

# PREVELANCE AND RISK FACTORS RELATED TO AUTISM SPECTRUM DISORDER IN TODDLERS

\*Rukhsar Fatima, \*\*Hafiz Usman Asad, \*\*Asim Raza, \*\*Farooq Islam

\*Department of Rehabilitation Sciences, University of Chenab, Gujrat, Punjab, Pakistan

\*\*University Institute of Physical Therapy, University of Lahore, Punjab, Pakistan

## ABSTRACT

**Background:** Autism spectrum disorder(ASD) is a neurodevelopmental impairment characterized by social isolation and a variety of cognitive abnormalities. There are 18.5 autism cases for every 1000 children of aged below eight years. Current study was carried out to determine the prevalence and risk factors of autism spectrum disorder in toddlers.

**Methods:** An observational cross sectional study was performed on 209 participants in district Gujrat and Gujranwala, Punjab, Pakistan. Non probability convenient sampling technique was used to select the parents of children of age 16 to 30 months. Information were collected from parents to their child between August to September, 2022 and Modified Checklist for Autism in Toddlers (MCHAT) questionnaire with Cronbach's  $\alpha = 0.85$  was used to assess the risk of autism spectrum disorder. Data analyses were completed through SPSS. All results were calculated at 95% confidence interval.

**Result:** Out of total  $n=209$ , 170 (81.34%), 30 (14.35%) and 9(4.31%) children had low, moderate and high risk of autism spectrum disorder respectively. According to the survey 184(59.3%) participants belong to the rural area. There was found significant association between premature and autism spectrum disorder with  $p \text{ value} < 0.05$ . Positive correlation was observed between the complications related to conception and autism spectrum disorder.

**Conclusion:** On the basis of finding, low prevalence was found with high risk of autism spectrum disorder this study population. Premature births and complication related to conception increased the risk of autism.

**Keywords:** Prevalence, autism, risk factor, cross sectional study

## INTRODUCTION

A spectrum of complex neurodevelopmental problems known as autism spectrum disorder is characterized by social isolation, a variety of cognitive difficulties, and linguistic communication challenges. The behavioral patterns, hobbies, and activities that make up this society are also repetitive, stereotyped, and constrained. ASD looks to have pandemic proportions and to be the most prevalent neurodevelopmental condition in children right now.<sup>1,2</sup> The normal functioning of the brain is impacted by autism in many different ways. An accepted current prevalence rate of 3-6/1000 has been reached as a result of the apparent recent increase in autism diagnoses worldwide.<sup>3</sup>

18.5 out of 1,000 children under the age of eight have ASD. The generality of ASD has significantly expand over the last few decades, with cases of ASD recorded at 0.6–0.8% in preschoolers, 1.0% in school-aged toddlers and adolescents, and roughly 1 percent in adolescents. it is common knowledge that guys are 4.3 percent greater likely to have ASD than girls.<sup>4</sup>At the age of 18 months, the MCHAT might behave differently than it does at two years.<sup>5</sup>The Autism diagnoses can be made at any age, proved by studies that autism is present from birth. Nevertheless, achieving a quick diagnosis can be challenging. At the age of two, pediatrics advises evaluating all young toddlers for growth problems.<sup>6</sup>

Restricted, repetitive, or stereotyped patterns of behavior as well as impaired communication and reciprocal social engagement are hallmarks of these diseases. Even in very young children, early detection of autism is thought to be challenging since characteristic behaviors may be difficult to spot until they become obvious and can be distinguished from normal developmental delay. Manifestations and behaviors may vary across cases, age groups, and genders, and the development of motor abilities is hardly ever impacted.<sup>7</sup>There is currently a lot of proof that ASD can be identified prior the 3 years, even if the average age of prognosis is yet behind the 4 years. It has been shown that children who get early and intense behavioral intervention have superior growth trajectories than toddlers who do not. As a result now suggested a comprehensive approach that includes ongoing developmental monitoring, general growth examination at nine months, one and half year, and two to 2.5 year, as well as Autism Spectrum Disorder precise evaluation for all kids at one and half and two years.<sup>8</sup>The MCHAT is one of the few evaluating measures for Autism in toddlers that has been found to be successful in the few

research that have been done on the subject.<sup>1</sup> Children of 18 months and older can be screened for the risk of ASD using a validated tools, such as the MCHAT.<sup>9</sup>

To detect the autism at early stage was considered as so difficult task. Children with autism are expected to have a better outcome so timely diagnosis and treatment are widely recommended to enhance the motor outcomes of children with autism spectrum disorder. Current study was carried out to determine the prevalence and risk factors of autism spectrum disorder in toddlers.

