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Original Research Article

Early detection of autism in childhood outpatient department practice: insight from pediatric neurology in Hyderabad, India

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ABSTRACT

Background: Autism spectrum disorder (ASD) is prevalent neurodevelopmental disorder marked by core challenges in social communication, social interaction and presence of restrictive and repetitive behaviors. Early identification through effective screening is essential, as timely intervention significantly enhances developmental outcomes.
Methods: This descriptive cross-sectional study was conducted on a sample of 506 children aged 16 to 30 months attending the pediatric OPD clinic. Eligible children who met the inclusion criteria were screened for the risk of autism using the revised modified checklist for autism in toddlers (Revised M-CHAT).
Results: Among 506 children screened with the revised M-CHAT tool, 1.6% screened positive for ASD. The study population had a mean age of approximately 21.6 months without male predominance (59.6%). Key factors significantly associated with positive ASD screening included partial immunization, preterm birth, lack of exclusive breastfeeding, and exposure to more than 2 hours of screen time. Other demographic variables such as gender, mode of delivery, and parental education showed no significant association. Revised M-CHAT questionnaire items (notably questions 1, 2, 7, 10, and 12) were frequently positive among ASD screen-positive children, suggesting particular sensitivity for screening. Breastfeeding, screen-time exposure and immunization are confirmed statistically by this study.
Conclusions: All toddlers attending Pediatric clinics should be routinely screened for autism by a child specialist. The revised M-CHAT is a simple, easy-to-administer, and validated screening tool suitable for use in busy pediatric outpatient settings.

Keywords: Autism spectrum disorder, M-CHAT, Screening, Early detection ASD, Neurodevelopmental disorder

INTRODUCTION

Autism spectrum disorder (ASD) is a Neurodevelopmental disorder that affects how children communicate, interact, and behave. Children with ASD may have trouble with social communication and may repeat certain actions or show limited interests.[1] The number of children with ASD is about 1% in the United Kingdom and 1.5% in the United States.[2] It is seen more often in boys than in girls, with a ratio of about four to one.[3-6]

Finding autism early is very important because early treatment helps children do better as they grow. In many studies between 1990 and 2012, the average age at which ASD was detected was around 38 months, while in the United States it was about 50 months.[7,8]

India has a large population, and about one-third are children under 15 years of age. The number of children with autism in India is lower than in Western countries, with about 12 to 14 children in every 10,000.[9] In comparison, in the United States about 1 in 68 children

aged 8 years have ASD, and in the United Kingdom about 10 in every 1,000 adults have ASD.[10]

The American academy of paediatrics (AAP) recommends screening all children for autism at 18 and 24 months.[11] In India, different tools are available to check for autism, such as the M-CHAT, revised M-CHAT (M-CHAT-R), infant toddler checklist (ITC), screening tool for autism in two-year olds (STAT), and childhood autism spectrum test (CAST).

However, many of these tools are not often used or properly tested in Indian settings.[12-14]

There is a need for simple, low-cost, and effective tools to detect autism early, especially in low- and middle-income countries. The M-CHAT-R is one such tool used worldwide and has been translated into Indian languages like Hindi and Telugu.

This study was done to screen toddlers aged 16 to 30 months attending the paediatric outpatient department of a tertiary care hospital in urban Telangana.

The M-CHAT-R was used to find out how common autism is in this group and to check if this tool is useful in identifying toddlers at risk for ASD.

Aim

Aim of the study was to determine the prevalence of ASD among toddlers attending a tertiary care paediatric outpatient department in urban Hyderabad, Telangana.

Objectives

Objectives were to estimate the prevalence of ASD among toddlers in urban Hyderabad, Telangana, to identify risk factors associated with ASD, to analyse the relative response patterns for each item in the revised M-CHAT screening tool.

Study design

This was a cross-sectional screening study conducted at the paediatric outpatient department of Princess Esra Hospital, Owaisi Group of Hospitals, Deccan College of Medical Sciences (DCMS), Hyderabad, Telangana.

Study period

The study was carried out over 18 months, from December 2020 to June 2022.

Sample size

A total of 506 toddlers were included in the study. Sample size estimation was performed using Andrew Fisher's formula based on data from previous studies.

Ethical considerations

The research protocol was reviewed and approved by the institutional review board of Deccan College of Medical Sciences. Informed consent was obtained from the parents or caregivers of all participating children.

Inclusion criteria

Children aged 16-30 months attending the paediatric outpatient department whose parents provided informed consent were included.

Exclusion criteria

Children with visual or hearing impairment, neurodegenerative disorders, or pre-existing neurological deficits, and those whose parents did not consent were excluded.

