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To Determine the Risk Factors of Autism Among Children of Age 4 to 18 Years in Centres for Care of Autistic Child At Dhaka Metropolitan City and SSMC & Mitford Hospital

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Abstract **Original Research Article**

Autism is a pervasive developmental disorder characterized by qualitative impairments in social interaction and communication, and stereotyped repetitive behavior. A better understanding of autism not only holds promise for earlier intervention and prevention, but will also yield important insights about both pathological and normal development. Determining the epidemiology of autism is likely to help in understanding this puzzling disorder. Current study aimed at determining the risk factors of autism among children of age 4 to 18 years for care of autistic child at Dhaka metropolitan city and SSMC & Mitford Hospital. The study adopted Case control setting, including one government and one private organization involving in the field with. Forty five cases of autism were selected from the two centers. Controls were selected matching for age and sex and place of residence to cases. Regarding Socioeconomic status based on family income the group dosent differ statistically. Specific co-morbidity among mothers during pregnancy like fever, Psychiatric disorder, diabetes, hypertension and cardiac disease were found to be similar in both the groups. Drug use during pregnancy is also not found to exert in the current study, however inquiry about the effect of individual drug is not tested excepting for antipsychotic drug. Birth-order, presentation at births either vertex or breach does not alter the risk of childhood autism. Mode of delivery, particularly, cesarean section over normal vaginal delivery and Gestational age at birth particularly preterm rise the risk of Development of autism. However in multivariate analysis adjusting for other factors these risks was found to be not significant. Child factors were also investigated, particularly the events since birth. None of birth weight, requirement of parinatal resuscitation immediately after birth, History of breast feeding and most importantly the immunization history didn't show any increased risk. In present study more autistic child gave history of developing meningitis in their early life and who were exposed to heavy metal. Multiple logistic regressions ruled out any increased risk of autism from meningitis. Subjects with autism are around 9 times more likely to have someone autistic in the family. (OR 9.35, 1.2 – 73.7) and exposure to heavy metal showed significant relation with increased risk of autism. Subjects with autism were 5 time more likely to be exposed to heavy metal (OR 5.03, 1.08 - 23.5). Finding of the case control study could not give any conclusive clue to the causal mechanism apart from few random associations. Autism results from several different etiologies or combinations of pathological mechanisms which are yet to unveil. Further studies with greater sample size and logistic support are recommended hereby.

Keywords: Risk factors of autism, Autistic child, Metropolitan city.

INTRODUCTION

Autism spectrum disorders (ASD) are a group of pervasive developmental disorders characterized by impaired communication and social interaction as well as restricted and repetitive interests and behaviors. Included are autistic disorder, pervasive developmental disorder not otherwise specified, and Asperger's syndrome. The disorder is characterized by deficits in social interaction and communication, and restricted, repetitive interests and behaviours beginning in infancy