## METHODS

### *Study design, duration and setting*

An observational cross sectional study was performed between May to August 2022 in Gujrat and Gujranwala, Punjab, Pakistan.

### *Sampling and Sample size*

Non probability convenient sampling technique was used to select 209 participants. Minimum sample size of the study was calculated 209 that were calculated through a formula given below:

$$n = \frac{Z_{(1-\frac{\alpha}{2})}^2 \sigma^2}{d^2}$$

Where n is the sample size, Z=1.96 at 95% confidence interval,  $\sigma=2.21$  is expected variance, and effect size or precision of the study; d=0.30 was applied.

### *Selection of Participants and data collection*

Parents of children whose ages were 16 to 30 months. Informed consent was taken before data collection. Information were collected from parents relate to their children and filled the questionnaire. Modified Checklist for Autism in Toddlers (MCHAT) a standard questionnaire with Cronbach's  $\alpha = 0.85$  was used to assess the risk of autism spectrum disorder in children. Then Questionnaire was filled by parents asking them 23 questions related to their children to test the risk of autism spectrum disorder by the MCHAT questionnaire (Modified Checklist for Autism in Toddlers). These 23 questions had the "yes" and "no" options. Each question had "0" and "1" score. Those children who scored between 0-2 had low risk of autism spectrum disorder. Those who scored between 3-7 had a moderate risk and those children who scored between 8-20 had high risk of autism spectrum disorder.

To check the risk factors related to autism spectrum disorder a Self-Made Questionnaire was filled by the parents. It consisted of a list of about 21 questions. This questionnaire was based upon the information taken from the literature review. The parents were then interviewed using the checklist for presence of risk factors which had “yes” and “no” type of questions and in-addition, wherever possible, the personal information was also collected from questionnaire. Some items such as age of the father and mother at the time of birth of index child, family income, social interaction with others, and occupation of father and mother etc. were taken as continuous variable.

### ***Consent and ethical approval***

After the approval of institutional review board (IRB) of university of Lahore and hospital ethics committee data were collected

### ***Statistical analysis***

Data were entered and analyzed through Statistical Package for Social Sciences (SPSS) version 24. Numerical data were described in mean and standard deviation. Frequencies and percentages were calculated for qualitative variables. To find the significance, Chi square test was applied. Spearman correlation was applied for measuring statistical relationship or association between the variable of interest. All results were calculated at 95% confidence level. P-value  $\leq 0.05$  was considered as a significant value.

## **RESULT**

Results showed that those who had scored between 8 to 20 have autism spectrum disorder and those children who scored between 3 to 7 have more chances to have ASD. There was found significant association between ASD and risk factors with p value  $< 0.05$ .

**Table 1** shows the frequency of all variables i.e. grades of autism spectrum disorder, parent's education, occupation of father, family income, how many times go for outing, weight of baby, age of child, area of child, cousin marriage, Hb of mother, social interaction, any complication related to conception, Identical twin, any birth defect and premature child. Total 209 participants were included 209 among these 170 are with low risk of ASD ,30 participants. Came with moderate risk and only 9 participants have high risk of Autism spectrum disorders.

**Table 1. Frequency distribution for variables**

<b>Variables</b>	<b>Categories</b>	<b>N (%)</b>
<b>Grades of autism spectrum disorder</b>	Low Risk (1-2)	170(81.3)
	Moderate Risk (3-7)	30(14.4)
	High Risk (8-20)	9(4.3)
<b>Parents education</b>	Illiterate	13(6.2)
	Primary	39(18.7)
	Matriculation	76(36.4)
	Intermediate	34(16.3)
	Graduate	21(10.0)
	Post graduate	26(12.4)
<b>Occupation of father of child</b>	Worker	58(27.8)
	Job	45(21.5)
	Business	80(38.3)
	Abroad	26(12.4)
<b>Family income (PKR)</b>	20 K	25(12.0)
	50 K	107(51.2)
	100 K	77(36.8)
<b>How many times go for outing?</b>	weekly	21(10.0)
	More than one times a week	176(84.2)
	Once a year	12(5.7)
<b>Weight of baby at time of birth</b>	Normal	40(19.1)
	Underweight	169(80.9)
<b>Age of child(Months)</b>	16 -24	106(50.7)
	25-30	103(49.3)
<b>Gender of the child</b>	Male	98(46.9)
	Female	111(53.1)
<b>Area of the child</b>	Urban	124(59.3)
	Rural	85(40.7)
<b>Cousin marriage</b>	Yes	115(55.0)
	No	94(45.0)
<b>Hb of mother at the time of child birth</b>	Normal	147(70.3)
	< 8	62(29.7)
<b>Social interaction of mother and father with others</b>	Yes	139(66.5)
	No	70(33.5)
<b>Any complication related to conception</b>	Yes	54(25.8)
	No	155(74.2)
<b>Identical twins</b>	Yes	4(1.9)
	No	205(98.1)

