

## “Study of Psychiatric Co-morbidity in Autism Spectrum Disorder”

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### Abstract

**Background:** Autism is one of the pervasive developmental disorders throughout the world that is causing serious familial, social and economic burden to the different nations. The prevalence of autism is probably about 20 per 10000 children. Autism is four times common in boys as in girls. **Objective:** To find out the psychiatric co-morbidity in Autism spectrum disorder. **Methods:** This was a descriptive and cross sectional study among the patient attending in Department of Psychiatry, Combined Military Hospital, Dhaka, Proyash School (Special Child Special Right), Dhaka Cantonment, National Institute of Mental Health (NIMH), Dhaka and Institute of Pediatric Neurodisorder & Autism (IPNA) in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. The study was carried out 6 months from April, 2016 to September, 2016. Sample size n=100 patients. Informed written consent was taken from patient's parent/caregiver. During data collection, a semi-structured questionnaire designed by the researcher containing socio-demographic and other variables was used. Then Developments and Well-Being Assessment (DAWBA) was applied on the ASD children. The DAWBA has three versions-parent versions, self-version and teacher version. In this study parent version was used. Data was analysed by software program me statistical package for Social Sciences (SPSS) version 16 for windows using appropriate statistical test- chi square test. **Results:** Among the respondents (n=100) 79% Autism spectrum disorder (ASD) children had comorbid psychiatric illness and 21% children had no comorbid psychiatric illness. Most frequent 72.15% was ADHD followed by Specific phobia 11.39%, Social phobia 6.33% and Major Depressive disorder 1.27%. Two comorbid psychiatric illnesses were present in 8.86% ASD children. Chi-square test was done to measure the level of significance. But there were no significant association (significant when p value  $\leq 0.05$ ) found between socio-demographic factors and comorbid psychiatric disorder. **Conclusion:** Although there were many limitations, the present study provides important information. High number of co-morbidities found in this study. It could be necessary to increase the sample size and to collect the largest number of clinical information, for studying etiopathogenesis and risk factors for the occurrence of co-morbidity. Knowing the burden and extent of disease could be help design screening tools that are applicable, culturally acceptable and cost-effective for early diagnosis and intervention. Furthermore, raising ASD awareness among parents, preschool/elementary school teachers are invaluable in helping autistic children cope with different challenge and improve their quality of life.

**Keywords:** Psychiatric, Co-morbidity, Autism Spectrum Disorder, quality of life, Depressive disorder.

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### I. INTRODUCTION

Autism is one of the pervasive developmental disorders throughout the world that is causing serious familial, social and economic burden to the different nations. The prevalence of autism is probably about 20 per 10000 children. Autism is four times common in boys as in girls [1]. Autism Spectrum Disorder (ASD) has become a major child psychiatric disorder in all

over the world including Bangladesh. ASD with comorbid psychiatric illness into the tertiary level hospital of Bangladesh have been increasing in recent years and present considerable health care problems. Autism with comorbid psychiatric illness causes increase rate of suffering, disabilities and overall family burden. There are four major pathways to mental health care in Bangladesh. Family members had a significant

role on the decision to seek help from health service. So delays to reach mental health professional (MHP), diagnoses and treatment received [2]. Like many developing countries, mental disorders are important but under recognized public health problems in Bangladesh; People are less aware about mental illness and acceptance of treatment are very low due to social stigma and superstition [3]. Nation-wide survey on mental health in Bangladesh in 2003-2005 found the prevalence of mental disorder to be 16.05% in adult population [4]. The Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5) published in 2013 redefined the Autism Spectrum Disorder to encompass the previous diagnoses of autism, Asperger syndrome, pervasive developmental disorder not otherwise specified (PDD-NOS), and childhood disintegrative disorder. Features of these disorders include social deficits and communication difficulties, stereotyped or repetitive behaviors and interests, sensory issues, and in some cases, cognitive delays [5]. In 1943, Leo Kanner was first described autism. Furthermore, Kanner's definition involves a failure to ever develop close relationships with others. He explains that this lack of development can be detected early in the life. Further defining and differentiating Kanner's definition of autism includes, having limited facial expressions, an absence of eye contact. For a long time after Kanner's initial description of autism over 60 years ago, research was devoted mainly to exploring its biological roots and to disproving the psychogenic theories of its causation. Clinical based studies suggest that 50-70% of children with autism had additional psychiatric disorder [6]. Child psychiatric disorders can be roughly divided into two main groups: internalizing and externalizing (or disruptive behavior) disorder. Internalizing disorders are characterized by behaviors and emotions that are directed inwards and include mood disorders (e.g. major depressive disorder, dysthymic disorder) and anxiety disorder (e.g. separation anxiety disorder, social anxiety disorder, obsessive-compulsive disorder, specific phobia). Children with autism are characterized not only by their core deficits, impairments in social interaction, communication and repetitive stereotyped behaviors but they also suffer from many comorbid features such as anxiety, depression, ADHD and behavioral problems [7]. When problematic behaviors are recognized as manifestations of a comorbid psychiatric disorder, rather than just isolated behaviors, more specific treatment is possible. Clinical experience suggests that specific treatment is more effective, i.e., associated with greater improvement in functioning, than non-specific treatment [8]. Comorbidity consists of temporal co-existence of two or more disorders. But the pathologies are not simply concomitant; they are nested into one another and can arise at different moments in the child's development, each one evolving on their own behalf and interfering with the patient's symptomatology [9]. Indeed, these patients often show a deficit in

