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Original Research Paper

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A CROSS-SECTIONAL STUDY ON PREVALENCE OF RISK OF AUTISM SPECTRUM DISORDERS AMONG CHILDREN 18-36 MONTHS AND ITS RISK FACTORS

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ABSTRACT

Background: ASD not only affects the child and his / her family, but it also has direct and indirect financial implications for the country, as resources must be spent on health care, educational support, and rehabilitative services for these children. But still, there is an under-recognition of this disorder due to a delay in the diagnosis of ASD at a young age. Though many studies are done on ASD, very little literature has been done in South Indian set up and that too below the age of 3 years. In this regard, this study is done to assess the risk of ASD among the children aged 18 months to 3 years attending OPD in RMMCH, Chidambaram, Tamilnadu, and its associated risk factors.

Methodology: This is a cross-sectional study conducted among 352 children attending RMMCH OPD services. The semi-structured questionnaire was used to collect data on demographic details and prenatal & natal factors. The M-CHAT-R scale was administered to assess the risk of ASD among the children. The data were analyzed using SPSS -22. The results were expressed in proportions and chi-square test / Fischer exact test was used to find an association. $P < 0.05$ is considered significant

Results: The prevalence of severe risk of ASD is 1.1%. The age less than 25 months, presence of antenatal complications, preterm birth, cesarean section mode of delivery and suboptimal breastfeeding were significant determinants of severe risk of ASD.

Conclusion: This study recommends a need for follow-up researches and regular screening for ASD, among preterm babies and babies born to mothers with antenatal complications and routine screening in children above 18 months.

KEYWORDS : ASD, M-CHAT-R, preterm, LSCS, suboptimal breastfeeding

INTRODUCTION:

According to DSM-V, a patient with autism spectrum disorders (ASD) is described as having persistent deficits in social communication and social interaction, which include deficits in social-emotional reciprocity, deficits in nonverbal communicative behaviours used for social interaction, and deficits in developing and understanding relationships.

The 2012 survey shows the prevalence was estimated to be 61.9/10,000 globally. A meta-analysis study conducted in India has shown the prevalence of ASD to be 0.09-0.31%.[2]

ASD not only affects the child and his / her family, but it also has direct and indirect financial implications for the country, as resources must be spent on health care, educational support, and rehabilitative services for these children. [1] But still, there is an under-recognition of this disorder due to a delay in the diagnosis of ASD at a young age.[3] Though many studies are done on ASD, very little literature has been done in South Indian set up and that too below the age of 3 years.

In this regard, this study is done to assess the risk of ASD among the children aged 18 months to 3 years attending OPD in RMMCH, Chidambaram, Tamilnadu and its associated risk factors.

METHODOLOGY:

Study design: Cross-sectional study

Study population: Children aged 18 months to 3 years attending OPD in Paediatrics dept., RMMCH, Chidambaram

Inclusion Criteria:

All stable children ages 18-36 months

Exclusion Criteria:

Children with other proven causes of developmental delay, previous established diagnosis of ASD, children whose parent didn't give consent

Sampling size:

The ASD prevalence as per the meta-analysis study is 0.31% with alpha error at 5%, absolute precision (d) as 0.6% and non-response rate of 15 %, the sample size was calculated to be 352.

Study period: October 2019-December 2021

Sampling method: Convenient sampling

Data collection method: After obtaining the necessary permission from the parent/guardian, the study was conducted. A pretested semi-structured questionnaire was administered in the local language after getting informed written consent for getting the data on risk factors and the M-CHAT-R was administered for assessment of ASD risk.

Study variables and operational definition:

Autism Spectrum disorders:

By using M-CHAT-R screening tool, the children were assessed. A score of 0-2 is considered mild/low risk, 3-7 as moderate risk, and 8 and above as high or severe risk.