and toddler years [1].The term ‘‘autism’’ is often used to refer to autistic disorders. According to Gillberg [2], it affects approximately one to two children per 1,000. According to Fombonne E [3], the prevalence of autism has been estimated at 13/10,000 and is believed to be rising. According to a recent report from the Centers for Disease Control and Prevention (CDC), the prevalence of autism spectrum disorders is now 1 in 150 [4].The aetiology of autism is unknown. Although the estimated 60–92% concordance rate in monozygotic twins as compared to 0–10% in dizygotic twins underscores the importance of genetic influences, the incomplete concordance in monozygotic twins also indicates a role of environmental factors [4]. It is now believed that the mechanism underlying autism aetiology is most likely polygenic and potentially epistatic and that environmental factors may interact with genetic factors to increase risk [5]. Autism is a complex disorder of the central nervous system that has the following & defining core features: a) Problem with social interaction b) Impaired verbal and non-verbal communication a) A pattern of repetitive behavior with narrow restricted interests. A number of other associated symptoms frequently coexist with autism. Most people with autism have problem with language, forming relationship and appropriately interpreting and responding to the external world around them [6].The disorder is characterized by deficits in social-emotional functioning, atypical language and communication, and stereotypy [7]. Once thought to be rare, autism and related spectrum disorders are now known to be among the most common of the developmental disorders. Autism occurs in every social class and every country of the world. It is three to four times more prevalent in males than in females. Although behavioral and pharmacological treatments can greatly improve outcomes in autism, there is currently no biological marker and no cure. The lifelong emotional, social, and financial costs to individuals with autism, their families are enormous. Autism has an extraordinary history. It was first described by Kanner [8], who clearly implicated an underlying biological aetiology; he termed it an inborn defect of affective contact. His original insight notwithstanding, the disorder came to be blamed on defective parenting. Much time, effort, and money were spent trying to find out how parents might have caused autism. However, there is no credible evidence that parenting can cause autism in an otherwise normally developing child. Accumulating research indicates that autism is a biological disorder that originates during brain development. The limited autopsy data available show no evidence of lesions or scarring to indicate postnatal insult. Rather, the neuropathology suggests neurological immaturity and developmental failure due to abnormalities during the gestational period [9]. The nature of those abnormalities is not clear at present. There is still lot of unresolved questions regarding aetiology of autism whether the patho-physiological cascade that leads to autism occur very early in gestation or later in brain development. Still there is no agreement whether genetic and/or environmental variables are implicated? Most recent reviews estimate prevalence of one to two cases per 1000 people for autism and about six per 1000 for autism spectrum disorder. Because of inadequate data, these numbers may underestimate ASDs true prevalence. Male to female ratio of ASD averages 4.3:1. The number of children known to have autism has increased dramatically since 1980, at least partly due to changes in diagnostic practice. The question of whether actual prevalence has increased is unresolved, and as-yet-unidentified contributing Environmental risk factors cannot be ruled out [6]. Although autism is the result of a neurological abnormality, the cause of these problems with the nervous system is unknown in most cases. Research findings indicate a strong genetic component most likely. Environmental, immunologic and metabolic factors also influence the development of the disorder. There is probably no single gene or genetic defect that is responsible for autism. Researchers suspect that there are a number of different genes that when combined together increase the risk of getting autism. In families with one child with autism the risk of having another child with autism is 3-8%. The concordance of autism in monozygotic twin is 30%. A number of studies have found that first-degree relatives of children with autism also have an increase risk of ASD. In some children autism is linked to an underlying medical condition, which includes metabolic disorders e.g., Untreated PKU. Congenital infections, genetic disorders, developmental brain abnormality and neurological disorders acquired after birth like lead encephalopathy, bacterial meningitis [10]. These medical disorders alone do not cause autism, as most children with these conditions do not have autism. Environmental factors and exposures may interact with genetic factors to cause an increased risk of autism in some families. Over time many different theories have been proposed about what causes autism. Some of these theories are no longer accepted. However some believed that emotional trauma at an early age especially -bad parenting, was to blame. This theory has been rejected. Although the mercury preservation used in some vaccines is known to be neurotoxin, the most recent research on this subject does not suggest a specific link between vaccines and autism. Although there is no definitive proved cause has been identified for autism but there are certain risk factors supposed to be responsible for autism. Of these are prenatal factors which include prematurely, low birth weight, perinatal asphyxia, first born or breech presentation, parental characteristics such as advanced paternal or maternal age, parental psychiatric history mostly schizophrenia like psychosis or affective disorders, substance abuse or other mental disorder [11] has been implicated as a risk factor. Heavy metal exposure during prenatal period has been implicated as a risk factor several studies suggest that MMR could potentially cause autism via an autoimmune mechanism; measles vaccine is likely an etiological agent [12]. Research also proved that infants

who are non breast fed or were fed infant formula which was not fortified with Docosahexaenoic acid or Arachidonic acid were significantly more likely to have autistic disorder [13].Contrary to western countries autism is a disease that still not much common in Bangladesh. However, not many studies have been done in Bangladeshi setting to affirm the fact. Another element could be that proper diagnosis may be in back. As people are not aware of such disease there might be underreporting. Precise knowledge about dynamics, risk factor and causal mechanism might build strategy of preventing the disease even before the emergence of possible epidemic. With that hope in mind current study aimed at looking to the risk factors of autism in Bangladeshi population.