communicative abilities and "theory of mind", that in turns impair their capability of describing their own mental states, mental experiences as well as their own feelings and emotions, and this makes the clinicians' ability of recognizing comorbidities in ASD even more complicated [10]. Moreover, the threshold between autism core symptoms and comorbid psychiatric disorders can be blurred. For instance, a sudden decrease of repetitive or stereotyped behaviors in individuals with ASD could be mistakenly described to an improvement of the autistic symptomatology; however it may also be the onset of depressive symptoms [11]. Though we have many organizations in Bangladesh working with various fields of disability, there is hardly any quality institute developed exclusively for the ASD children. The problem further is aggravated with the unavailability of centers to train trainers or teachers and health professional to work with autistic children. Similarly, there is no facility available for the training or motivation of parents or caregivers of ASD children. Parents, relatives and teachers of autistic children should be more patient in raising such special child. We have to develop a strong programmed through government and NGO collaboration to ensure a useful methodology to help these autistic children and their families [12].

## II. OBJECTIVES OF THE STUDY

### I. General Objective

1. To find out the psychiatric co-morbidity in Autism spectrum disorder.

### II. Specific objectives

2. To find out the type of comorbidity.
3. To find out the association of socio demographic correlates with comorbidity in Autism spectrum disorder.

## III. METHODS AND MATERIALS

This was a descriptive and cross sectional study among the patient attending in Department of Psychiatry, Combined Military Hospital, Dhaka, Proyash School (Special Child Special Right), Dhaka Cantonment, National Institute of Mental Health (NIMH), Dhaka and Institute of Pediatric Neurodisorder & Autism (IPNA) in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. The study was carried out 6 months from April, 2016 to September, 2016. Sample size n=100 patients. Informed written consent was taken from patient's parent/caregiver. During data collection, a semi-structured questionnaire designed by the researcher containing socio-demographic and other variables was used. Then Developments and Well-Being Assessment (DAWBA) was applied on the ASD children. The DAWBA has three versions-parent versions, self-version and teacher version. In this study parent version was used. Data was analysed by software program me statistical package for Social Sciences

(SPSS) version 16 for windows using appropriate statistical test- chi square test.

**Inclusion criteria**

1. Patient diagnosed as a case of Autism spectrum Disorder by qualified Psychiatrist.
2. Children up to the age of 16 years.
3. Both male and female patients.
4. Parents/ caregiver who are willing to provide information.

**Exclusion criteria**

1. Parents/ caregiver who are non-co-operative and not interest to provide information.
2. Unwilling to give informed consent.

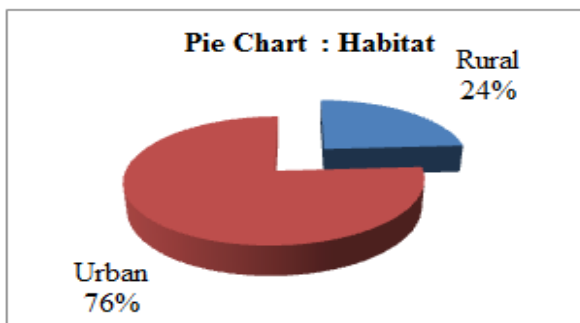
Data processing and analysis: All collected data were checked and rechecked for omission, inconsistencies. Then cleaning the data was performed followed by editing, coding and entering into computer. Data analysis was performed according to the objective of the study using computer software program Statistical Package for Social Science (SPSS), version 16.0 for windows. Result was presented as texts, tables, graphs and figures.