<b>Is there any birth defect at time of birth</b>	Yes	28(13.4)
	No	181(86.6)
<b>Premature baby</b>	yes	25(12.0)
	No	184(88.0)
<b>Total</b>		<b>209(100)</b>

These 13 parents are illiterate, 39 came with primary education, 76 parents done with matriculation, 34 parents done intermediate, 21 participants have done graduation and 26 parents have done post-Graduation. among these 58 are workers, 45 participants are doing any government or public job, 80 participants doing a business and 26 (12.4) % are abroad. 40(19.1%) participants are normal at time of birth and 169(80.9%) participants are underweight. that 106 (50.7%) participants are between the range of 16 to 24 months and 103(49.3%) children are between the range of 25 to 30 months. 184(59.3%) participants belong to the rural area and 85(40.7%) participants are from urban area. 74.6 % mothers are house wives and 25.4 % mothers are doing a job. We have 90 participants lie between the range of 20 to 30 years and 119 participants are between the range of 30-40 years.

**TABLE 2: Association between risk factors and ASD**

<b>Variables</b>	<b>Spearman Correlation (r)</b>	<b>P value</b>
Gender of child	-0.119	0.087
Parent Education	-0.004	0.953
How many times go for outing	-0.069	0.322
Social interaction	0.058	0.407
Father age	-0.133	0.054
Mother age	0.111	0.111
Hb of mother at the time of child birth	-0.069	0.319
Any complication related to conception	-0.242	<b>&lt;0.001*</b>
Identical twin	-0.121	0.081
Any birth defect at the time of child birth	-0.3	<b>&lt;0.001*</b>
Premature child	-0.293	<b>&lt;0.001*</b>

“\*” indicates statistically significant

147 participants had the normal Hb level and 62 participants had <8 out of 209. that 70 participants are in the range of 20-35 years of age and the 139 participants are in the range of 35-45 years of age of fathers. 139(66.5%) said yes and 70(33.5%) said no to the question which is their social interaction. 54(25.8 %) said yes and 155(74.2%) said no to the question, any complication. only 4(1.9%) participants are identical twin and 205(98.1%) participants are not identical twined. 28(13.4%) participants have birth defect at the time of birth and 181(86.6) participants said no to the question out of 209. 25(12%) participants are born premature and 184(88%) participants with full gestation period.

**TABLE 3: Association autism with risk factors**

Association	Chi-Square	P-value
Grades of autism spectrum disorder	219.91	<0.001*
Age of child(Months)	0.04	0.836
Area of the child	7.27	0.007*
Gender of the child	0.8	0.369
Parents education	70.58	<0.001*
Occupation of father of child	29.56	<0.001*
Occupation of mother of child	50.76	<0.001*
Mother age(years)	4.02	0.045*
Father age(years)	22.78	<0.001*
Cousin marriage	2.11	0.146
Family income (PKR)	49.41	<0.001*
How many times go for outing?	244.02	<0.001*
Hb of mother at the time of child birth	34.56	<0.001*
Social interaction of mother and father with others	22.78	<0.001*
Weight of baby at time of birth	79.62	<0.001*
Any complication related to conception	48.8	<0.001*
Identical twins	193.3	<0.001*
Is there any birth defect at time of birth	112	<0.001*
Premature baby	120.96	<0.001*

Chi square test for significant value (, p-value≤0.005 indicate the significance)“\*” indicates statistically significant

Results also show a strong association present between risk factors and grades of ASD. **Table:2** shows the association between grades of autism spectrum disorder with the variables. There was no statistically significant association between the genders, parent education, outing social interaction etc. with autism spectrum disorder. There is strong association is present between the autism and premature child with P value 0.00. Second correlation association between the autism and birth defect with P value of 0. Complication related to conception and autism have also a positive correlation with each other with p-value <0.001. Father age and autism also have a strong correlation with each other with p-value of 0.054.

