

## Psychiatric comorbidities with autism spectrum disorder in an adult clinical sample

Rifat Binte Radwan, Chiro Islam Mallik, Mohammad S I Mullick

**Background:** As part of continuity, prevalence of autism spectrum disorder (ASD) is nearly the same as children and is associated with other comorbid psychiatric disorders that have substantial impact on their life and complex the intervention.

**Objectives:** This study was aimed to examine psychiatric co-morbidity in referred adult ASD patients compared to non-ASD psychiatric patients.

**Methods:** In total, 36 adult ASD patients from a psychiatric consultation center in Dhaka city were included in the study consecutively who were referred for psychiatric consultation during the period of 2019. Equal number of age and sex-matched non-ASD psychiatric patients were selected for comparison. Socio-demographic information and clinical assessment-based on DSM-5 diagnosis of the cases were made.

**Results:** Patients' age ranged from 18-41 years with a mean of  $26.72 \pm 6.5$  years. Male-female ratio was 1.6:1. Mean number of psychiatric disorders was 1.92 in patients with ASD and 1.67 in patients without ASD and the difference was significant ( $P = 0.04$ ). Most three frequent co-morbidities among ASD patients were obsessive-compulsive disorder (27.8%), major depressive disorder (25%) and specific phobia (19.4%). All these disorders were significantly higher in ASD patients than in non-ASD psychiatric patients. Conversely, major depressive disorder (30.6%), bipolar disorder (19.4%), schizophrenia, generalized anxiety disorder and substance-related disorder (13.9% each) were higher among non-ASD patients.

**Conclusions:** Subsequent broad-based studies using extensive measures of psychopathology are required to confirm these preliminary findings. Greater understanding of the presence of other psychiatric disorders in ASD patients will turn this awareness into action.

**Declaration of interest:** None

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**Keywords:** ASD; adults; psychiatric comorbidity.

### Introduction

An increasing number of autism spectrum disorder (ASD) children enter adulthood along with this lifelong disorder and face additional difficulties while coping up with daily challenges of life. ASD is well monitored in the child and adolescent population due to its vast impact in childhood.

Throughout the globe, the prevalence of ASD is ranging from 0.3 to 3% among children.<sup>1-9</sup> From these studies, it is found that prevalence of ASD in children of developed countries is way more than the children of developing countries. However, the trend of prevalence is increasing,

and it is likely contributed to by extrinsic factors such as increased awareness and diagnostics.<sup>8,9</sup> Studies from USA showed that from 2010 to 2016, children identified with ASD has increased from one in 68 children to around one in 54 children (18.5 per 1,000 8-year-olds).<sup>10,11</sup> In Bangladesh, there are a few studies exploring the prevalence of ASD among children ranged from 0.2-0.75%.<sup>12,14</sup> As the ASD has adulthood continuity, the prevalence among the adult population for this disorder is expected to be more or less the same. With dramatically increasing prevalence, autism is rapidly becoming a disorder of adulthood as well.<sup>15</sup> The developmental trajectory of children with autism shows both continuity and change.<sup>16</sup> The lifelong continuity of ASD is also reported in studies. It is currently estimated that by 2026, in the UK alone, another 1.7 million adults will need some type of care; among whom minimum 1% will be adults and older individuals with ASD and learning disability.<sup>17</sup> The first published information on the epidemiology of ASD among the adult population depicted that the prevalence of ASD in English adults was 9.8 per 1000.5 Earlier in May 2020, The Centers for Disease Control and Prevention published the first study to estimate the prevalence of autism in U.S. adults age 18 and older and that was 2.21%. It also reported that ASD prevalence among adults is increasing.<sup>15,18</sup>

People with ASD suffer a lot due to the disorder itself; sadly, they suffer a lot when they have other comorbidities. Research has found that, beside the core symptomatology, ASD people are frequently affected by psychiatric co-morbidities and behavioral problems.<sup>19</sup> Some studies of children with ASD have depicted comorbid psychiatric condition in higher rates which ranges from 70% to 80.9%.<sup>20-24</sup> Several studies demonstrated that the frequently reported psychiatric disorders in children and adolescents with ASD include mood disturbance, anxiety disorders, attention deficit hyperactivity disorder, tic disorder and oppositional defiant disorder.<sup>21-23,25-27</sup>

