Original Article

Early Signs of Autism and It's Relation with Gestational Factors: An Urban Based Study in Bangladesh

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Abstract

A cross-sectional study was conducted to observe the prevalence autism spectrum disorders (ASD) and its correlation with gestational factors in country population between January and December of 2016. The study population was nursery school child aged 3-5 years whose parents were willing to participate in the study. In this study, the children are excluded whom already being identified as any forms of autism spectrum disorders. Convenient sampling technique was followed to select the samples from 47 schools of Uttara, Ashulia and Nikunjo area of Dhaka City Corporation and Tongi area of Gazipur City Corporation under Dhaka Division, Bangladesh. A total of 1000 children were recruited in the study. The research instrument was a semi-structured questionnaire based on Early Screening of Autistic Traits (ESAT) tool. Based on the diagnosis of the cases, parents were invited to another interview to fill out questionnaire related to some parental and gestational factors to assess the relationship with autism. The study found early signs of autism in 2.6% cases (26 in 1000), by using Early Screening of Autistic Traits (ESAT) questionnaire. Among the children having early signs of autism, history of normal birth weight was found more in term pregnancy (62.5%) than its preterm counterpart (60.0%). Growth parameter was higher in normal birth weight (68.8%) than low birth weight (60.0%). Similarly, growth parameter was also higher in children that are from 3rd gravida (75.0%) than that of 2nd gravida (66.7%) and 1st gravida (61.5%). Birth weight was also higher in >2 years birth spacing (60.0%) than that of <2 years (50.0%). Complication was more in home delivery (50.0%) than institutional delivery (20.8%). Birth injury happened more in home delivery than institutional delivery. Similarly, complication during delivery was higher in >2 years birth spacing (30.0%) than that of <2 years (0%), However, the difference was not significant statistically in any of the comparisons (P>0.05). Hence, no causal relation was found between autism and gestational factors.

Keywords: *Autism spectrum disorder, early signs of autism, prevalence, gestational factors*

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INTRODUCTION

Autism spectrum disorders (ASD) are a diverse group of conditions. Commonly seen in the beginning in infancy and toddler years, those developmental disorders are characterized by lac of social interaction and communication, constricted and dreary interests and behaviours.[1] Characteristics of autism may be detected in early childhood, but autism is often not diagnosed until much later.[2] Although several studies have hypothesized and showed that some of the parental, postpartum or obstetric conditions are associated with autism,[2-4] the problematic effects, or causations and overall conclusions of those studies were found often inconsistent.[5] In this regard, research into prenatal factors were focused on usually parental factors, like age, comorbidity, medications, while perinatal research were focused on

usually possible trauma during the birth process with its complications like Caesarean section, breech presentation, fetal distress, postpartum hemorrhage and prolonged labour, incidence of multiple gestations, pregnancy with co-morbidities and complications, preterm and/post-term birth etc. Similarly, newborn research concentrated on neonatal distress, including low birth weight and neonatal complications.[6-9] However, in our country, there is no such research reports available to date; hence we lack evidence. During the last 10 years, autism has appeared as a major public health issue around the globe.[1] Though the degree of impairment and consequences might differ among the patients, ASD is a lifelong condition. Immense support is required to overcome the conditions and social situations.[1] It is common in ASD condition that children are deprived from the proper routine education.[1] Therefore, studies related to epidemiology and underlying factors are important especially on the relation of pre-, peri- and neonatal risk factors on ASD from an ethnically and socially diverse country like Bangladesh. Considering those points, we did this study to see the relationship between gestational factors/exposures and autism in children in an urban area.

MATERIALS AND METHODS

This study was cross-sectional and conducted in the span of January to December of 2016. The population of study was school going children aged 3-5 years whose parents were willing to participate in this study. We excluded children who were already diagnosed as having autism spectrum disorder. However, a convenient sampling technique was followed to select the samples from 47 schools of Uttara, Ashulia, Nikunjo areas of Dhaka City Corporation and Tongi area of Gazipur City Corporation under Dhaka Division, Bangladesh. A total of 1000 children aged 3-5 years, who fulfilled the selection criteria, were recruited in the study. The instrument was pre-tested among 10 children in Azampur Govt. Primary School at Uttara Area under Dhaka City Corporation for clarity, accuracy, lucidity and find out the validity of the questions. Minor modifications were considered in the final interview schedule. The research instrument contained a semi-structured screening questionnaire, based on Early Screening of Autistic Traits (ESAT) questionnaire tool to determine early signs of autism.[10] Early Screening of Autistic Traits (ESAT) is a primary screening checklist with 19 items that was designed for infants 0-36 month(s) old. It is based on prominent early signs and symptoms of autism spectrum disorders (ASD), and designed to be completed by parents/caregivers during children's health visits. Failure on three or more items indicates the need for further evaluation.[10] Based on the diagnosis of the cases, parents were invited to another interview to fill out questionnaire related to some parental factors and gestational factors which could be helpful to assess their relationship with autism.