Objectives

General objective

- To determine the risk factors of autism among children of age 4 to 18 years in centre's for care of autistic child at Dhaka metropolitan city and SSMC & Mitford Hospital.

Specific objectives

- To assess hereditary risk factors of autism among the patient attending selected facility for care.
- To assess non hereditary risk factors of autism among the patient attending in selected facility for care.
- To assess socio demographic status among the patient attending in selected facility for care.

METHOD AND MATERIALS

The study was done in the Department of Pediatrics, Sir Salimullah Medical College & Mitford Hospital, Autism Welfare Foundation during the period from July 2010 to December 2010. Purposively 45 cases were selected from the two centers. For detecting cases 'prevalent cases' of autism is considered as sampling population. All the patients of autism spectrum disorder reported into selected centers during the study period were approached for assessing the eligibility criteria. Patient's meeting the eligibility criteria was included in the study upon consent of their guardian. Controls were selected matching for age and sex and they were healthy child of peers and colleagues.

For collection of primary data about patient a semi-structured questionnaire was developed based on research objective. After the pretesting, amendment of the items and question were done based on study finding. In the final questionnaire both structured and open questions were kept. A check list was prepared to compile the data from facility records and treatment records. Current study involves collection data which were collected by face to face interview of the patient's attendant by the researcher at facility during the period of stay at centre, upon their consent and convenience. Socio demographic and personal information were recorded from patient's attendant by through interview, with a semi structured pre-tested questionnaire. Information regarding risk factors and risk behavior were inquired taking effort to minimize the recall bias. Collected data were sorted and screened for any discrepancy. The edited data were then being entered on to the template of SPSS®16. For Back ground variables and socio-demographic data, descriptive statistics and relative frequency (percentage) were generated. Individual risk factors were identified through Multivariate analysis and the confounders were adjusted. Odds Ratio with 95% CI was generated through binary logistic regression to assess individual refractors adjusting for all possible confounders. Data were presented in the form of table and graphs. Descriptive statistics were presented with frequency tables. Association was illustrated with cross tables and test statistics were added in the foot note of the table. Bar charts were generated to illustrate descriptive statistics. Informed written consent was taken from the participant (parents) after explaining all the facts potential dangers to the subjects in case of primary data collection. The study involves collection of non-sensitive Socio-demographic data (primary data), compilation of treatment records and history of parents events collected by researcher under supervision of relevant specialists. As the procedures involved in the study were of minimal risk, for no further potential of ethical issue to be raised. The participants were assured that the information acquired would be used only for academic purpose. They were assured of confidentiality, and for the purpose of data analysis, no individual data were reported rather the identified data were preceded for analysis.

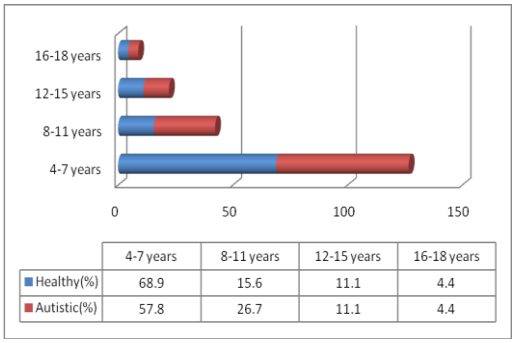
Eligibility criteria for case

- **Inclusion criteria:** Patients of autism reported in the selected **,** Diagnosis confirmed by relevant expert**,** Age between 4 – 18 years
- **Exclusion criteria:** Patients attendant not willing to participate**,** Patients with acute emergency condition**,** Patient with psychological disorder

Eligibility criteria for control

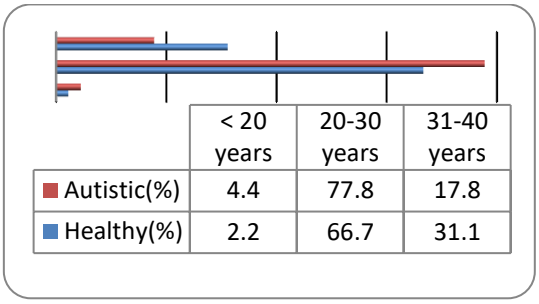
- **Inclusion criteria:** Matched by age and sex, Healthy child of peers and colleagues matching for age and sex, Age between 4 – 18 years
- **Exclusion criteria:** Patient's attendant not willing to participate**,** Patients with acute emergency condition**,** Mentally retarded