## DISCUSSION

The main goal of my research is to check the prevalence of autism spectrum and its Risk factor among the toddlers. The results show that 81.3% toddlers are at low risk, 14.4% children are at moderate risk and only 4.3 %toddlers are at high risk of autism spectrum disorder checked by modified checklist for autism in toddlers. Which is best detecting tool to assess the Autism. The study is line with another study conducted to determine the feasibility of using the MCHAT for international evaluation of young kids with autism.<sup>10</sup>A study was carried out to check those child who born after treating the infertility have more chances to born with ASD.<sup>11</sup>As according to my study there is strong association between the autism and any complication related to the conception before the child birth with p value less than 0.05.

Those mothers who have been through treatment for infertility have more chances to have autistic child than normal mothers. A study conducted to compare the clinical presentation with the data obtained from the MCHAT. The MCHAT is appropriate for children aged 16 to 30 months.<sup>1</sup> I perform this study on the toddlers of age 16 to 30 months and current finding suggest that this age is appropriate for using the MCHAT questionnaire. According to the article's findings, the prevalence of autism is higher at age 2 in infants with birthweights less 1.5 kg than it is in the general population. Longer hospital stays and shorter gestation periods were linked to the ASD diagnosis..<sup>12</sup>but according to my survey there is no relation between the weight of baby and autism as I can't find any association between them the p value is >0.05. In current study I didn't find any association between the family history and ASD. As there is no relation present between them and p value > 0.05, which is not significant.



In my study I found boys are more prone to the Autism than girls as 2.87% boys have high risk of ASD. On the other hands girls are 1.14% with high risk of Autism. Which is in line with another study He concluded that boys are 4.3 times more likely than girls to have Autism.<sup>1</sup>

Moore discovered a link between neonates with smaller birthweight and a higher probability of high MCHAT testing. Some other research did not examine this variable. Given the increased incidence of autism in preterm SGA infants, this is probably not shocking.<sup>13</sup>As in my study I also find the association between autism spectrum disorder and premature babies with p value < 0.05. this indicates that those babies who born immature had more chances to develop ASD.

In my study I find a positive association between the autism spectrum disorder and babies born with birth defects those children who are born with any abnormality related to their physical or mental health. A positive test for ASD was associated with a younger maternal age in the past study's bivariate analysis, Preterm SGA infants have been linked to an elevated risk of autism.<sup>13</sup>in recent studies same result was find as there is negative association between mother age and preterm child.<sup>14</sup>but according to my study social interaction have no association with autism spectrum disorder with p value >0.05. This study was a cross sectional study to assess the risk factors a case control study design was recommended. In current study, confounding variables not assess . these were limitations of this study.

## CONCLUSION

It revealed that prevalence of autism spectrum disorder was generally low in district Gujrat and Gujranwala. Premature births and complication related and prior to conception had increased the risk of autism. Father age was also strongly associated with autism. Those children who born with any birth defects had more risk to get autism spectrum disorder. Social interaction of parents with others was weak associated but Autistic children are unable to attract socially. Further it is concluded that a lot of people didn't know about Autism spectrum disorder. Therefore, considering these factors in mind awareness program should be held.

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## AUTHORS

**First Author:** Rukhsar Fatima, DPT, University Institute of Physical Therapy, University of Lahore, Gujrat, Punjab, Pakistan, fatimachaudhry850@gmail.com

**Second Author:** Hafiz Usman Asad\*, M.Phil( MSK), Department of Rehabilitation Sciences, University of Chenab, Gujrat. h.usmanasad@gmail.com, <http://orcid.org/0000-0001-5584-0515>

**Third Author:** Asim Raza\*, PhD (Scholar Public Health), M.Phil. (Epidemiology and Public Health), M.Sc. (Biostatistics), Assistant Professor (Epidemiology and Biostatistics), Allied Health Sciences, University of Chenab, Gujrat, Punjab, Pakistan. asimrazathakur@gmail.com, <http://orcid.org/0000-0002-7667-1869> .

**Fourth Author:** Farooq Islam, PhD (Scholar), Assistant Professor, Department of Rehabilitation Sciences, University of Chenab, Gujrat, Punjab, Pakistan. farooq.islam@uip.t.uol.edu.pk

### Corresponding Authors:

<sup>1</sup>Asim Raza, asim.raza@uip.t.uol.edu.pk, +92-300-7536828.

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