However, pediatric psychiatric disorders like emotional and behavioral problems tend to diminish over the period from childhood to adulthood and the probable reason behind this could be internalization of behavior, an adjustment to stable routine, emotional and physical maturation.<sup>28</sup> Pattern of co-morbidity among children and adolescents with ASD is much different from the pattern of comorbidity in adults with ASD.<sup>28,29</sup> Frequently reported psychiatric disorders in adults with ASD include obsessive-compulsive disorder, major depressive disorder, specific phobia, social phobia, generalized anxiety

disorder. Another study reported that, among the adult ASD patients, 16% were suffering from depression, anxiety 10%, psychoses 7%, OCD 5% and learning disability 4%.<sup>19</sup> These psychiatric comorbid conditions have immense potential to impact the outcome among adults, who have ASD from childhood.<sup>21,22,28,30</sup> In a nutshell, presence of these comorbidities further worsen the already compromised cases of ASD<sup>31,32</sup> and while being at a psychosocial rehabilitation, these comorbidities are more likely to cause interference with critical efforts.<sup>27</sup>

There are very limited studies depicting the clinical characteristics of this lifelong disorder in adult population.<sup>27</sup> To plan the community service and optimize the quality care of these patients' lives, it is crucial to understand the adult outcomes associated with ASD.<sup>32,33</sup> In Bangladesh, to the researchers' best knowledge, no study has yet been reported with the information on the adult ASD including co-morbidities of ASD exclusively in adults. The objective of the present study was to delineate the proportion and types of psychiatric co-morbidities among adult patients with ASD in comparison with non-ASD psychiatric patients. It has been hypothesized that adult patients with ASD have more psychiatric co-morbid conditions than other non-ASD general psychiatric patients.

## Methods

This cross-sectional, quantitative, descriptive, and comparative type of study was conducted in a psychiatric consultation center in the city of Dhaka during the period of January to December 2019. The patients attend here from all corners of the country. A total of <sup>36</sup> adults with ASD who were referred to the center for psychiatric consultation during the study period were included in the study consecutively. Similar number of age and sex-matched psychiatric patients with at least one non-ASD diagnosis were selected from the same center for comparison. The socio-demographic and relevant data were collected. It contained variables that were proved to be effective to compare the psychiatric disorders between patients with ASD and patients without ASD. These were age, sex, social background, economic status, educational background whether they had received mainstream education or special education, occupation, marital status, and family type. The third author (MM), who is an experienced senior consultant psychiatrist, to whom patients were referred confirmed diagnosis. The process of psychiatric diagnosis was clinical and phenomenally based. Detailed history of a subject was taken from the patient and attending reliable informants. After that clinical

examination, mental status examination and relevant investigations were carried out. The assessment was done either in single or in multiple settings as per requirement. The diagnoses were assigned by careful interpretation of all available information, clinical examination, and relevant investigations according to DSM-5. In the ASD group, any other associated diagnosis of psychiatric disorder was considered as co-morbid psychiatric disorder. On the other hand, in the non-ASD group, any other psychiatric disorder at the same time with one main psychiatric diagnosis was considered as co-morbidity. All collected data were cleaned by checking and rechecking for omissions, inconsistencies, and improbabilities. Data was edited, coded, and entered the computer. After managing data properly, it was analyzed in Statistical Package for Social Science (SPSS) version 20. Comparisons of psychiatric disorders were made between the two patient groups.

The researchers were duly concerned about the ethical issues related to the study. Confidentiality of information was maintained. Informed written consent was obtained from the participants and their legal guardians after informing them about the nature, purpose and the procedure of the study. Moreover, the participants could withdraw from the study at any time. Participants did not gain financial benefit from this study. The present study posed a very low risk to the participants, as procedures causing psychological, spiritual or social harm were not included.

## Results

In total, 72 cases were included in the study, among which 36 adults with ASD were referred to the psychiatric consultation center and the other 36 adults were referred for general psychiatric consultation. The cases ranged from 18 to 41 years with the mean of  $26.7 \pm 6.5$  years. Table 1 shows the socio-demographic characteristics of both the groups.

**Table 1: Socio-demographic characteristics ASD and non-ASD patients**

Characteristics	ASD patients		Non-ASD Patients		Total		P value
	n = 36	%	n = 36	%	n = 72	%	
<b>Age (in year)</b>							
18-30	27	75	27	75	54	75	0.5
31-42	9	25	9	25	18	25	
<b>Sex</b>							
Male	22	61.1	22	61.1	44	61.1	0.5
Female	14	38.9	14	38.9	28	38.9	
<b>Education</b>							
No education	12	33.3	-	-	12	16.7	0.0
Mainstream education	14	38.9	36	100	50	69.4	
Special education	10	27.8	-	-	10	13.9	
Both mainstream and special education	1	2.8	-	-	-	-	
<b>Occupation</b>							
Unemployed	20	55.6	7	19.4	27	37.5	0.01
Employed	5	13.9	8	22.2	13	18.1	
Student	9	25	15	41.7	24	33.3	
Housewife	2	5.6	6	16.7	8	11.1	
<b>Social Background</b>							
Rural	11	30.6	17	47.2	28	38.9	0.1
Urban	25	69.4	19	52.8	44	61.1	