RESULTS



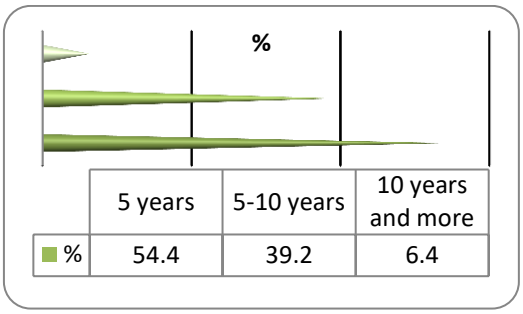
	4-7 years	8-11 years	12-15 years	16-18 years
Healthy(%)	68.9	15.6	11.1	4.4
Autistic(%)	57.8	26.7	11.1	4.4

Fig-1: Distribution of sample by age on enrollment (n=90)
χ^2 =1.75, df=3, P=0.625



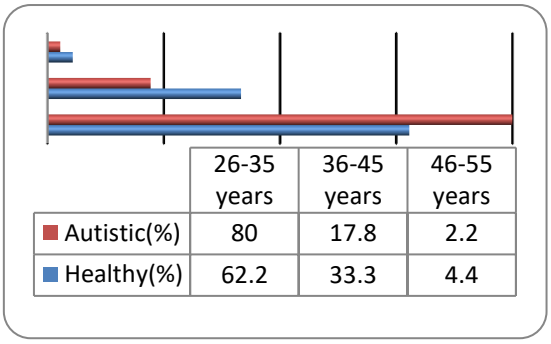
	< 20 years	20-30 years	31-40 years
Autistic(%)	4.4	77.8	17.8
Healthy(%)	2.2	66.7	31.1

Fig-3: Distribution of sample by age of mother when the Child was born (n=90)
χ^2 =2.35, df=2, P=0.30



	5 years	5-10 years	10 years and more
%	54.4	39.2	6.4

Fig-2: Distribution of the autistic child by age at diagnosis (n=45)



	26-35 years	36-45 years	46-55 years
Autistic(%)	80	17.8	2.2
Healthy(%)	62.2	33.3	4.4

Fig-4: Distribution of sample by age of father when the Child was born (n=90)
χ^2 =3.46, df=2, P=0.17

Table-1: Distribution of sample by monthly family income (n=90)

Income(Monthly)	Healthy (%)	Autistic (%)
<10000 BDT	8.9	6.7
10000 – 15000 BDT	6.7	6.7
15000 – 20000 BDT	11.1	6.7
> 20000 BDT	73.3	80

Table-2: Distribution of factors related to Autism (n=90)

Characteristics			Total	Statistics
	Healthy N (%)	Autism N (%)		
Co morbidity among mothers				χ^2 =0.20, df=1, P=0.64
None	32(71.1)	30(66.7)	62(68.9)	
Present	13(28.9)	15(33.3)	28(31.1)	
Total	45(100.0)	45(100.0)	90(100.0)	
Drugs used in pregnancy				
None	35(77.8)	29(64.4)	64(71.1)	χ^2 =1.94, df=1, P=0.163
Used	10(22.2)	16(35.6)	26(28.9)	
Total	45(100.0)	45(100.0)	90(100.0)	
Types drugs used in pregnancy				
Anti psychotic	0(.0)	2(4.4)	2(2.2)	χ^2 =3.22,(exact) df=2, P=0.19
Others	10(22.2)	14(31.1)	24(26.7)	
Total	10(22.2)	16(35.6)	26(28.9)	
Birth order				
1st	27(60.0)	32(71.1)	59(65.6)	χ^2 =1.42, df=2, P=0.49
2nd	15(33.3)	10(22.2)	25(27.8)	
3rd	3(6.7)	3(6.7)	6(6.7)	