Age: Age in months as per the history given

Gender: Male/female

Location: Urban or rural as per the address

Socio-economic class (S.E.S): S.E.S is classified as per modified Kuppusamy scale[8]

Ante-natal complication:

Presence of complications as per the history by mother/guardian

Maturity: 1-preterm – delivery before 37 weeks of gestational age; 2-term – delivery between 37 and 42 weeks; 3-post term-delivery after 42 weeks of gestational age [6]

Mode of delivery: LSCS or normal vaginal delivery – self-explanatory

Breastfeeding: Exclusive breastfeeding: Feeding only breast milk up to 6 months of age; Suboptimal breastfeeding: not following exclusive breastfeeding methods [11]

Immunization: Fully immunized: immunized up to age as per UIP; partially immunized: immunized partially or not immunized up to age as per UIP [4]

Parents education: Education whether up to 12th standard as per history

RESULTS:

The data collected were entered in excel and analyzed using SPSS. The prevalence was given in proportion and the association of risk factors was tested using Chi-square test or Fischer's exact test.

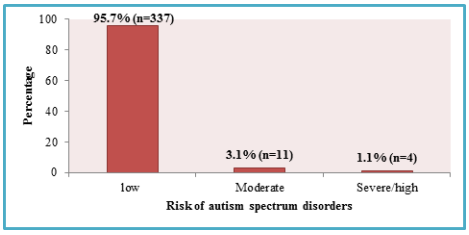

Fig.1: Distribution of participants as per risk of ASD (N=352)

Tab.1: Distribution of study participants (N=352)

Factors	n	%
1. Age (in months)		
18-20	87	24.7
21-25	158	44.9
26-30	62	17.6
>30	45	12.8
2. Sex		
Female	146	41.5
Male	206	58.5
3. Residence		
Urban	99	28.1
Rural	253	71.9
4. Education of parents		
Both educated upto HSC	103	29.3
One parent completed HSC	148	42
None completed upto HSC	101	28.7
5. S.E.S		
Upper middle	12	3.4
Lower middle	35	9.9
Upper lower	62	17.6
Lower	243	69
6. Thyroid problems in mother		
Present	49	13.9
Absent	303	86.1
7. Maturity at birth		
Preterm	67	19
Term	284	80.7
Post term	1	0.3
8. Mode of delivery		
Vaginal delivery	275	78.1
LSCS	77	21.9
9. Breast feeding history		
Exclusive	312	88.6
Suboptimal	40	11.4
10. Immunisation		
Fully	340	96.6
Partial	12	3.4

Fig.1 shows that 95.7% had low risk and only four children had a severe or high risk of ASD. The results with p-value less than 0.05 were considered significant. The distribution of study participants is given in tab.1. The majority of the children (69.5%) were below 25 months of age and 58.5% were male children. 71.9% and 69% were belonging to the rural residence and lower S.E.S. The natal history shows majority were delivered at term by normal vaginal delivery. 88.6% had exclusive breastfeeding and 96.6% were fully immunized. (Tab.1)

Tab.2: Comparison of risk factors with ASD

Factors	Risk of ASD (n, %)			p-value
	low risk	Moderate risk	High risk	
1. Age (in months)				
18-20	78,89.7	7,8	2,2.3	**0.036**
21-25	154,89.7	2,1.3	2,1.3	
26-30	62,100	0	0	
>30	43,95.6	2,4.4	0	
2. Sex				
Female	144,98.6	2,1.4	0	0.064
Male	193,7	9,4.4	4,1.9	
3. Residence				
Urban	93,93.9	3,3	3,3	0.111
Rural	244,96.4	8,3.2	1,0.4	
4. Parent's education				
Both educated upto HSC	98,95.1	4,3.9	1,1	0.983
One parent completed HSC	142,95.9	4,2.7	2,1.4	
None completed upto HSC	97,96	3,3	1,1	
5. S.E.S				
Upper middle	12,100	0	0	**0.028**
Lower middle	31,88.6	2,5.7	2,5.7	
Upper lower	57,91.9	3,4.8	2,3.2	
Lower	237,97.5	6,2.5	0	
6. Complications in Antenatal Period				
Present	47,95.9	0	2,4.1	**0.047**
Absent	290,95.7	11,3.6	2,0.7	
7. Maturity at birth				
Preterm	62,92.5	1,1.5	4,6	**0.001**
Term	274,96.5	10,3.5	0	
Post term	1,100	0	0	
8. Mode of delivery				
Vaginal delivery	267,97.1	8,2.9	0	**0.001**
LSCS	70,90.9	3,3.9	4,5.2	
9. Breast feeding history				
Exclusive	302,96.8	10,3.2	0	**0.01**
Suboptimal	35,87.5	1,2.5	4,10	
10. Immunisation				
Fully	325,95.6	11,3.2	4,1.2	0.553
Partial	12,100	0	0	