Characteristics	ASD patients		Non-ASD Patients		Total		P value
	n = 36	%	n = 36	%	n = 72	%	
<b>Income group</b>							
Low	3	8.3	13	36.1	16	22.2	0.01
Middle	23	63.9	19	52.8	42	58.3	
High	10	27.8	4	11.1	14	19.4	
<b>Marital Status</b>							
Unmarried	22	61.1	21	58.3	43	59.7	0.5
Married	14	38.9	15	41.7	29	40.3	
<b>Family Type</b>							
Nuclear	16	44.4	22	61.1	38	52.8	0.1
Joint	20	55.6	14	38.9	34	47.2	

It depicts that 75% of the cases were aged below 30 years and the rest 25% cases were aged from 31-42 years. Among the pool of two groups, from a total 72 cases, 22 were male and 14 were female in each group. Therefore, the age and sex of both groups were found to be matched. The male-female ratio was 1.57:1. On educational background, ASD patients were higher in no education (33.3%) and special education (27.7%) categories, and the result was significant as there were no non-ASD patients in these groups. In contrast, all the non-ASD patients had mainstream education and it was significantly higher than ASD patients (100% vs. 38%). In terms of occupation, students, employed and housewives were comparatively more found in non-ASD patients and those were 41.70%, 22.20% and 16.70%, respectively. On the other hand, unemployed individuals were hugely more in number among the ASD patients (55.6%) and that was significant. Whereas students in this group were approximately 25%, 13.9% were employed and only 5.6% were housewives. A bigger part of the subjects came from urban settings (61.1%) and the rest came from the rural area. On the economic background, 58.3% of subjects came from the

middle-income families followed by low-income (22.2%) and high-income (19.4%) families. The ASD patients came significantly more from the middle and high-income group (63.9% and 27.8%) and non-ASD patients came more from the middle-income group (52.8%). In the group of patients with ASD, around 61.1% cases were unmarried whereas in the non-ASD patients 58.33% were unmarried. Most of the ASD cases came from joint families and that was 55.60%. In contrast, most 61.10% psychiatric cases without ASD belonged to the nuclear family.

Proportion and mean of comorbid psychiatric disorders other than main diagnosis among the patients of both the groups is presented in Table 2. It reveals that among the patients with ASD, 83.3% had at least one or more comorbid psychiatric disorders whereas; this was found 55.5% among the non-ASD patients. This difference was highly significant (p= 0.02). Further, the mean number of co- morbid psychiatric disorders was 1.9±1.1 in patients with ASD and it was 1.6±0.72 in the patients without ASD. The difference was measured, and it was also highly significant (p=0.039).

**Table 2: Proportion and mean of comorbid psychiatric disorders in ASD and non-ASD patients**

Patient's Group	Co-morbidity n (%)		P value	Mean	SD	SE Mean	P value	Odds Ratio
	Present	Absent						
ASD	30 (83.3%)	6 (16.6%)	0.02	1.9	1.1	0.188	0.04	4
Non-ASD	20 (55.5%)	16 (44.4%)		1.6	0.7	0.120		

The frequencies of comorbidities were calculated and are presented in Figure 1. It shows that an overall higher frequency of comorbid psychiatric disorders was found among ASD patients in terms of two and three comorbidities (30.56% and 36.11%, respectively). On the other hand, non-ASD patients had lower frequency of psychiatric comorbidities as expressed in higher rate of no and single comorbidity (44.44% and 36.11% respectively).

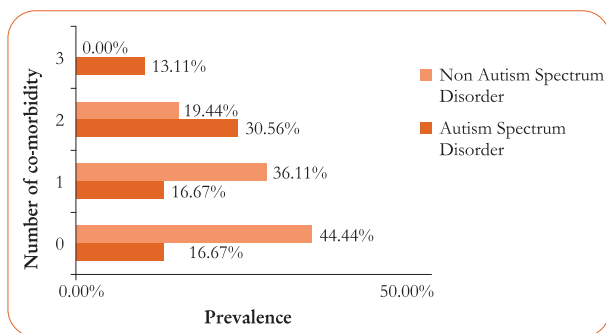


Figure 1: The frequency of comorbidities in ASD and non-ASD patients

Table 3 shows the types of specific comorbid psychiatric disorders. It depicts that among the ASD patients, the most frequent comorbidity was obsessive-compulsive disorder (27.8%) which was followed by major depressive disorder (25%) and specific phobia (19.4%) that were significantly higher than the non-ASD patient group. After these, attention deficit/hyperactivity disorder (ADHD), social phobia and intermittent explosive disorder were commonly found in this patient group and the frequency was 16.7%. Conduct disorder (11.11%) and generalized anxiety disorder came next in the line according to frequency. Moreover, both tic disorder and other specified disruptive impulse control & conduct disorder were found to be 8.33% each among the ASD patients. Apart from these, psychosis (not otherwise specified), sibling rivalry disorder, other specific anxiety disorder and oppositional defiant disorder were also diagnosed in the ASD patient group and their frequency was 2.8% each. Among the non-ASD patient group, the most commonly reported disorder was major depressive disorder, which was 30.6%. Bipolar mood disorder (19.4%) followed it. Schizophrenia,