**IV. RESULTS**

Among the respondents (n=100) seventy one (71%) children were male and twenty nine (29%) children were female. Among the respondents (n=100) eighty nine (89%) children were Muslim, ten (10%) were Hindu and one (1%) was Buddhist. Age ranges of children are between 3.5 to 15 years. Mean age of children 6.7 with SD± 2.79 [Table-1].

**Table-1: Distribution of respondents (n=100) according to Sex and Religion**

	Frequency(n)	Percent (%)
Sex		
Male	71	71%
Female	29	29%
Religion		
Muslim	89	89
Hindu	10	10
Buddhist	01	01



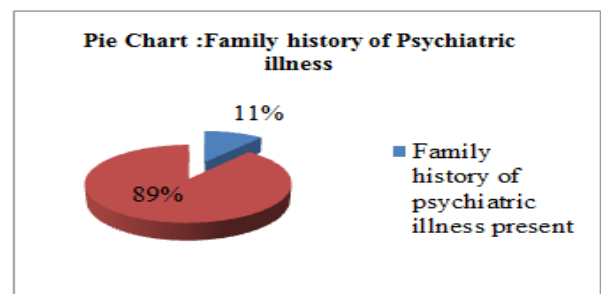
**Fig-1: Habitat of the respondents**

Among the respondents (n=100) seventy six (76%) children were come from urban area and twenty four (24%) children were come from rural area shown in fig.-1.

**Table-2: Distribution of respondents according to Birth history, Vaccination history and Developmental history (n=100)**

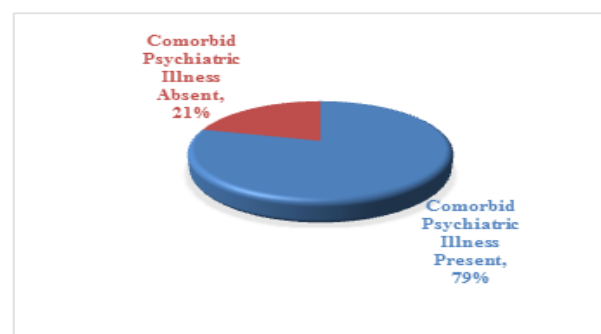
	Frequency (n)	Percent (%)
Birth history		
Uneventful	70	70
Birth complication	30	30
Vaccination history		
Complete	98	98
Incomplete	02	02
Developmental history		
Normal	24	24
Delayed	76	76

Among the respondents (n=100) seventy (70%) children had history of uneventful birth history; thirty (30%) children had history complicated birth. Among the children ninety-eight (98%) had history of complete vaccination, two (2%) children had history incomplete vaccination Seventy six (76%) had delayed developmental history; twenty four (24%) children had normal developmental history shown in Table.-2.



**Fig-2: Family history of Psychiatric illness of the respondents (n=100)**

Among the respondents (n=100) family history of psychiatric illness was present in eleven (11%) children and absent in eighty nine (89%) children shown in fig.-2.



**Fig-3: Distribution of Comorbid Psychiatric illness of the respondents (n=100)**

Among the respondents (n=100) seventy nine (79%) present Autism spectrum disorder (ASD) children had comorbid psychiatric illness and twenty

one (21%) absent children had no comorbid psychiatric illness shown in fig.-3.

**Table-3: Distribution of different Comorbid Psychiatric illness of the respondents (n=79)**

Comorbidity	Frequency (n)	Percent (%)
ADHD	57	72.15
Specific phobia	9	11.39
Social phobia	5	6.33
Major Depressive disorder	1	1.27
ADHD and Specific phobia	7	8.86

Among the respondents (n=79) most frequent 72.15% was ADHD followed by Specific phobia 11.39%, Social phobia 6.33% and Major Depressive

disorder 1.27%. Two comorbid psychiatric illnesses were present in 8.86% ASD children shown in table.-3.

