also observed ASD children with psychosis had significantly fewer restricted, repetitive and stereotyped behaviours and interests than those with ASD alone which was similar to findings by Larson et al.,^[23] 2017. It may represent the genetic fractionation of the core symptoms of ASD (Happé et al.,^[11] 2008), and could suggest that the genetic risk factors for social-communication difficulties share a greater association with genetic risk factors for psychosis than restricted and repetitive behaviours. The prevalence of neurotic disorders were quite less in our studies which included social anxiety disorders, depression, OCD with tics which was in contrast to a study by Chuan Lai et al.,^[11] 2018 where increased rates of anxiety disorders (20%), sleep-wake disorders (13%), disruptive impulsive control & conduct disorders (12%), depressive disorders (9%) were seen.

Association of severity of ASD with its neuropsychiatric comorbidities

No significant association was found between severity of ASD and presence of neuropsychiatric comorbidities. But on studying the statistical association of each and every neuropsychiatric comorbidity with severity of ASD, a significant association was found between ADHD and symptom severity. Thus it can be inferred that possibly presence of ADHD may have an influence on the severity of ASD among the children. Mansour et al.,^[24] 2021 observed that increasing severity of ASD symptomatology was not associated with higher risk of poorer performance on any cognitive tasks performance. However, when ADHD was concomitantly present, children with ASD were at higher risk for impairments in tasks assessing attention, immediate memory, and response inhibition. Similar to our findings, Sprenger et al.,^[25] 2013, observed that children with ASD and an additional ADHD (ASD+) would show a higher severity of autistic symptoms than those with ASD only (ASD-). Although there are many reasons for such a high comorbidity rate of ASD with the ADHD, research suggests that shared genetic risks or exposure to repeated social stressors may also be contributing factors. Based on these previous findings, it can be argued that ADHD enhances the vulnerability of a child with ASD to developing other psychiatric symptoms, such as depression, anxiety, eating disorders and ODD. Hence it can be concluded that severity of ASD symptomatology was not associated with greater neuropsychiatric comorbidities but highlights the importance of assessing the presence of ADHD in children with ASD. Therefore, ADHD symptoms appear to be a strong indicator of severity of autistic symptoms in ASD children.

Our study had certain limitations also. Firstly, there was a lack of control of group in our study. Also because of the limited sample size (50) the sample size may not be a true representative of the community. Our study was a hospital-based cross-sectional study and so it may not reflect the actual scenario of the sociodemographic variables of the society. EEG findings of the ASD children were not included in our study as a variable which may be one of the reasons for the decreased prevalence of seizure in our study sample. However, this was one of the rare studies assessing the relation between severity of ASD and its neuropsychiatric comorbidities in Northeastern part of India. Also, the tool used for grading of severity of ASD (ISAA) carries a good inter-rater and test-retest reliability and also high validity.

CONCLUSION

From the current study it was concluded that comorbid intellectual disability, ADHD and childhood-onset psychosis were the most presented neuropsychiatric comorbidities. The most occurring coincidence of comorbidity is comorbid ADHD with IDD. From our study, no significant association was found between the severity of ASD and its neuropsychiatric comorbidities. However, when statistical association of each and every neuropsychiatric comorbidity was studied, a significant relation was seen between ADHD and severity of ASD. Such co-occurrence warrants clinical attention and aetiological investigations to uncover sources of vulnerability associated with autism. By addressing specific comorbidities, management of a child with ASD may be subsequently more effective, but failure to diagnose early, impacts negatively on the long-term quality of life of ASD children. Our findings may lead clinicians to consider employing more intensive treatment techniques, whether psychiatric, psychological, or educational, to appropriately manage children with Autism Spectrum Disorders who present with comorbid neuropsychiatric comorbidities.

ACKNOWLEDGEMENTS:

Authors would like to thank Department of Psychiatry, Gauhati Medical College and Hospital, Guwahati.

DECLARATION

Conflicts of interests: The authors declare no conflicts of interest.

Author contribution: All authors have contributed in the manuscript.