generalized anxiety disorder, substance related disorder and conversion disorder were found to be 13.9% more frequent among this patient group. Panic disorder and illness anxiety disorder followed the frequency trail with 8.33% for each. Between these two groups, patients with obsessive-compulsive disorder, specific phobia, ADHD, social phobia and intermittent explosive disorder were found more in number and frequency in the ASD patient group and the difference is highly significant ( $p=0.03, 0.03, 0.01, 0.05, 0.01$ , respectively). Conversely, major depressive disorder, bipolar mood disorder, substance-related disorder, conversion disorder, schizophrenia and generalized anxiety disorder were more common in the non-ASD patient group than the ASD patient group. However, the difference was significant only for conversion disorder ( $p=0.03$ ). Conversion disorder, panic disorder and illness anxiety disorder were not found in ASD patient group but found in non-ASD patient group in 8.3-13.9% cases, whereas, tic disorders, conduct disorder, other specified disruptive, impulse-control, and conduct disorder and attention-deficit/hyperactivity disorder were not reported in non-ASD patients but found among ASD patient group in 8.3-16.7% cases.

## Discussion

This study was carried out to document the comorbid psychiatric disorders in ASD patients and compare them with other psychiatric patients without ASD who were referred to a psychiatric consultation center for assessment, diagnosis and treatment. In total, 36 adult patients with ASD suffered from high rates of psychiatric comorbidity at a frequency that was comparable to the psychiatrically referred adult patients without ASD.

At referral, most of the cases were young adults of below 30 years. ASD is an early childhood onset, pervasive and life-long disorder, which has not been considered with priority until recently in Bangladesh. Another reason could be that the reported prevalence of ASD in Bangladesh was 0.2%,<sup>12</sup> 0.84%<sup>34</sup> and 0.15%<sup>13</sup> in 2005, 2009 and 2017, respectively. These detected cases came into the system of follow up gradually for a better living. Probably therefore, the age of 75% cases were below 30 years. Most of these

**Table 3: Specific comorbid psychiatric disorders in ASD and non-ASD patients**

Specific diagnosis	ASD patient Group		Non-ASD patient group		P value
	Frequency	%	Frequency	%	
Obsessive-Compulsive Disorder	10	27.8	3	8.3	0.03
Conduct Disorder	4	11.1	-	-	0.06
Major Depressive Disorder	9	25	11	30.6	0.40
Schizophrenia	1	2.8	5	13.9	0.09
Tic Disorders	3	8.3	-	-	0.12
Generalized Anxiety Disorder	4	11.1	5	13.9	0.50
Other Specified Disruptive, Impulse-Control, and Conduct Disorder	3	8.3	-	-	0.12
Attention-Deficit/Hyperactivity Disorder	6	16.7	-	-	0.01
Intermittent Explosive Disorder	6	16.7	-	-	0.01
Specific Phobia	7	19.4	1	2.8	0.03
Social Phobia	6	16.7	1	2.8	0.05
Substance-Related Disorder	2	5.6	5	13.9	0.21
Bipolar Mood Disorder	2	5.6	7	19.4	0.08
Psychosis Not Otherwise Specified	1	2.8	-	-	0.50
Sibling Rivalry Disorder	1	2.8	-	-	0.50
Other Specific Anxiety Disorder	1	2.8	-	-	0.50
Avoidant Personality Disorder	-	-	1	2.8	0.50
Panic Disorder	-	-	3	8.3	0.12
Illness Anxiety Disorder	-	-	3	8.3	0.12
Conversion Disorder	-	-	5	13.9	0.03
Borderline Personality Disorder	-	-	2	5.6	0.25
Somatic Symptom Disorder	-	-	2	5.6	0.25
Sexual Dysfunction	-	-	1	2.8	0.50
Oppositional Defiant Disorder	1	2.8	-	-	0.50
Agoraphobia	-	-	2	5.6	0.25
Antisocial Personality Disorder	-	-	1	2.8	0.50
Histrionic Personality Disorder	-	-	1	2.8	0.50
Delusional Disorder	-	-	1	2.8	0.50
Somatic Symptom Disorder	-	-	1	2.8	0.50
Dependent Personality Disorder	-	-	1	2.8	0.50
Dissociative Amnesia	-	-	1	2.8	0.50

cases were diagnosed before and referred to the psychiatric consultation center for regular follow-ups.