Total	45(100.0)	45(100.0)	90(100.0)	
Presentation				
Vertex	41(91.1)	36(80.0)	77(85.6)	χ^2 =2.24, df=1, P=0.134
Breech	4(8.9)	9(20.0)	13(14.4)	
Total	45(100.0)	45(100.0)	90(100.0)	
Mode of delivery				
Normal	19(42.2)	10(22.2)	29(32.2)	χ^2 =5.62, (exact) df=2, P=0.04
LUCS	26(57.8)	33(73.3)	59(65.6)	
Others	0(0.0)	2(4.4)	2(2.2)	
Total	45(100.0)	45(100.0)	90(100.0)	
Gestational age				
Full Term	40(88.9)	28(62.2)	68(75.6)	χ^2 =9.11, df=32, P=0.006
Pre Term	5(11.1)	15(33.3)	20(22.2)	
Post Term	0(0.0)	2(4.4)	2(2.2)	
Total	45(100.0)	45(100.0)	90(100.0)	
Birth weight in kg				
>3.5	4(8.9)	6(13.3)	10(11.1)	χ^2 =1.12, df=2, P=0.62
2.5-3.5	38(84.4)	34(75.6)	72(80.0)	
1.5-2.4	3(6.7)	5(11.1)	8(8.9)	
Total	45(100.0)	45(100.0)	90(100.0)	
Parental Resuscitation				
Resuscitation Required	2(4.4)	4(8.9)	6(6.7)	χ^2 =0.71, df=1, P=0.33
Not Required	43(95.6)	41(91.1)	84(93.3)	
Total	45(100.0)	45(100.0)	90(100.0)	
Breastfeeding Pattern				
Breastfeeding continued upto 2 years	33(73.3)	26(57.8)	59(65.6)	χ^2 =2.41, df=2, P=0.29
Partially Breastfed	10(22.2)	16(35.6)	26(28.9)	
Non Breastfed infants	2(4.5)	3(6.7)	5(5.6)	
Total	45(100.0)	45(100.0)	90(100.0)	
Vaccination status				
Completed EPI Schedule	45(100.0)	44(97.8)	89(98.9)	χ2=1.01,df=1p=0.45
Partially Complete	0(0.0)	1(2.2)	1(1.1)	
Total	45(100.0)	45(100.0)	90(100.0)	
Meningitis				
Present	3(6.7)	10(22.2)	13(14.4)	χ^2 =3.23, df=1, P=0.036
Absent	42(93.3)	35(77.8)	77(85.6)	
Total	45(100.0)	45(100.0)	90(100.0)	
History of possible exposure to heavy metal				
Present	3(6.7)	11(24.4)	14(15.6)	χ^2 =5.41, df=1, P=0.02
Absent	42(93.3)	34(75.6)	76(84.4)	
Total	45(100.0)	45(100.0)	90(100.0)	
H/O Autism in the Family				
Present	2(4.4)	10(22.2)	12(13.3)	χ^2 =6.15, df=1, P=0.013
Absent	43(95.6)	35(77.8)	78(86.7)	
Total	45(100.0)	45(100.0)	90(100.0)	

Table-3: Multivariate analysis of the risk factors of Autism (n=90)

Independent variables	OR	95.0% C.I. for OR		P value
		Lower	Upper	
Co-morbidity	.530	.145	1.943	.338
Presentation	3.237	.774	13.527	.107
Mode of delivery	1.652	.504	5.416	.407
Gestational Age at delivery	2.951	.726	12.004	.131
Birth weight	.477	.077	2.954	.427
Breast feeding duration	1.099	.362	3.339	.868
Meningitis	1.136	.193	6.675	.887
Exposure to possible heavy metal	5.032	1.077	23.510	.040*
Family History of autism	9.353	1.187	73.719	.034*
Peri-natal Asphyxia	1.789	.631	5.074	.274
Birth Order	1.026	.105	10.021	.982
Psychiatric illness of mother	.838	.205	3.432	.806

