

Mothers Prenatal Health as Risk Factors for Autism Spectrum Disorder.

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Abstract

Autism Spectrum Disorder is a lifelong neurodevelopmental male dominant condition, and the number is increasing rapidly worldwide. Regarding its cause, researchers believe that ASD is a gene-dominant disorder, but maternal health during pregnancy is a concern. The present study identified some maternal-prenatal risk factors for ASD. The researcher used an exploratory and qualitative approach. A total of 50 mothers were included in the study as participants who had a child already diagnosed with ASD. Findings show that most of the mothers have a history of prenatal diseases; more than one time threatened abortions, increased maternal age, and are surrounded by an unhygienic health environment and mental stress and trauma. The findings will help future mothers and health professionals take precautions to avoid the situation.

Key words: Autism Spectrum Disorder, Maternal Prenatal Health, Risk Factors.

Introduction

Autism Spectrum Disorder (ASD) is an incapacitating, lifelong disorder characterized by severe and pervasive impairment in multiple areas of development, including communication skills, reciprocal social interaction, and the presence of stereotyped behaviour, activities, or interests starting before the age of 3 years (American Psychiatric Association [APA], 2018). It is five times more prevalent in males and diagnosed before the age of three. ASD has recently become a topic of great interest for many researchers and professionals because of its increasing numbers compared to 10 years ago. The great concern is that the Centres for Disease Control and Prevention (CDC) identified 1 out of 68 children (1 in 42 boys and 1 in 189 girls) with ASD in the world's most socio-economically advanced country, the United States (2020). That means presently, around 1% of the world population is affected by ASD (Schneider et al., 2020).

ASD and its common risk factors

Although considered rare, due to its complex characteristics and costly diagnostic criteria, ASD has become an 'important public health concern' throughout the world (APA, 2013). Many explanations have been cited for this increasing prevalence, such as increasing knowledge and awareness about ASD among professionals as well as parents, changes in definitions, and the inclusion of relatively milder groups of disorders in ASD. The causes and contributing factors for ASD are poorly understood despite several decades of research (Gardener et al., 2009; 2011). But evidence for genetic causes is strong; several chromosomal abnormalities have been linked to ASD (Bonora et al., 2006). Yet the most recent and largest twin study conducted on a well-characterized sample urged scientists to consider the importance of environmental factors, reporting that almost 55% of the variance in ASD could be attributed to shared environmental factors (Hallmayer et al., 2011). Whereas a number of reports have been published using data from animal studies

reporting that exposure to a variety of stressors during pregnancy may lead to long-term neurodevelopmental and behavioural impairments of the offspring (Glover, 2011). In India, most young women are nutritionally depleted due to horrendous diets. Many are also overtired and are not living a healthy lifestyle. They are also all quite toxic. Toxic metals and perhaps toxic chemicals from the mother pass through the placenta and affect the brain.

Mother's Prenatal Health as Risk for ASD

Researchers are increasingly looking at prenatal risk factors for ASD because this period plays a key role in the brain development of offspring. Prenatal factor related to ASD is maternal use of medication during pregnancy (Gardener et al., 2009). Additional factors reportedly related to ASD include intrauterine exposure to certain drugs and maternal stress (Kinney et al., 2008). According to the CDC (2018), more than 60 percent of women of childbearing age in the U.S. are overweight, while more than 31 percent of them are obese. A mother's weight and metabolic conditions during pregnancy are not just potentially harmful to her; they can also play a key role in her child's development. Xin et al. (2010) identified gravidity, maternal unhappy mood during pregnancy, maternal second-hand smoke exposure, maternal chronic or acute illness (non-pregnancy involved), and gestational complications to be associated with ASD. Women with prior induced abortions had a three-fold higher risk of delivering a newborn later diagnosed with ASD (Guinchat et al., 2012). The research also indicated that social factors might influence long-term developmental outcomes, such as maternal exposure to abuse (physical, emotional, and sexual) in early childhood, furthermore, the relationship between parental depression and ASD is often cited as having a genetic origin (Croen et al., 2011; Daniels et al., 2008).

Emergence of the problem

ASD is a clinical disorder, and the role of genetics in the development of these conditions remains a matter of some debate. Over the past decade, there has been an exponential growth in the number of environmental factors studied in association with ASD. Most of the research is held in western countries, mainly in developed and socio-economically advanced countries. But in a developed country like India, the scenario is different. Here, the scarcity of research in ASD is seen even in the twenty-first century. Although the field is still in its early stages, studies grounded in biologically plausible pathways and focused on critical time periods of neurodevelopment have suggested promising risk and protective factors, as well as avenues for future research. The present study discusses certain health-related risk factors for mothers that may alter their risk for ASD when exposure occurs during the prenatal period.

Methodology

Objective of the Study

The purpose of this study is to identify the probable maternal risk factors for ASD. The nature of this study calls for an exploratory and qualitative approach in order to understand a mother's health condition and related triggers.

Nature of Sample

50 mothers were included as participants in this study from different private schools in Kolkata who had a child diagnosed with ASD. Table 1 shows that most of the mothers were married, aged below 30 years, and belonged to urban areas with high socio-economic conditions and high educational qualifications.