In the ASD patient group, most of the cases (38.9%) have received mainstream education. Since ours is a country of lower middle income, maintaining a life-long treatment for ASD patients is difficult. Moreover, providing special education and teaching basic life skill training to these patients is easier said than done. Even after that, 27.8% of patients with ASD had received special education and only one patient (hailing from a middle-income family), i.e., 2.8% of the ASD sample had received both the mainstream education and special education. Furthermore, 33.3% had not received any formal education at all in this group. All these findings are clearly indicative of gross academic failure of the ASD patients and that must have a severe impact on them. Patients with ASD are more likely to receive special education to lead a balanced life with this life-long disorder. They need to have basic training, certain adjustment in lifestyle and a strict routine. ASD patients usually utilize these special education services from their childhood by receiving extra tuitions, placement in special classes and they are more in need of mental health interventions including combination of pharmacotherapy and counseling.<sup>27</sup> Again, parents of the ASD patients also have expressed their satisfaction about receiving special education and a maintained life-style.<sup>35</sup>

Comparing the other socio-economic variables, the occupation between ASD and non-ASD patient groups, a large proportion of the subjects, especially from the ASD cases, remain unemployed and that is 55.6%, which is almost three times more than the non-ASD patient group. This finding is supported by another study from Paris.<sup>36</sup> On the other hand, non-ASD patients have twice the chance of getting employed than ASD patients. Most of the cases came from the urban middle-income section. Studies from India, the country that has almost the same socio-economic-cultural condition have the same findings. The reason behind these findings is probably due to fact that the high-income families do not frequently seek

treatment for ASD from a public psychiatric center and families from the low socio-economic status do not have access to such facilities unless their children are acutely ill.<sup>37,38,39</sup> It appears that both psychiatric patient groups, either with or without ASD have difficulties in having a long-term relationship. One interesting fact appeared in the family structure of psychiatric patients with ASD and that is approximately 55.6% of them comes from a joint family. Probably this is because multiple careers are needed to give proper attention and support to the ASD patients and this factor binds up all the family members to stay together. This theory is not supported by other studies though.

In the present study, majority of the ASD patients (83.3%) had comorbid disorders. On the other hand, around 55.6% non-ASD patients had comorbidities. Conversely, in the non-ASD patient group no comorbidity was found in 44.4% patients and it was 16.7% in the ASD patient group. Moreover, most of the psychiatric disorders were significantly higher in patients with ASD than in patients without ASD. Adult psychiatric patients with ASD were four times more likely to have comorbidities than those, who did not have ASD. This finding clearly supports that autism is a fertile field for nurturing other psychiatric disorders due to shared biological and environmental risk factors.<sup>40,41</sup>

Substantial variability may exist among the reported rates of comorbid psychiatric disorders in adults with ASD. Several factors like small sample size, selection bias and range of study participants' intellectual findings can cause this variation.<sup>20</sup> In this study sample, the most frequent comorbid condition among psychiatric patients with ASD was obsessive-compulsive disorder, followed by major depressive disorder and specific phobia. Specific phobia was the most common anxiety disorder followed by social phobia and generalized anxiety disorder. These findings are consistent with the result of another similar study<sup>27</sup> that stated that the most common psychiatric diagnosis in adults with ASD were mood and anxiety disorders, followed by emotional and behavioral disorders like ADHD and

intermittent explosive disorder. There are some other studies which have found that a high rate (30%) of adult psychiatric patients with ASD have co morbid ADHD.<sup>25,29,42</sup>

Obsessive-compulsive disorder, specific phobia, social phobia, intermittent explosive disorder and ADHD have high significance among adult ASD patients. In this sample, it appeared that adult psychiatric patients have three times more risk of having OCD if they have ASD. Similarly, patients with ASD have seven times more risk of having specific phobia and a significantly increased risk of having ADHD. These findings are supported by other studies of adult ASD patients.<sup>27,43</sup> In a nutshell, it can be said that individuals with ASD have 65-90% risk of developing concomitant psychiatric disorders<sup>43,44</sup> with however seemingly different pattern of co-morbidities. These patterns include higher rates of co-occurring anxiety, depression, bipolar disorder (7%) and schizophrenia or other psychotic disorders (7.8%).<sup>40,41</sup> This variation in findings may be found due to the above mentioned factors.<sup>20</sup> At the time of evaluation, majority of the ASD adults (around 85.75%) who already had social phobia were also experiencing social anxiety and this finding is supported by the study in Boston, USA.<sup>27</sup> Both the studies found out that among anxiety disorders, panic disorder is the least frequent in adult ASD patients. Among mood disorders, major depressive disorder was found most frequently in both adult ASD and non-ASD patients. The high rate of major depressive disorder co-morbidity in adult ASD cases may result from having difficulty to communicate, social withdrawal, loss of appetite and having sleep disturbance, which are the characteristics of ASD itself.<sup>45</sup>