REFERENCES

1. American Psychiatric Association, American Psychiatric Association, editors. Diagnostic and statistical manual of mental disorders: DSM-5. 5th ed. Washington, D.C: American Psychiatric Association; 2013.
2. Boland RJ, Verduin ML, Ruiz P, Shah A. Kaplan & Sadock's Synopsis of Psychiatry. Wolters Kluwer; 2021.
3. Autism Spectrum disorders (ASD) in South Asia: a systematic review | SpringerLink [Internet]. [cited 2022 Oct 10]; Available from: <https://link.springer.com/article/10.1186/s12888-017-1440-x>
4. Sagar R, Dandona R, Gururaj G, Dhaliwal RS, Singh A, Ferrari A, et al. The burden of mental disorders across the states of India: the Global Burden of Disease Study 1990–2017. *The Lancet Psychiatry* 2020;7(2):148–61.
5. Ameis SH, Szatmari P. Common psychiatric comorbidities and their assessment [Internet]. In: Anagnostou E, Brian J, editors. *Clinician's Manual on Autism Spectrum Disorder*. Cham: Springer International Publishing; 2015 [cited 2022 Sep 11]. page 19–32. Available from: https://doi.org/10.1007/978-3-319-03056-2_3
6. Oakley B, Loth E, Murphy DG. Autism and mood disorders. *International Review of Psychiatry* 2021;33(3):280–99.
7. Uptegrove R, Abu-Akel A, Chisholm K, Lin A, Zahid S, Pelton M, et al. Autism and psychosis: Clinical implications for depression and suicide. *Schizophrenia Research* 2018;195:80–5.
8. Mayes SD, Calhoun SL. Ability Profiles in Children with Autism: Influence of Age and IQ. *Autism* 2003;7(1):65–80.
9. van Steensel FJA, Bögels SM, de Bruin EI. Psychiatric Comorbidity in Children with Autism Spectrum Disorders: A Comparison with Children with ADHD. *J Child Fam Stud* 2013;22(3):368–76.
10. Pillai S, Makhetha M, Aldous C. A study reflecting the demographics and comorbidities of children diagnosed with autism spectrum disorder at initial presentation to the KwaZulu-Natal Children's Hospital. *South African Journal of Child Health* 2021;15(3):125–9.
11. Lai MC, Kasseh C, Besney R, Bonato S, Hull L, Mandy W, et al. Prevalence of co-occurring mental health diagnoses in the autism population: a systematic review and meta-analysis. *The Lancet Psychiatry* 2019;6(10):819–29.
12. Mandell DS, Novak MM, Zubritsky CD. Factors Associated With Age of Diagnosis Among Children With Autism Spectrum Disorders. *Pediatrics* 2005;116(6):1480–6.
13. Werling DM, Geschwind DH. Sex differences in autism spectrum disorders. *Curr Opin Neurol* 2013;26(2):146–53.
14. Adak B, Halder S. Systematic Review on Prevalence for Autism Spectrum Disorder with Respect to Gender and Socio-Economic Status. *J Ment Disord Treat* [Internet] 2017 [cited 2022 Aug 16];03(01). Available from: <https://www.omicsonline.org/open-access/systematic-review-on-prevalence-for-autism-spectrum-disorder-with-respect-to-gender-and-socioeconomic-status-2471-271X-1000133.php?aid=85410>
15. Larsson HJ, Eaton WW, Madsen KM, Vestergaard M, Olesen AV, Agerbo E, et al. Risk Factors for Autism: Perinatal Factors, Parental Psychiatric History, and Socioeconomic Status. *American Journal of Epidemiology* 2005;161(10):916–25.
16. Davidovitch M, Glick L, Holtzman G, Tirosh E, Safir MP. Developmental Regression in Autism: Maternal Perception. *J Autism Dev Disord* 2000;30(2):113–9.
17. Ugur C, Tonyali A, Goker Z, Uneri OS. Birth order and reproductive stoppage in families of children with autism spectrum disorder. *Psychiatry and Clinical Psychopharmacology* 2019;29(4):509–14.
18. Gardener H, Spiegelman D, Buka SL. Prenatal risk factors for autism: comprehensive meta-analysis. *The British Journal of Psychiatry* 2009;195(1):7–14.
19. Balachandar V, Bharathi G, Jayaramayya K, Venugopal A, Mahalaxmi I, Narayanasamy A, et al. Autism spectrum disorder (ASD)-a case-control study to investigate the prenatal, perinatal and neonatal factors in Indian Population. *Brain Disorders* 2021;4:100024.
20. Kiselev Y, Handal M, Hjellvik V, Reichborn-Kjennerud T, Stoltenberg C, Suren P, et al. Nationwide Study of Neuropsychiatric Comorbidity and Medicines Use in Children With Autism Spectrum Disorder in Norway. *Frontiers in Psychiatry* [Internet] 2020 [cited 2022 Aug 27];11. Available from: <https://www.frontiersin.org/articles/10.3389/fpsy.2020.596032>
21. Postorino V, Fatta LM, Sanges V, Giovagnoli G, De Peppo L, Vicari S, et al. Intellectual disability in Autism Spectrum Disorder: Investigation of prevalence in an Italian sample of children and adolescents. *Research in Developmental Disabilities* 2016;48:193–201.
22. Begovac I, Begovac B, Maji G. LONGITUDINAL STUDIES OF IQ STABILITY IN CHILDREN WITH CHILDHOOD AUTISM – LITERATURE SURVEY. 1993;21(3):10.
23. Larson FV, Wagner AP, Jones PB, Tantam D, Lai MC, Baron-Cohen S, et al. Psychosis in autism: Comparison of the features of both conditions in a dually affected cohort. *The British Journal of Psychiatry* 2017;210(4):269–75.
24. Mansour R, Ward AR, Lane DM, Loveland KA, Aman MG, Jerger S, et al. ADHD severity as a predictor of cognitive task performance in children with Autism Spectrum Disorder (ASD). *Research in Developmental Disabilities* 2021;111:103882.
25. Sprenger L, Bühler E, Poustka L, Bach C, Heinzel-Gutenbrunner M, Kamp-Becker I, et al. Impact of ADHD symptoms on autism spectrum disorder symptom severity. *Research in Developmental Disabilities* 2013;34(10):3545–52.