Tab.2 shows that there is a high prevalence of low risk of ASD among all age groups. Only 4 children were diagnosed with a high risk of ASD and all four children were belonging to age 18-25 months. Gender, residence, parent's education, and immunization have no significant association with Autism spectrum disorders. None of the upper-middle and lower S.E.S had a high risk of ASD. The children whose mother had complications like thyroid disorders during pregnancy had a higher prevalence of severe ASD risk whereas mothers without complication has 0.7% prevalence and the result is statistically significant. Preterm children have a higher prevalence of severe ASD risk. Similarly, children with suboptimal breastfeeding have a higher prevalence of severe ASD risk when compared to exclusively breastfed babies.

DISCUSSION:

ASD is a lifelong developmental disability that puts a strain on children and their families. Early detection and intervention of this disease result in a better prognosis and reduced family burdens. As a result, the goal of our study was to identify

children of 18-36 months for ASD and its risk factors. The M-CHAT-R screening form was completed by the parents to assess the risk of ASD in our study. It consists of 20 (yes or no) questions with the scoring of "NO" response indicating ASD risk for all items except 2, 5, and 12 where the "YES" response indicates ASD risk. The overall prevalence of severe risk of ASD is 1.1%. A study has shown the prevalence of severe ASD risk to be 2% similar to our study.[5] Another Indian study done in JIPMER shows the prevalence of severe ASD risk to be 9.4%.[7] The difference in the study results may be due to the difference in methodology and sample size.

The genetic evidence study has shown gender difference shows males have higher odds compared to females.[12] In our study no such difference in gender is seen. This variation may be due to differences in ethnicity and age distribution in samples. Also, the upper-middle S.E.S participants have no moderate or high risk of ASD in our study.

The participant's residence, parent's education, and immunization have no significant association with severe risk of Autism spectrum disorders. This is similar to the Egyptian study which shows father's education, location, and immunization status have no significant association with ASD.[10] The mother's low level of education has increased the chance of ASD risk in this above study but in our study, as the mother's education component is not separately studied the association of mother's education with ASD in children was not tested out.

Suboptimal breastfeeding has a higher prevalence of severe ASD risk. The same Egyptian study has also shown similar results.[10] The JIPMER study has reported that delayed initiation of breast feeding has significant higher risk of ASD.[7] A systematic review in children of Gulf countries has shown that suboptimal breast feeding and LSCS has been a significant risk factor of ASD similar to our study results.[9]

The preterm and prenatal complications have a higher prevalence of severe ASD risk in our study. The systematic review study has shown that antenatal complications is a significant risk factor for ASD in children.[9] Another report by Autism research new published in august 2021 has stated that 6% of those born during 22 to 27 weeks of gestation have autism, compared with 4.5 % of those born during weeks 28 to 36 weeks and 1.6 percent of those born during weeks 37 to 38. Whereas, only 1.4% of babies born full-term have autism. This report is similar to our study with a high prevalence of severe ASD risk among preterm children.

The main limitation of our study is the use of convenient sampling and the study was conducted at hospital set up and not at the community level. So, this might restrict our generalised ability of study results.

CONCLUSION:

The prevalence of 1.1% in our study is still an alarming number. So, we recommend a need for routine assessment of children for ASD from age of 18 months periodically. And also there is a need for follow-up researches and screening for ASD, among preterm babies and babies born to mothers with antenatal complications as they were one of the significant risk factors of ASD in this study.

Abbreviation used:

ASD-Autism Spectrum Disorder
M-CHAT-R-Modified Checklist for Autism in Toddlers, Revised
DSM-V- Diagnostic and Statistical Manual of Mental Disorder
RMMCH- Rajah Muthiah Medical College and Hospital
OPD - Outpatient Department

Conflict of interest: None

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Ethical committee approval: This study got approved by the Institutional ethical committee.

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