Among the adult non-ASD cases, schizophrenia, substance related disorder, conversion disorder and illness anxiety disorder are commonly found. However, these disorders are rare in adult psychiatric cases with ASD. On the other hand, intermittent explosive disorder, tic disorder and conduct disorder are common in adults with ASD and comparatively rare in non-ASD cases. Overall, it can be said that adults

with ASD in their lifetime suffer from a significant higher burden of psychiatric disorders. It can be mentioned here that a good number of physical disorders were also present in the ASD patients that were not reported in this study. The co-occurring physical disorders will certainly add insult to the injury.

Naturally, comorbidity exists in psychiatry and expected in nearly half of the cases across age, gender and time. The main reasons for comorbidity are shared biological and environmental risk factors that create complex psychopathology. Considering comorbidity is one of the key issues in clinical psychiatry for adequate intervention to minimize multiplied distress and impairment.<sup>46</sup> It is widely acknowledged that individuals treated for incident mental disorders are at increased risk of subsequently developing other mental disorders. A nationwide population-based comprehensive cohort study in Denmark revealed that the age- and sex-specific risk of comorbidity was pervasive across all pairs of disorders and that this risk was temporally patterned with higher estimates during the first year after the onset of the first disorder, but with persistently elevated rates during the entire observation period. The comorbidity within mental disorders is pervasive and the risk persists over time.<sup>47</sup> This largest and most detailed examination of comorbidity within mental disorders provides new insights into the complex nature of comorbidity and its importance. Further in-depth studies on existence, cause and risk estimates of psychiatric comorbidities are required for better intervention and prevention of comorbidity.

The present clinic-based study has some limitations that need to be mentioned. The sample size was small and the data was limited to a one-year span. Diagnoses were clinically based. The diagnosis of intellectual disability was not included in the study which was one of the common comorbidities, because of their provisional nature of diagnosis in the record since the center was not well equipped with the adequate measures. All these limits the generalization of the results. Despite these limitations, this study is the first to depict the psychiatric co-morbidities



among the adult ASD population in Bangladesh and where an under recognition of the compared fact often interferes in optimizing patient care considering its longevity. Additionally, the effects of ASD and other psychiatric disorders on socio-demographic variables as well as the association of psychiatric co-morbidities in patients with and without ASD were also discussed.

## Conclusions

This research shows that comorbid psychiatric disorders were frequently found in patients with ASD. This finding has important implications both in clinical practice and research opportunities. While evaluating a case of ASD, clinicians need to consider the possibilities of finding comorbid conditions, rather than consider them within the features of ASD. Subsequent broad-based, multi-centered studies using extensive measures of psychopathology are required to confirm these preliminary findings. Greater understanding of the presence of other psychiatric disorders in ASD patients will turn this awareness into action.