DISCUSSION

Autism spectrum disorders (ASDs) are developmental disabilities where language development is absent or delayed or repetitive behaviors typically emerge, and nonverbal communication, imagination and social interactions are profoundly hindered. The severity of impairment in each of these dimensions can be quite variable, as can individual cognitive functioning [3]. Current thesis explores the epidemiology of ASD, focusing on risk factors. Autism is a pervasive developmental disorder characterized by qualitative impairments in social interaction and communication, and stereotyped repetitive behavior. In order to fulfill the diagnostic criteria of childhood autism, the symptoms must be apparent before three years of age. In contrast, when symptoms are present after the age of three, or impairments in all three areas of behavior are lacking, the criteria of atypical autism are fulfilled [14]. Presently, there is no biological marker for autism, and thus it has historically been defined in terms of behavior. Kanner [8] was the first to identify a unique group of children with an apparent failure to establish ''affective contact'' with others. Kanner provided a rich description of the prototype of autism, often referred to as ''classic'' or nuclear autism. Children so defined are socially aloof, showing little interest in human contact of any kind. However its casual mechanism is yet to be explored. Current study aimed at determining the risk factors of autism among children of age 4 to 18 years attending centers for care of autistic child at Dhaka metropolitan city and SSMC & Mitford Hospital. The study adopted Case control setting, including one government and one private organization involving in the field with. Forty five cases of autism were selected from the two centers. Controls were selected matching for age and sex and place of residence to cases. As the controls were selected matching for age and sex, age and sex of the two groups doesn't statistically differ, Average age being 9.2 ± 5.23 years and sex ratio was 22:78 in female to male. The disease is significantly prevalent among male. Regarding Socioeconomic status based on family income the group does not differ statistically. The aetiology of autism remains elusive. Many fundamental questions remain unanswered. Particularly for example, why is the disorder often but not exclusively associated with mental retardation? This question and related ones are of considerable interest to both researchers and practitioners. As it stands, autism remains a major overlooked health problem. It exerts an enormous burden of suffering on individual families and service systems worldwide are struggling with the scope of the need. A better understanding of autism not only holds promise for earlier intervention and prevention, but will also yield important insights into both pathological and normal development. Determining the epidemiology of autism is likely to help in understanding this puzzling disorder. In current study among the controls 28.9% mother had co morbidity and among the cases 33.3% had co morbidity. Specific co-morbidity like fever, Psychiatric disorder, diabetes, hypertension and cardiac disease were found to be similar in both the groups. Drug use during pregnancy is also not found to exert in the current study, however inquiry about the effect of individual drug is not tested excepting for antipsychotic drug. Researchers have considered the possibility that those general suboptimal conditions during pregnancy, delivery, or infancy may contribute to the aetiology of autism. Research shows that autism fluctuates with the seasons of birth [15], Bolton *et al*. [16] also found a significant correlation, but the effects were not consistent with any obvious model for what factors might underlie the relationship. The most reported association of autism with a teratogenic exposure is that with thalidomide. Miller and Stromland [17] reported five cases of autism in a sample of about 100 thalidomide victims from the Swedish registry of those compensated for disabilities after exposure to the drug. Present study showed that birth-order, presentation at births either vertex or breech did not alter the risk of childhood autism. Mode of delivery, particularly, cesarean section over normal vaginal delivery and Gestational age at birth particularly preterm rise the risk of Development of autism. However in multivariate analysis adjusting for other factors these risks was found to be not significant. In the current study child factors were also investigated, particularly the events since birth. None of birth weight, requirement of parinatal resuscitation immediately after birth, History of breast feeding and most importantly the immunization history didn't show any increased risk. Concerns were raised once that, children's symptoms of autism appeared after vaccinations against infectious diseases. Since the infection following vaccinations is invariably milder than an uncontrolled case of the disease itself, it seems unlikely that the effect of exposure by vaccination could be more severe than the effect of a case of the disease. However, it has been postulated that postnatal vaccinations might not act via the same mechanisms observed with in utero infections. Several possibilities have been reviewed by Golden [18]. One can imagine something like an exaggerated allergic reaction to a vaccination leading to brain injury. The kind of reaction proposed would have to cause a serious, even life-threatening, condition to create permanent damage to the central nervous system. However, a review of studies of the medical results of childhood inoculations indicates that serious illness in response to vaccinations is extraordinarily rare [19]. The fact that autism has not been reported after the very unusual acute neurologic illnesses after vaccinations argues against any causal relationship between vaccination and autism. However, there are no data to address whether long-term chronic sequelae can occur in the absence of an acute illness following inoculation. Findings from epidemiological research indicate that at least 25–30% of individuals with autism have associated medical conditions [20]. Among the most prevalent are sensory impairment (blindness and/or deafness), tuberous sclerosis, neurofibromatosis, and

