

# Socio-Environmental Factors in Children with Autism Spectrum Disorders in Bangladesh

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## Abstract:

**Background:** Autism is a complex disorder resulting from the combination of genetic and environmental factors. Though various genetic factors are involved in expression of autism, exogenous factor can modify and control gene expression.

**Objectives:** To find out the socio-environmental factors which may contribute to early development and expressions of autism in children of Bangladesh.

**Materials & Methods:** Autism cases (n=652) were diagnosed clinically and by applying ICD10 criteria in Child Development Centers (CDCs) of 15 tertiary medical college hospitals of Bangladesh. A retrospective analysis was done on collected data of detailed history and clinical notes of those children.

**Results:** Among total 652 children with autism, 71.9% were from 2-5 years' age group at diagnosis, with a male predominance (79%). Seventy-two percent were from middle to higher income family groups, 68% from urban areas and maximum children from nuclear families (77.5%). 'Less interactive family' was found in 67.50%. Play opportunity was absent in 60.60%. All the children watched TV and 85.6% watched TV for more than 2 hours/day.

**Conclusion:** Children from urban area, higher income and nuclear family, lack of interactive play opportunity may play important role to develop autism in Bangladeshi children.

**Keywords:** Autism, Child Developmental Center (CDC), Socio-environmental factors.

## Introduction:

Autism is a neurodevelopmental disorder which is marked by a persistent deficit in social interaction and social communication and restricted, repetitive patterns of behaviors/fixated interests or activities.<sup>1,2</sup> Autism is a complex disorder resulting from the combination of genetic and socio-environmental factors. Though various genetic factors are involved in expression of autism, exogenous factor can modify and control gene expression.<sup>3,4</sup> Epigenetics refers to the heritable changes in gene expression without changing the underlying DNA sequence. Moreover, supporting evidence of significant contribution of

environmental factors to autism risk is now clear that the search for environmental factors should be reinforced.<sup>3</sup> The recurrence risk of pervasive developmental disorder in siblings of children with autism is 2% to 8% and it rises to 12% to 20% if one takes into account the siblings showing impairment in one or two of the three domains impaired in autism respectively.<sup>3-5</sup> Individuals with ASD vary in language ability, ranging from absent speech to fluent language, and in cognitive development, ranging from profound intellectual disability to above-average intellectual functioning. Individuals may also show associated medical comorbidities including epilepsy and minor physical anomalies, as well as psychiatric comorbidities, thus showing a wide clinical heterogeneity.<sup>1</sup>

The detection of copy number variations (CNVs), with constantly increasing resolution, consistently confirmed the importance of the synaptic function in autism.<sup>6</sup> Autism affects males four times more than females, and the cause for this difference is not well understood.<sup>7</sup> Several theories have been proposed, among which the involvement of the sex chromosome in the etiology of ASD, and the role of

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hormonal influences in utero. However, none of these theories has been confirmed yet.<sup>6</sup> Specific genetic syndromes like Rett syndrome or Fragile-X syndrome, or cytogenetic abnormalities, the most common being the 15q11-q13 duplication of the maternal allele, associated with ASD affect synaptic plasticity.<sup>8,9</sup> Objectives of the study was to find out the socio-environmental factors which may be contributing to early development and expressions of autism in children of Bangladesh.

**Methodology:**

This retrospective study was based on recorded data of 2009-2014 from 15 Child Development Centre (CDC) across Bangladesh. All autism cases of 18 month-12 years diagnosed in 15 CDC across Bangladesh who met ICD-10 criteria were included in this study and those who do not fulfill ICD-10 criteria were excluded. First of all, those children attended in CDC with speech delay, no response to name calling, lack of eye contact, restricted behavior or interest were screened by M-CHAT(<4years), SCQ (4years or more). General developmental assessment (GDA) was done in all screening positive cases. During GDA detailed history and neurological examination was done and ICD-10 form were filled. Data were collected from recorded detailed history and clinical notes. In this study operational definition were used for economic categorization, family status and family interaction. The monthly income less than 10000 taka/month categorized as lower income, 10000-20,000-middle income and more than twenty thousand fall into higher income group. The child who stay with father, mother and /caregiver has been leveled as single/nuclear family and those who live with parents along with grandparents, uncle, aunt, were leveled them as joint family. Those parents spend time in interactive play with child for >2 hours without time spend in child rearing was leveled as good family interaction. Data regarding opportunity, type and duration of play along with detailed history of TV watching were collected from record. Collected data were analyzed. Ethical clearance was taken from National coordinator office, Child development centre, Dhaka.

**Results:**

Of the 652 children, 71.9% were from 2-5 year age group and only 6.3% from less than 2year of age with male predominance (79%, M:F=4:1). Majority of children (78.5%) were from middle to higher income groups and urban areas (68%).Maximum autism children were found to resided in a single or

nuclear family (77.5%). Less interactive family was found 67.50% and there was no play opportunity in 60.60% family. Hundred percent of the children watched TV and 85.6% of them watched TV for more than 2 hours/day. Most of the children began to watch TV in early infancy.