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## References

- 1 Kadesjö B, Gillberg C, Hagberg B. Brief report: autism and Asperger syndrome in seven-year-old children: a total population study. *J Autism Dev Disord* 1999; 29(4): 327-31.
- 2 Bertrand J, Mars A, Boyle C, Bove F, Yeargin-Allsopp M, Decoufle P. Prevalence of autism in a United States population: the Brick Township, New Jersey, investigation. *Pediatrics* 2001; 108(5): 1155-61.
- 3 Baird G, Simonoff E, Pickles A, Chandler S, Loucas T, Meldrum D, et al. Prevalence of disorders of the autism spectrum in a population cohort of children in South Thames: The Special Needs and Autism Project (SNAP). *Lancet* 2006; 368(9531): 210-5.
- 4 Kogan MD, Blumberg SJ, Schieve LA, Boyle CA, Perrin JM, Ghandour RM, et al. Prevalence of parent-reported diagnosis of autism spectrum disorder among children in the US, 2007. *Pediatrics* 2009; 124 (5):1395-403.
- 5 Brugha TS, McManus S, Bankart J, Scott F, Purdon S, Smith J, et al. Epidemiology of autism spectrum disorders in adults in the community in England. *Arch Gen Psychiatry* 2011; 68 (5): 459-65.
- 6 Durkin MS, Maenner MJ, Meaney FJ, Levy SE, DiGuiseppi C, Nicholas JS, et al. Socioeconomic inequality in the prevalence of autism spectrum disorder: evidence from a U.S. cross-sectional study. *PLOS One* 2010; 5(7): e11551.
- 7 Samadi SA, Mc Conkey R. Autism in developing countries: lessons from Iran. *Autism Res Treat* 2011; 2011: 145359.
- 8 Idring S, Lundberg M, Sturm H, Dalman C, Gumpert C, Rai D, et al. Changes in prevalence of autism spectrum disorders in 2001-2011: findings from the Stockholm youth cohort. *J Autism Dev Disord* 2015; 45(6): 1766-73.
- 9 Onaolapo AY, Onaolapo OJ. Global data on autism spectrum disorders prevalence: a review of facts, fallacies, and limitations. *Univers J Clin Med* 2017; 5(2): 14-23.
- 10 Report MW. Prevalence of autism spectrum disorder among children aged 8 years - autism and developmental disabilities monitoring network, 11 sites, United States, 2010. *MMWR Surveill Summ* 2014; 63(2): 1-21.
- 11 Maenner MJ, Shaw KA, Baio J, Washington A, Patrick M, Di Rienzo M, et al. Prevalence of autism spectrum disorder among children aged 8 years-autism and developmental disabilities monitoring network, 11 Sites, United States, 2016. *MMWR Surveill Summ* 2020; 69(4): 1-12.
- 12 Mullick MSI, Goodman R. The prevalence of psychiatric disorders among 5–10-year-olds in rural, urban and slum areas in Bangladesh: an exploratory study. *Soc Psychiatry Psychiatr Epidemiol* 2005; 40 (8):663-71.

- 13 Hossain MD, Ahmed HU, Uddin MMJ, Chowdhury WA, Iqbal MS, Kabir RI, et al. Autism spectrum disorders (ASD) in South Asia: a systematic review. *BMC Psychiatry* 2017; 17(1): 281.
- 14 Akhter S, Hussain AHME, Shefa J, Kundu GK, Rahman F, Biswas A. Prevalence of autism spectrum disorder (ASD) among the children aged 18-36 months in a rural community of Bangladesh: A cross sectional study. *F1000Res* 2018; 7: 424.
- 15 Mandell DS. Adults with autism--a new minority. *J Gen Internal Med* 2013; 28: 751-2.
- 16 McGovern CW, Sigman M. Continuity and change from early childhood to adolescence in autism. *J Child Psychol Psychiatry* 2005; 46(4): 401-8.
- 17 Mukactova-Ladinska EB, Perry E, Baron M, Povey C. Ageing in people with autistic spectrum disorder. *Int J Geriatr Psychiatry* 2012; 27(2): 109-18.
- 18 Charman T. The prevalence of autism spectrum disorders: recent evidence and future challenges. *Eur Child Adolesc Psychiatry* 2002; 11(6): 249-56.
- 19 Fusar-Poli L, Brondino N, Rocchetti M, Petrosino B, Arillotta D, Damiani S, et al. Prevalence and predictors of psychotropic medication use in adolescents and adults with autism spectrum disorder in Italy: a cross-sectional study. *Psychiatry Res* 2019; 276: 203-9.
- 20 Brereton AV, Tonge BJ, Einfeld SL. Psychopathology in children and adolescents with autism compared to young people with intellectual disability. *J Autism Dev Disord* 2006; 36(7): 863-70.
- 21 Leyfer OT, Folstein SE, Bacalman S, Davis NO, Dinh E, Morgan J, et al. Comorbid psychiatric disorders in children with autism: interview development and rates of disorders. *J Autism Dev Disord* 2006; 36 (7): 849-61.
- 22 De Bruin EI, Ferdinand RF, Meester S, De Nijs PFA, Verheij F. High rates of psychiatric co- morbidity in PDD-NOS. *J Autism Dev Disord* 2007; 37(5): 877-86.
- 23 Simonoff E, Pickles A, Charman T, Chandler S, Loucas T, Baird G. Psychiatric disorders in children with autism spectrum disorders: prevalence, comorbidity, and associated factors in a population-derived sample. *J Am Acad Child Adolesc Psychiatry* 2008; 47(8): 921-9.
- 24 Mattila M-L, Hurtig T, Haapsamo H, Jussila K, Kuusikko-Gauffin S, Kielinen M, et al. Comorbid psychiatric disorders associated with Asperger syndrome/high-functioning autism: a community- and clinic-based study. *J Autism Dev Disord* 2010; 40(9): 1080-93.
- 25 Ghaziuddin M, Weidmer-Mikhail E, Ghaziuddin N. Comorbidity of Asperger syndrome: a preliminary report. *J Intellect Disabil Res* 1998; 42 (4): 279-83.
- 26 Bradley E, Bolton P. Episodic psychiatric disorders in teenagers with learning disabilities with and without autism. *Br J Psychiatry* 2006; 189: 361-6.
- 27 Joshi G, Wozniak J, Petty C, Martelon MK, Fried R, Bolfek A, et al. Psychiatric comorbidity and functioning in a clinically referred population of adults with autism spectrum disorders: a comparative study. *J Autism Dev Disord* 2013; 43(6): 1314-25.
- 28 Buck TR, Viskochil J, Farley M, Coon H, McMahon WM, Morgan J, et al. Psychiatric comorbidity and medication use in adults with autism spectrum disorder. *J Autism Dev Disord* 2014; 44(12): 3063-71.
- 29 Ghaziuddin M, Zafar S. Psychiatric comorbidity of adults with autism spectrum disorders. *Clin Neuropsychiatry* 2008; 5(1): 9-12.
- 30 Lainhart JE. Psychiatric problems in individuals with autism, their parents and siblings. *Int Rev Psychiatry* 1999 Jan 1; 11(4): 278-98.
- 31 Wozniak J, Biederman J, Faraone SV, Frazier J, Kim J, Millstein R, et al. Mania in children with pervasive developmental disorder revisited. *J Am Acad Child Adolesc Psychiatry* 1997; 36(11): 1552-60.
- 32 Billstedt E, Gillberg C, Gillberg C. Autism after adolescence: population-based 13- to 22-year follow-up study of 120 individuals with autism diagnosed in childhood. *J Autism Dev Disord* 2005; 35(3): 351-60.
- 33 Howlin P, Goode S, Hutton J, Rutter M. Adult outcome for children with autism. *J Child Psychol Psychiatry Allied Discip* 2004; 45(2): 212-29.
- 34 Rabbani MG, Alam MF, Ahmed HU, Sarkar M, Islam MS, Anwar N. Prevalence of mental disorders, mental retardation, epilepsy and substance abuse in children. *Bangladesh J Psychiatry* 2009; 23: 11-52.
- 35 Bitterman A, Daley TC, Misra S, Carlson E, Markowitz J. A national sample of preschoolers with autism spectrum disorders: special education services and parent satisfaction. *J Autism Dev Disord* 2008; 38(8): 1509-17.
- 36 Hofvander B, Delorme R, Chaste P, Nydén A, Wentz E, Ståhlberg O, et al. Psychiatric and psychosocial problems in adults with normal-intelligence autism spectrum disorders. *BMC Psychiatry* 2009; 9: 35.
- 37 Singhi P, Malhi P. Clinical and neurodevelopmental profile of young children with autism. *Indian Pediatr* 2001; 38(4): 384-90.
- 38 Daley TC. From symptom recognition to diagnosis: children with autism in urban India. *Soc Sci Med* 2004; 58(7): 1323-35.