epilepsy, all of which predominate among individuals with the most severe mental retardation. Peripheral hearing loss may be more prevalent than previously reported and evidence of abnormal brain stem auditory-evoked responses implicates basic impairments in the processing of sensory information in some individuals. In present study more autistic child gave history of developing meningitis in their early life. The association is significant in univariate analysis (P=0.036). The suspicion is that the association could be sporadic as multiple logistic regressions ruled out any increased risk of autism from meningitis. A strong genetic component has been established [21] but the mode of inheritance appears to be complex. Interaction with environmental risk factors has also been proposed. Several risk factors have been investigated, by different researchers like maternal obstetrical complications, viral infections during pregnancy [22], maternal age, immunological abnormalities, vaccines and, and season of birth [16], but the specific aetiology remains unknown. Most studies investigating risk factors of autism are based on prevalence rather than incidence.

A study used data from the Danish Psychiatric Central Register [11] to investigate the effects of potential risk factors of autism, of which some are related to family factors. The risk factors studied are family history of psychiatric disorders, place of birth of the child and parents, paternal identity and parental age. Munk-Jørgensen & Mortensen [11] used an incidence study design where each individual contributes years at risk since the incidence rates are more sensitive with respect to changes in etiological factors compared to prevalence rates. In current study subjects with autism are around 9 times more likely to have someone autistic in the family. (OR 9.35, 1.2 – 73.7).Although ASD is acknowledged as brain pathology, no single distinguishing neuropathological feature has yet been identified, and no single model of pathophysiology is currently accepted. Numerous physiologic abnormalities have been reported to be linked with increased risk of autism. However current study took into consideration the possible exposure to heavy metal. Among the controls 6.7% gave the history of possible exposure to heavy metal and among cases 24.4% gave history of possible exposure to heavy metal. Following Logistic regression, possible exposure to heavy metal showed significant relation with increased risk of autism. Subjects with autism were 5 time more likely to be exposed to possible heavy metal exposure (OR 5.03, 1.08 - 23.5). However, definite history of heavy metal exposure needs to be evidenced by level of those heavy metals in substances that the children took and the presence and level in the blood was beyond the scope of the study.

Limitations of the study

The study population was selected from one selected hospital in Dhaka, so that the results of the study may not be reflect the exact picture of the country. The present study was conducted at a very short period of time. Small sample size was also a limitation of the present study.

CONCLUSION & RECOMMENDATIONS

Based on the study findings none of the apparently suspected risk factor like parental age, age at marriage, occupation and socioeconomic status were found to be related with risk of autism. Gestational history like, order of pregnancy, drug use, co-morbidity at pregnancy, gestational age, birth weight were found to exert any impact on the risk. Post natal event like birth trauma, resuscitation, immunization history were also not found to have any effect. Possible exposure to heavy metal, and most importantly the family history that was found to have significant impact on increased risk of autism. Most of the misperceptions are immunization, drug use during pregnancy etc. prevailing in the community about reason for development of autism and does not have any basis. Rather based on the current study finding, only the possibility of heavy metal exposure were found to show significant impact, hence heavy metal exposure to child should be prevented. However further study proving the evidence of definite heavy metal exposure needs to be confirmed. As family history seems to raise the risk, kin of autistic child should also be careful about their child's neurodevelopment. Further research should be done on the issue to get clearer picture on the issue.