**Table I**

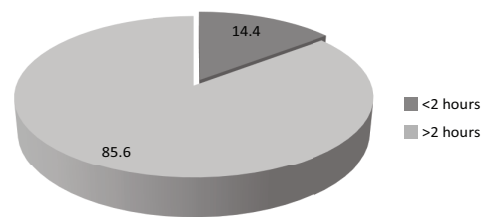
*Socio-demographic characteristics of children with ASD (n= 652)*

Age	<2yrs	2-5yrs	>5yrs
	46 (7.1%)	469 (71.9%)	137 (21%)
Gender	Male	Female	
	515 (79%)	137 (21%)	
Socioeconomic Status	Lower	Middle	Upper
	140(21.50%)	190(29.10%)	322(49.40%)

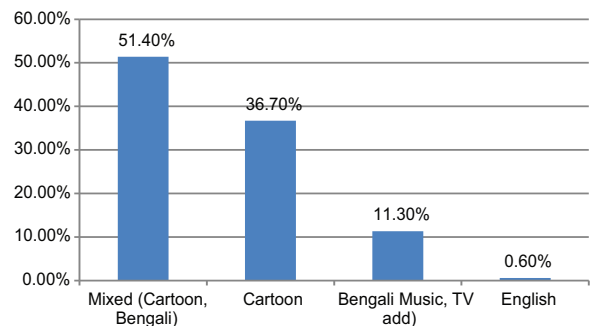
**Table-II**

*Family status, family interaction and Play opportunity of children with ASD (n=652)*

Family status	Single family	Joint family
	505 (77.45%)	147 (22.55%)
Family interaction	<2 hours	e" 2 hours
	440 (67.48%)	212 (32.52%)
Play opportunity	Present	Absent
	257 (39.42%)	395 (60.58%)



**Fig-1:** Time of TV watching in children with autism (n=652)



**Fig-2:** Pattern of TV channels watched by autistic children(n=652)

### Discussion:

ASD is a complex disorder resulting from the combination of genetic and environmental factors and affects males four times more than females,<sup>7,10</sup> and several theories have been proposed, among which the involvement of the sex chromosome in the etiology of ASD.<sup>11</sup> In our study we also found male preponderance. CDC (Centre for disease control) most recent estimate is that 1 out of every 68 children, or 14.7 per 1,000, have some form of ASD as of 2010.<sup>12</sup> CDC report shows that it affects all races and socioeconomic group.<sup>13</sup> We found higher income group were mostly affected. Analyzing the age 71.9 % of the children were in the range of 2-5 year group. This shows that symptoms of the disease visualized by parents in between 2-5 years. Small percentage of the parents could detect the abnormalities before 2 yrs of age. In our study we found maximum percentage (77.5%) of children came from nuclear family and interaction of the family with the child were less (67.5%), because they were engaged with everyday activities and less knowledge about interaction and play.

In our study, we found children are less engaged in play activities and opportunity to play were present in 39.4% while play opportunity was absent in 60.60%. Children with autism have difficulty in social interaction and communication. They need more intensive interaction and play with peer group. Researchers of Cornell University found positive correlation between autism rates and television watching by children under the age of three.<sup>10</sup> Chonchaiya W and Pruksananonda C in their study found that those children who started watching television at <12 months of age and watched television >2 hours/day were approximately six times more likely to have language delays. There was a relationship between early onset and high frequency of TV viewing and language delay though they did not study in autism children.<sup>14</sup>

Since the brain is organizing during the first years of life and since human beings evolved responding to three-dimensional stimuli, if exposing toddlers to lots of colorful two-dimensional stimulation could be harmful to brain development.<sup>15</sup> If the child continuously exposed to TV, parental interaction is less, there are less opportunity to play with peer group, then there will be less connection in socio-emotional domain, so they can't understand socio-emotional relationship.

Marshall in his study showed, nearly two-thirds (60.3%) of the youths with ASD were reported to spend "most of his/her time" watching television or videos.<sup>16</sup> Our study showed, hundred percent of the autistic child watched TV and 85.6% of the child watch TV more than 2 hours/day. They watched mixed TV channels (51.4%), cartoon (36.70%), Bengali music and TV advertisement (11.30%). Eighty five percent children watched more than two hours of TV a day, despite a recommendation from the American Academy of Pediatrics (AAP) that kids of 2 year and older should not watch more than one to two hours daily. The AAP recommends that kids under 2 watch nothing at all.<sup>11</sup>

### Conclusion:

Most children were from urban, higher income, nuclear families and less than five year age group. Excessive TV watching, nuclear family, lack of play opportunity and less parental interactions were found among the children with autism. Advice for less TV watching, joint family environment, more parental interactions and interactive play for children should be in consideration when counseling the caregivers.

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