- 39 Juncja M, Mukherjee SB, Sharma S. A descriptive hospital-based study of children with autism. *Indian Pediatr* 2005; 42(5): 453-8.
- 40 Hutton J, Goode S, Murphy M, Le Couteur A, Rutter M. New-onset psychiatric disorders in individuals with autism. *Autism* 2008; 12(4): 373-90.
- 41 Lahey BB, Van Hulle CA, Singh AL, Waldman ID, Rathouz PJ. *Arch Gen Psychiatry* 2011; 68(2): 18-89.
- 42 Stahlberg O, Soderstrom H, Rastam M, Gillberg C. Bipolar disorder, schizophrenia, and other psychotic disorders in adults with childhood onset AD/HD and/or autism spectrum disorders. *J Neural Transm* 2004; 111(7): 891-902.
- 43 Lever AG, Geurts HM. Psychiatric co-occurring symptoms and disorders in young, middle-aged, and older adults with autism spectrum disorder. *J Autism Dev Disord* 2016; 46 (6): 1916-30.
- 44 Rai D, Heuvelman H, Dalman C, Culpin I, Lundberg M, Carpenter P, et al. Association between autism spectrum disorders with or without intellectual disability and depression in young adulthood. *JAMA Netw Open* 2018; 1(4): e181465.
- 45 Stewart ME, Barnard L, Pearson J, Hasan R, O'Brien G. Presentation of depression in autism and Asperger syndrome: a review. *Autism* 2006; 10(1): 103-16.
- 46 Mullick MSI. Psychiatric comorbidity and its clinical importance. [Editorial] *Arch NIMH* 2021; 4(1): 1-3.
- 47 Plana-Ripoll O, Pedersen CB, Holtz Y, et al. Exploring Comorbidity Within Mental Disorders Among a Danish National Population. *JAMA Psychiatry* 2019; 76(3): 259-62.