**Table-4: Association between Socio demographic factors and comorbid psychiatric illness**

Variables	With Comorbid Psychiatric disorder		Without Comorbid Psychiatric disorder		P*-value
	n	%	n	%	
Age					
<5	15	19	2	9.5	0.58
5-10	50	63.3	15	71.4	
>10	14	17.7	4	22.4	
Sex					
Male	56	70.9	15	71.4	0.59
Female	23	29.1	6	28.6	
Habitat					
Urban	62	78.5	14	67.7	0.26
Rural	17	21.5	07	33.3	
Religion					
Muslim	71	89.9	18	85.7	0.15
Hindhu	08	10.1	2	9.5	
Buddhist	00	0.0	1	4.8	

\*chi-square test was done to measure the level of significance.

Table 4 Shows that among the respondents with Comorbid Psychiatric disorder (n=79) 63.3% children were in the age range between 5-10 years,

70.9% were male, 78.5% were from urban background and 89.9% were Muslim.

**Table-5: Association between Socio demographic factors and comorbid psychiatric illness**

Variables	With Comorbid Psychiatric disorder		Without Comorbid Psychiatric disorder		P*-value
	n	%	n	%	
Birth history					
Uneventful	56	70.9	14	66.7	0.79
Complicated	23	29.1	07	33.3	
Vaccination history					
Complete	77	97.5	21	100	1.0
Incomplete	2	2.5	00	0	
Developmental history					
Normal	18	22.8	6	28.6	0.58
Delayed	61	77.2	15	71.4	

\*chi-square test was done to measure the level of significance.

Table 5 Shows that among the respondents with Comorbid Psychiatric disorder (n=79) had 70.9% uneventful birth history, 97.5% had complete

vaccination history and 77.2% had delayed developmental history.

**Table-6: Association between Socio demographic factors and comorbid psychiatric illness**

Variables	With Comorbid Psychiatric disorder		without Comorbid Psychiatric disorder		p* -value
	n	%	n	%	
Age of Father (during birth)					
20-24	3	3.8	0	0	.346
25-29	23	29.1	9	42.9	
30-34	31	39.2	10	47.6	
35-39	20	25.3	2	9.5	
40-45	2	2.5	0	0	
Age of Mothers (during birth)					
15-19	6	7.6	1	4.8	.862
20-24	27	34.2	8	38.1	
25-29	32	40.5	10	47.6	
30-34	13	16.5	2	9.5	
35-40	1	1.3	0	0	

\*chi-square test was done to measure the level of significance.

Table 6 Shows that Among the respondents (n=100) forty one (41%) father age (during birth) were between 30-34 years and forty two (42%) mother age (during birth) were between 25 to 29 years. The

respondents with Comorbid Psychiatric disorder (n=79) father age (during birth) range mostly between 30-34 years and mother age (during birth) mostly between 25-29 years.

**Table-7: Association between Socio demographic factors (Education of father & mother) and comorbid psychiatric illness**

Variables	With Comorbid Psychiatric disorder		Without Comorbid Psychiatric disorder		p* -value
	n	%	n	%	
Education of Father					
Primary	7	8.9	3	14.3	.885
Secondary	11	13.9	3	14.3	
Higher secondary	27	34.2	6	28.6	
Graduate & above	34	43.0	9	42.9	
Education of Mother					
Illiterate	7	8.9	2	9.5	.942
Primary	12	15.2	4	19	
Secondary	29	36.7	7	33.3	
Higher secondary	20	25.3	4	19	
Graduate & above	11	13.9	4	19	

\*chi-square test was done to measure the level of significance.

Table 7 shows that among the educational status of father of the respondents (n=100) forty three (43%) children's father were graduate & above. Thirty six (36%) children's mother was secondary level. The

respondents with Comorbid Psychiatric disorder (n=79) 43% father were in graduate & above level education and 36.7% mother were in secondary level education.

**Table-8: Association between Socio demographic factors and comorbid psychiatric illness**

Variables	With Comorbid Psychiatric disorder		Without Comorbid Psychiatric disorder		p*-value
	n	%	n	%	
Family Type:					
Nuclear	61	77.2	12	57.1	.06
Joint	18	22.8	9	42.9	
Socioeconomic Status					
Lower(<10000)	12	15.2	6	28.6	.26
Middle(10001-30000)	44	55.7	8	38.1	
Upper(>30000)	23	29.1	7	33.3	
Mental age					
Physical age consistent with mental age	20	25.3	7	33.3	1.0
Physical age not consistent with mental age	40	50.6	9	42.9	
Unknown	19	24.1	5	23.8	

\*chi-square test was done to measure the level of significance.