REFERENCES

1. Ozonoff S, Goodlin-Jones BL, Solomon M. Evidence-based assessment of autism spectrum disorders in children and adolescents. Journal of Clinical Child and Adolescent Psychology. 2005 Aug 1;34(3):523-40.
2. Gillberg C, De Souza L. Head circumference in autism, Asperger syndrome, and ADHD: a comparative study. Developmental Medicine & Child Neurology. 2002 May;44(5):296-300.
3. Connolly AM, Chez MG, Pestronk A, Arnold ST, Mehta S, Deuel RK. Serum autoantibodies to brain in Landau-Kleffner variant, autism, and other neurologic disorders. The Journal of pediatrics. 1999 May 1;134(5):607-13.
4. Klauck SM. Genetics of autism spectrum disorder. European Journal of Human Genetics. 2006 Jun;14(6):714.
5. Newschaffer CJ, Fallin D, Lee NL. Heritable and nonheritable risk factors for autism spectrum disorders. Epidemiologic Reviews. 2002 Dec 1;24(2):137-53.
6. Chugani DC, Muzik O, Behen M, Rothermel R, Janisse JJ, Lee J, Chugani HT. Developmental changes in brain serotonin synthesis capacity in autistic and nonautistic children. Annals of Neurology: Official Journal of the American

Neurological Association and the Child Neurology Society. 1999 Mar;45(3):287-95.
7. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 1994.4th ed. Washington, DC: American Psychiatric Association. 1994.
8. Kanner L. Autistic disturbances of affective contact. Nerv Child. 1943; 2:217–50.
9. Bauman ML. Microscopic neuroanatomic abnormalities in autism. Pediatrics. 1991; 87:791–796.
10. Rahman N. Autism Spectrum Disorder: Epidemiology. Newsletter, Bangladesh Society for Child Neurology, Development and Disability. 2008; (BSCNDD) /Available from, http/www.bscndd.org
11. Larsson HJ, Eaton WW, Madsen KM, Vestergaard M, Olesen AV, Agerbo E, Schendel D, Thorsen P, Mortensen PB. Risk factors for autism: perinatal factors, parental psychiatric history, and socioeconomic status. American journal of epidemiology. 2005 May 15;161(10):916-25.
12. Adams JB, Holloway CE, Margolis M, George F. Heavy metal exposures, developmental milestones, and physical symptoms in children with autism. InConference Proceedings of the Fall 2003 Defeat Autism Now! Conference on Oct 3-5, 2003 in Portland, Oregon 2003 Mar (pp. 71-75).
13. Schultz ST, Klonoff-Cohen HS, Wingard DL, Akshoomoff NA, Macera CA, Ji M , Bacher C. International breast feeding.2006; J;1(1):16.
14. Miller MT, Stro¨mland K.Thalidomide embryopathy: An insight into autism? Teratology. 1993; 47:387–388.
15. Mouridson SE, Nielsen S, Rich B. Season of birth in autism and other types of childhood psychoses. Child Psychiatr Hum Dev. 1994;25: 31–43.
16. Bolton PF, Pickles A, Harrington R. Season of birth: Issues, approches and findings for autism. J Child Psychol Psychiatry Allied Disciplines. 1992;33:509–530.
17. Miller MT, Stromland K. Teratogen update: a review, with a focus on ocular findings and new potential uses. Teratology.1992; 60:306–21.
18. Golden GS. Pertussis vaccine and injury to the brain. J Pediatr. 1990;116:854–861.
19. Wentz KR, Marcuse EK. Diphtheria-pertussis vaccine and serious neurologic illness: An updated review of the epidemiologic evidence. Pediatrics. 1991; 87:287–97.
20. Aronson M, Hagberg B, Gillberg C. Attention deficits and autism spectrum problems in children exposed to alcohol during gestation: A follow-up study, Dev Med Child Neurol.1997; 39: 583–587.
21. Folstein S, Rutter M. Genetic influences and infantile autism. Nature. 1977;265:726–8.
22. Chess S. Autism in children with congenital rubella. J Autism Child Schizophr.1971;1:33–47.