Table 1*General Information on the demographic characteristics*

Sample	Category	Cases (N=50)	
		Number	%
Childs Gender			
	Male	40	80
	Female	10	20
Habitat			
	Urban	30	60
	Semi urban	15	30
	Rural	5	10
Mother's age			
	Below 30 years	32	64
	30-40 years	15	30
	Above 40 years	03	06
Socio-economic status			
	High (above Rs 50,000 monthly)	34	68
	Moderate (Rs 15, 000-Rs 50,000 monthly)	12	24
	Low (below Rs 15,000)	04	08
Occupational Status			
	Job	9	18
	House-wife	41	82
Marital status			
	Married	45	90
	Separate	03	06
	Widow	02	04
Education of Mothers			
	College and university	38	76
	High school	10	20
	Elementary	02	04

Tools Used

General Information Schedule (GIS) for mothers and child indicating demographic and personal information (prepared by the researchers).

Risk factors for ASD Questionnaire (prepared by the researchers).

The present questionnaire was prepared after interviewing 50 mothers diagnosed with a child with ASD. The test consisted of a total of 29 items in an open-response qualitative approach on a mother's prenatal health issues. The judgment's validity was established through expert checking.

Result and Discussion

The purpose of the study was to identify the maternal risk factors for ASD. Results indicated that mothers have several problems in their prenatal stage, which may be risk factors for autism. The researchers visited the mothers at their residences and interviewed them after building up a bond with them in order to get extensive information on each area and aspect of the health care issues of the child and mother. The findings were derived as provided below-

Mother's prenatal diseases

The result shows that (table 2), 32% of mothers have diseases before or during pregnancy, including gastric ulcers (4%), allergies (8%), thyroid (12%), and hypertension (8%). There is some evidence to suggest

that exposure to pregnancy complications in general may increase the risk of ASD (Gardener et al., 2009). Thyroid problems that lead to thyroxin deficiency in the mother between 8 and 12 weeks of pregnancy have been postulated to produce changes in the fetal brain leading to ASD (Roman 2007). Whereas Croen et al. (2005) found a modest association between ASD in the child and maternal asthma and allergy diagnoses recorded during the second trimester. Studies show that maternal hypothyroxinemia resulting in low T3 in the fetal brain during the period of neuronal cell migration may produce morphological brain changes leading to ASD (Roman 2007). Mothers with metabolic disorders such as diabetes, hypertension, or obesity were also at higher risk of having a child with ASD (Kawicka & Regulska-Llow, 2013). Meanwhile, hypertension and edema in pregnant women may cause poor placental perfusion and function and damage fetal development through hypoxia (Gardener et al., 2009).

Table 2*Mother's prenatal diseases*

Disease	No of People	%
Gastric ulcers	02	04
Allergies	04	08
Thyroid	06	12
Hypertension	04	08
No problems	32	86

Threatened abortion

It was found from the study that about 26% of the mothers had a history of threatened abortions before 20 weeks (table 3). For ASD with intellectual disability, threatened abortion before 20 weeks gestation and poor fetal growth were associated with an increased risk (Glasson et al., 2004). According to experts, various factors potentially relevant here include the condition of the uterus, nutritional status, and possibly the interaction between genetic susceptibility and environmental insults (Xin et al., 2010).

Table 3*Threatened abortion*

Item	No of People	%
One	9	18
Two	3	6
Three or more	1	2
No abortion	37	74

Mother's diet

Almost 40% of mothers reported that they have eating-related problems, including a tendency to vomit throughout their pregnancy (table 4). During pregnancy, maternal malnutrition hampers placentation, with resulting changes in placental size, morphology, and blood flow (Belkacemi et al., 2010) that thereby reduce the supply of nutrients to the fetus. Regarding eating disorders, Gardener et al. (2009) found a positive relationship between nausea and vomiting and ASD. High weight gain in pregnancy has been considered an independent risk factor for ASD in the offspring (Stein, 2006). In the current study, 10% of mothers reported gaining weight during pregnancy due to their excessive food intake (table 4).

Table 4*Mother's diet*

Item	No of People	%
Vomiting tendency	20	40
Eating excessive food	5	10
Eating fast food, junk food, cold drinks etc	5	10
No Problem	20	40

Mother's accident and trauma

Maternal bleeding is one of several complications believed to be associated with fetal hypoxia (Previc, 2007). Fetal distress, maternal hypertension, prolonged labor, cord complications, a low Apgar score, and Caesarean delivery are other pregnancy-related factors that are believed to be related to ASD risk (Ben-Haroush et al., 2004). In the present study, 30% of mothers reported that (table 5) they have a history of falling and bleeding during pregnancy, which makes them hurt and have to be admitted to the hospital. Fetal hypoxia may underlie a potential relationship between gestational bleeding and ASD. Findings include a significantly higher incidence of bleeding during pregnancy, which has been associated with a higher risk of ASD (Brimacombe et al. 2007).

Table 5*Mother's accident and trauma*

Any injury	No of People	%
Fall	7	14
Bleeding	9	18
No problem	34	68

Limitations

There are a number of limitations inherent in this study that should be noted. *The first* is that the present study only concentrates on a mother's prenatal health. Medical and biological perspectives are not included in this study. *Secondly*, the researcher totally relies on her mother's information and memories. So there is no provision to reach doctors and primary paediatricians. *Thirdly*, 50 samples is not a big deal for generalizing risk factors for ASD. *Fourthly*, the study included only those mothers who had already been diagnosed with a child with ASD. *Fifthly*, samples of this study belonged to higher socio-economic backgrounds, so further study for comparison with low socio-economic groups would be required for generalizations.

Further Implication of the Study

The results of this study suggest that there are many maternal prenatal factors that are associated with autism. So the medical practitioner and researcher have the duty to place much more emphasis on this area. The results have implications for future mothers and medical professionals, as well as for health care, family planning, and education services.

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