Table 8 shows that among the Seventy three (73%) children were from nuclear family and twenty seven (27%) children were from joint family. Fifty two (52%) children were come from middle socioeconomic family, thirty (30%) children were from upper socioeconomic family and eighteen (18%) children were from lower socioeconomic family. Among the respondents (n=100) forty nine(49%) children physical age were not consistent with mental age, twenty seven

(27%) children physical age were consistent with mental age and twenty four (24%) children’s parents/caregiver unable to mention their child mental age in relation with physical age. The respondent with Comorbid Psychiatric disorder (n=79) 77.2% were come from nuclear type of family, 55.7% were from middle socioeconomic family and 50.6% children Physical age were not consistent with mental age(according to parent statement).

**Table-9: Distribution of Psychiatric Comorbidity according to Sex (n=79)**

Sex of children	ADHD	Specific Phobia	Social Phobia	Depressive Disorder	ADHD and Specific Phobia	Total	P*-value
Male	42	5	3	1	5	56	.85
Female	15	4	2	0	2	23	
Total	57	9	5	1	7	79	

\*chi-square test was done to measure the level of significance.

**Table-10: Distribution of Psychiatric Comorbidity according to Age (n=79)**

Age of children	ADHD	Specific Phobia	Social Phobia	Depressive Disorder	ADHD and Specific Phobia	Total	P*-value
Less than 5	14	1	0	0	0	15	.11
5 to 10	31	8	5	0	6	50	
More than 10	12	0	0	1	1	14	
Total	57	9	5	1	7	79	

\*chi-square test was done to measure the level of significance.

Table 10 shows that among the respondent with Comorbid Psychiatric disorder (n=79) most of the comorbid disorder (ADHA=31, Specific Phobia=8, Social Phobia=5 & ADHD and Specific Phobia=6) was present in the age range between 5 to 10 years.

**V. DISCUSSION**

Respondents mean age was 6.7 years with SD±2.79 and age range between 3.5 years to 15 years. Among the respondents male and female representations were 71% and 29% respectively.76% children were come from urban area and 24% were

from rural area. In one study of 42 patients conducted in Bangladesh where mean age was 6.24 years (age range between 2 years 4 months to 12 years). Male & female representations were 78.6% and 21.4% respectively. 81% were come from urban area and 19% were from rural area [13]. Another study of 60 Arab children (38 boys and 22 girls) conducted in three Arab countries (Jordan=22, Saudi Arabia=19 and Egypt=19) where mean age was 8.2 years (age range 4 to 11 years). Boys represented the majority cases in Jordan and Saudi Arabia (Jordan=59.1%, Saudi Arabia=78.9% and Egypt=47.4%). Most of the children were come from

urban areas (Jordan=86.4%, Saudi Arabia=52.6% and Egypt=63.2%) [14]. In this study 24% children had history of normal development and 76% children had history of delayed development. One study was done in India where they were found that 25% of cases had normal development up to at least 18 months of age [15]. One review article consisting of 101 articles conducted in Arab Gulf country (Oman, Saudi Arabia, and UAE) where they were found that male gender and history developmental delay were significantly associated with autism prevalence in all three studies [16]. In this study 70% children had history of uneventful birth history and 30% children had history of complicated birth history. One study conducted in India where they found that perinatal problems were reported in 25% cases [17]. Among the respondents 41% father age (during birth) were between 30-34 years and 32% father age were between 25-29 years. 42% mother age (during birth) were between 25 to 29 years and 26% mother age were between 20-24 years. Regarding educational status 43% children's father were graduate & above and 36% children's mother were secondary level. Study conducted in Arab Gulf country (Oman, Saudi Arabia, and UAE) where they were found that autism was correlated with maternal and paternal age above 30 years at time of birth [16]. Another study of 179 autism cases conducted in Iran where they were found that Fathers aged 35-39 had a nearly twofold greater risk and a higher than twofold greater risk for those aged 40 and older at the birth of the child, than those in the reference category (25-29 years). This association was independent of maternal age. Compared to younger, uneducated parents, older parents with college degrees or better had a six to eightfold higher risk of having a child with ASD; the effect of maternal education was stronger than the effect of paternal education. In the case of two older parents, even the lowest education category (both parents uneducated) carried a significantly increased risk for autism. In fact, for two older parents, all but the second education category (where both parents are high school graduates or one is a high school graduate and the other is uneducated) conferred significant risk for producing a child with autism [18]. In this study 52% children were come from middle socioeconomic family, 30% children were from upper socioeconomic family and 18% children were from lower socioeconomic family. One study conducted in Bangladesh where 59.5% ASD children were come from middle socioeconomic family and 38% ASD children were come from higher socioeconomic family [13]. Among the respondents according to parents/caregiver statement 50.6% children Physical age were not consistent with mental age. One Indian study found that mental retardation is comorbid with autism in up to 70% cases [15]. Another Indian study found that 66% of autistic children scored below 70 on an I.Q test [19]. An Italian study found that there is a strict relationship between autism and intellectual disability: 40% of