Proportions of early sign of autism were determined by frequency and percentage. Other data ware also shown in tables with frequency and percentage. In order to see the association of gestational factors and autism in those children, Chi-square (χ^2) test was done. All the tests were two tailed; $P<0.05$ was considered statistically significant. Data analysis was done using SPSS (Statistical Package for Social Science) version 16.0 software. This research was approved by the Institutional Ethical Committee of National Institute of Preventive and Social Medicine (NIPSOM), Dhaka, Bangladesh.

RESULTS

Table-I shows a prevalence of early signs of autism in 2.6% cases (26 in 1000). Children having deficits or failure on three or more items were detected as having early signs of autism. 4(0.4%) had deficiency to show interest in different objects, 4(0.4%) could not express their feeling as deserved by the situation, 2(0.2%) could not react to normal sensory stimulation, 7(0.7%) did not cry or call, while left alone. Stereotype repetitive body movements were observed in 6(0.6%), 1(0.1%) could not bring objects as directed, 8(0.8) failed to show interest on others, 6(0.6%) did not like to be cuddled, 5(0.5%) never smiled to others, and 4(0.4%) did not like to play with others. Besides, 1(0.1%) failed to react to spoken language, 3(0.3%) failed to speak conjoining 2/3 words together, 1(0.1%) failed to gaze at something shown or pointed to. Finally, 4(0.4%) children were found who could not ever pretend like making a cup of tea using a toy cup & teapot from the toys.

Table I: Early signs of autism as screened by using ESAT tool (n=1000)

Variables	Yes (Percentage)	No (Percentage)
Interested in different object	996 (99.6)	4 (0.4)
expresses feeling (crying/smiling) on expected/appropriate time	996 (99.6)	4 (0.4)
React normal way to sensory stimulation	998 (99.8)	2 (0.2)
If child is left alone, does it start crying/ calling?	993 (99.3)	7 (0.7)
Without stereotype repetitive movement (banging head/ rocking body)	994 (99.4)	6 (0.6)
Own accord, bring objects over you	999 (99.9)	1 (0.1)
Showing interest to other children or adults	992 (99.2)	8 (0.8)
Child likes to be cuddled	994 (99.4)	6 (0.6)
child ever smiled at you or others	995 (99.5)	5 (0.5)
Child likes to play with others	996 (99.6)	4 (0.4)
React to spoken language to for instance (by looking/ listening/ smiling/ babbling)	999 (99.9)	1 (0.1)
Child can speak a few words or utter various words	997 (99.7)	3 (0.3)
Child can follow your gaze to see what you are pointing to	999 (99.9)	1 (0.1)
Can the child ever pretend, make a cup of tea using a toy cup & teapot?	996 (99.6)	4 (0.4)
Early signs of autism present (as done by using ESAT tool)	**26 (2.6)**	**974 (97.4)**

Table-II shows that gestational age was term 16(61.5%), rest was preterm 10(38.5%). Normal birth weight 16(61.5%), low birth weight 10(38.5%). Birth injury was present in 2(7.75%). H/O milestone of growth 17(65.4%). 1 gravida 13(50.0%) and 2(7.7%) respondents had birth spacing (comprising previous issue) was less than 2 years and 10(38.5%) respondents birth spacing was greater than 2 years. Mode of delivery were, Caesarean section 20(76.9%), followed by normal vaginal delivery 5(19.2%) and Forceps' delivery 1(3.8%). No complication during delivery 20(76.9%) and 6(23.1%) respondents were complication during delivery.

Table II: Gestational factors at a glance (n=26)

Variables	Frequency	Percentage
Gestational age		
Preterm	10	38.5
Term	16	61.5
Weight at birth		
Low birth weight	10	38.5
Normal birth weight	16	61.5
Birth trauma /injury		
No	24	92.3
Yes	2	7.7
H/O milestone of growth		
No	9	34.6
Yes	17	65.4

Variables	Frequency	Percentage
Gravida		
1st	13	50.0
2nd	9	34.6
3rd	4	15.4
Birth spacing comprising previous		
<2 years	2	7.7
>2 years	10	38.5
Mode of delivery		
Normal vaginal delivery	5	19.2
Caesarean section	20	76.9
Forceps' delivery	1	3.8
Complication during delivery		
No	20	76.9
Yes	6	23.1

Table-III shows that normal birth weight was in term pregnancy 62.5% preterm group 60.0%. However, the result was found statistically not significant (P>0.05).

Table III: Gestational age and weight at birth

Gestational age	Weight at birth		χ^2	P value
	Low Birth Weight	Normal Birth Weight		
Preterm	4(40.0%)	6(60.0%)	.016	>0.05
Term	6(37.5%)	10(62.5%)		
Total	10(38.5%)	16(61.5%)		

Table-IV shows that, parameters of growth were higher in normal birth weight (68.8%) than that of low birth weight (60.0%), the result found statistically not significant though (P>0.05).

Table IV: Weight at birth and milestone of growth

Weight at birth	Milestone of growth		χ^2	P value
	No	Yes		
Low birth weight	4(40.0%)	6(60.0%)	.208	>0.05
Normal birth weight	5(31.2%)	11(68.8%)		
Total	9(34.6%)	17(65.4%)		

Table-V shows that, parameters of growth were higher in the 3rd gravida (75.0%) than that of the 2nd gravida (66.7%) and the 1st gravida (61.5%). However, the result was not found statistically significant (P>0.05).

Table V: Gravida of the respondents and milestone of growth

Gravida	Milestones of growth		χ^2	P value
	No	Yes		
1st	5(38.5%)	8(61.5%)	.255	>0.05
2nd	3(33.3%)	6(66.7%)		
3rd	1(25.0%)	3(75.0%)		
Total	9(34.6%)	17(65.4%)		

Table-VI shows that, birth weight was higher in >2 year birth spacing (60.0%) than that of <2 year birth spacing group (50.0%), the result was not statistically significant though (P>0.05).

Table VI: Birth spacing of respondents and birth weight

Birth Spacing	Birth Weight		χ^2	P value
	Low	Normal		
<2yrs	1(50.0%)	1(50.0%)	.069	>0.05
>2yrs	4(40.0%)	6(60.0%)		
Total	5(41.7%)	7(58.3%)		

Table-VII shows that, complication during delivery was higher in home delivery (50.0%) than institutional delivery (20.8%), though the difference was not statistically significant (P>0.05).

Table VII: Mode of delivery of the respondents and complications

Mode of delivery	Complication during delivery		χ^2	P value
	No	Yes	.885	>0.05
Home Delivery	1(50.0%)	1(50.0%)		
Institutional Delivery	19(79.2%)	5(20.8%)		
Total	20(76.9%)	6(23.1%)		

Table-VIII shows that, birth injury was higher in home delivery (50.0%) than institutional delivery (4.2%), though the difference was not statistically significant (P>0.05).

Table VIII: Mode of delivery of respondents and birth injury

Mode of delivery	Birth injury		χ^2	P value
	No	Yes		
Home Delivery	1(50.0%)	1(50.0%)		
Institutional Delivery	23(95.8%)	1(4.2%)	5.462	>0.05
Total	24(92.3%)	2(7.7%)		

Table-IX shows that, complications during delivery was higher in >2 year birth spacing (30%), while no complication was in <2 year birth spacing (0%). However, the result was found statistically not significant (P>0.05).

Table IX: Birth spacing of the respondents and delivery complications

Birth Spacing	Complication during delivery		χ^2	P value
	No	Yes	.800	>0.05
<2yrs	2(100%)	0(0%)		
>2yrs	7(70.0%)	3(30.0%)		
Total	9(75.0%)	3(25.0%)		

DISCUSSION

The study estimated that the prevalence of ASD was 2.6% (n=1000) and it is in agreement with other population-based study, such as 2.64% in South Korea[11], Japan[12] and China[13]. In contrast, a study done in our neighbouring country, India, on its diverse populations reported the ASD prevalence was 1.4% among children aged 6-9 years.[14] It is estimated that worldwide about one in 160 children has the ASD.[15] However, it has shown increasing trends in the western world.[16-17] In this study, ASD cases were determined in the overall sample, which were in mainstream school population, previously undiagnosed and untreated.

Earliest in 1956, that is just only a few years after ASD was first described, Pasamanick and colleagues tried to report the link between complications during pregnancy and autism.[18] Since then, plenty of interpretations have been portrayed and studies trying to identify risk factors of autism; but those hardly clarify the relation between autism and adverse exposures during the pre-, peri- and infant periods. Nonetheless, increasing evidence also suggests a role of genetic factors in the origins of autism.[19,20] Still it remains unclear whether "certain complications at birth are causal, play a secondary role in shaping clinical expression in individuals with genetic vulnerability, or represent some of the shared causal factors" in the development of ASD.[19]

In this study, there was no significant association between gestational age and weight at birth (P>0.05). However, Schendel et al. reported that birth weight <2.5 kg and preterm birth at <37 weeks gestation were associated with 2-fold increase risk of autism, as studied on a Danish population.[21] We did not find any relationship between gravida and autism (P>0.05); however, Curran et al. reported an increased risk of autism with higher number of gravida, in Swedish population.[22] Unlike ours, they also confirmed that children born by elective Caesarean section were 21% more likely to be diagnosed as having ASD.[22] Many of the earlier studies that examined pre-, and perinatal risk factors in autism[2-4,23-25] could not report significant differences, due to smaller sample size[26], as we assume research on such a sensitive issue impacts willful participation in a disability-averse society. Similar happened to ours. The present study was limited to cross-sectional design that signifies that the association found in this study does not necessarily mean to establish any causal relationship. Moreover, probability sampling technique could not be employed to recruit the study unit; our samples were selected conveniently due to time and budget constraints. As a result, there might be a selection bias. Last but not the least, most of the information about gestational factors was collected with a questionnaire based on the memory of the respondents, which may be liable to a recall bias.

CONCLUSIONS

This study finds that the prevalence of autism spectrum disorder is 2.6% in urban population of Bangladesh. However, no causal relationship was found between autism and gestational factors in children in our study. This was a small-scale cross-sectional study conducted in a few schools in urban region within a limited time frame and constrained budget. Further studies are recommended by using large, population-based epidemiological samples to explore associations between perinatal variables and the risk of autism all over Bangladesh.

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