people with intellectual disability also present autism; on the other hand 70% of people with autism also have intellectual disability [20]. In this study formal IQ scale was not applied to assess the IQ due to time and resource constrained. In this study 79% Autism spectrum disorder (ASD) children had comorbid psychiatric illness and 21% children had no comorbid psychiatric illness. Most frequent comorbidity was ADHD and that was 72.15%. One study conducted in Bangladesh found that 66.7% ASD children had comorbid illness and most frequent comorbid illness was hyperkinetic disorder (54.8%) [13]. One study of 300 patients conducted in Belgium where they found 70% of ASD children had at least one associated psychiatric disorder [24]. An Italian study among the 86 patients where they found 71% ASD patients are affected by one psychiatric condition as comorbidity and ADHD was the most common comorbidity and that was 66% [21]. Another study of 225 patients where they found 70.8% of children had at least one psychiatric disorder and 62.8% had a main disorder of ADHD [22]. One study of 30 ASD children conducted in Quebec City (Canada) where they found 59% to 83% of children with ASD had sufficient symptoms to diagnose ADHD [23]. In our study specific phobia was 11.39% and social phobia was 6.33% as comorbid psychiatric disorder. One study of 80 patients conducted in Netherland where they found 12.5% ASD children had specific phobia and 10% ASD children had social phobia [7]. Another study of 109 patients conducted in USA where they found 10% of children with Autism had a phobia of loud noises, which is not common in typically developing children and 7.4% children had social phobia [8]. One study conducted in Netherland where they found 30% specific phobia and 17% social phobia in autism as comorbid psychiatric disorder [25]. In our study Major Depressive disorder was found 1.27%. One study conducted in Netherland where they found 2.5% Major Depressive disorder as comorbid psychiatric disorder with ASD children [4]. An Italian study found that 5.3% Major Depressive disorder with ASD [21]. Another study found that 2% cases Depression was present with Autism as a comorbid condition [26]. In our study two comorbid psychiatric conditions was found 8.86% cases. An Italian study found that 24% cases two comorbid psychiatric disorders [21]. Chi-square test was done to measure the level of significance. But there were no significant association (significant when  $p$  value  $\leq 0.05$ ) found between socio-demographic factors and comorbid psychiatric disorder. One study of 80 patients conducted in Netherland where they calculated association between comorbidity and age and comorbidity and IQ. Associations were only small and none were found to be significant (all  $p > 0.10$ ) indicating no relation between the presence of comorbidity and age or between the presence of comorbidity and IQ [25]. Another study found no significant association between comorbidity and family

characteristics (parental education, parental socioeconomic status, parental distress, maternal GHQ score) [22]. Another study also found no significant association between parental age and risk of ASD [27].

## VI. LIMITATIONS OF THE STUDY

Although optimum care had been tried by the researcher in every steps of this study, still some limitations existed. The result should be interpreted in the light of the following limitations.

1. Purposive sampling technique was followed in this study, so there could be some selection bias.
2. The study was conducted in selected institution with relatively small sample size. So the study population may not represent the all Autism Spectrum Disorder children of Bangladesh and limits the generalization of the result.
3. Intellectual disability is a very important comorbid in ASD. In this study formal IQ scale was not applied to assess the IQ due to time and resource constrained.
4. The information was collected and interview was done in a single setting so there was a possibility of random answering by the parents.

## VII. CONCLUSION AND RECOMMENDATIONS

High number of co-morbidities found in this study. It could be necessary to increase the sample size and to collect the largest number of clinical information, for studying etiopathogenesis and risk factors for the occurrence of co-morbidity. Knowing the burden and extent of disease could be help design screening tools that are applicable, culturally acceptable and cost-effective for early diagnosis and intervention. Furthermore, raising ASD awareness among parents, preschool/elementary school teachers are invaluable in helping autistic children cope with different challenge and improve their quality of life.

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