METHODS

Consecutive children meeting inclusion criteria were screened using M-CHAT-R. Those who screened positive were referred to department of paediatric neurology, where senior consultants independently confirmed the diagnosis of ASD and initiated appropriate management.

A semi-structured proforma was used to collect data on perinatal risk factors and responses to individual M-CHAT-R items. Each child underwent a detailed physical and neurological examination.

Statistical analysis

Data were compiled in Microsoft excel and analysed using SPSS version 22.0. Descriptive statistics such as frequencies, percentages, and proportions were calculated. Results were presented in the form of tables, bar charts, and pie diagrams.

RESULTS

The results show that out of 506 children screened using revised M-CHAT tool, 8 (1.58%) screened positive for ASD, while 498 (98.4%) negative. Several demographic and clinical variables were analysed for their association with ASD screen positivity, and only immunization status, gestational age, exclusive breastfeeding, and screen time exposure were statistically significant factors.

Findings

Only 1.58% of children screened positive for ASD (Table 2). Mean age of screened-positive children was 21.6 months, and mean age for screened-negative was 21.5 months. Gender, mode of delivery, place of delivery, and parental education status showed no statistically significant association with screen positivity ($p>0.05$ for all).

Statistically significant associations

Immunization status

Partially immunized children were more likely to screen positive compared to fully immunized children (Odd's ratio: 16.8, p=0.001) (Table 1).

Gestational age

Preterm infants had a higher risk of screening positive for ASD (p=0.001) (Table 1).

Breastfeeding

Lack of exclusive breastfeeding was associated with increased screen positivity (p=0.002) (Table 1).

Screen exposure

Children with more than 2 hours of screen time exposure had a statistically higher rate of screening positive (Odds ratio: 19.39, p=0.001) (Table 4).

Non-significant associations (Table 2)

Gender

No significant difference between males and females in risk of positive screening (p=0.6).

Mode of delivery

No significant association seen (p=0.057).

Parental education status

Not found significant (p=0.663).

M-CHAT questionnaire analysis

Questions 1, 2, 7, 10, and 12 from the revised M-CHAT scale were most frequently positive among screen-positive cases.

Suggesting these may be more sensitive items for the ASD detection in this population (shows in Table 4).

Table 1: Factors associated with ASD screen positivity.

Factors		Interpretation
Gender	No	No difference
Mode of delivery	No	No difference
Immunization status	Yes (p=0.001)	Partial immunized higher risk
Gestational age	Yes (p=0.002)	Preterm higher risk
Parental education	No	No association

Table 2: Screening positivity of ASD using M-CHAT-R scale in the study population.

Screening test	N	Percentage (%)
Negative	498	98.42
Positive	8	1.58

Table 3: Breastfeed pattern of the study population.

Exclusive breastfed	N	Percentage (%)
Yes	408	80.6
No	98	19.4

Table 4: Questions which are positive in screening positive ASD cases.

M-CHAT questionnaire no:	Positive response out of 8 positive cases	M-CHAT questionnaire no:	Positive response out of 8 positive cases
Question:1	7/8	Question:11	2/8
Question:2	5/8	Question:12	6/8
Question:3	4/8	Question:13	2/8
Question:4	1/8	Question:14	2/8
Question:5	4/8	Question:15	4/8
Question:6	4/8	Question:16	3/8
Question:7	5/8	Question:17	3/8
Question:8	4/8	Question:18	2/8
Question:9	4/8	Question:19	3/8
Question:10	7/8	Question:20	2/8

Table 5: Effects of screen-time exposure in ASD screen test positivity in children under study.

Screentime exposure (>2 hours)	Screen-test negative	Screen-test positive	Fisher value	P value
Yes	489 (96.6%)	6 (75%)	21.1	<0.001
No	9 (4.4%)	2 (25%)		

DISCUSSION

In the present study, the prevalence of ASD among toddlers attending a tertiary care pediatric OPD in Hyderabad was found to be 1.58% (Table 1). This prevalence aligns with existing national and international data, indicating that ASD affects approximately 1-2% of the paediatric population worldwide.[2]

Comparable studies conducted globally report ASD prevalence rates ranging from 1 in 100 to 1 in 36 children, as per the centres for disease control and prevention (CDC) and the American academy of paediatrics (AAP).[16]

Indian studies, such as those by Chauhan et al have reported prevalence rates between 0.09% and 1.07%, comparable to our findings.[17]

Gender distribution

In the present study (Table 1), out of 506 children, eight (1.58%) screened positive for ASD using the M-CHAT-R tool. Among the screen-positive cases, four were male and four were female, indicating no gender preponderance (male-to-female ratio 1:1).

According to DSM-IV and CDC data, the typical male-to-female ratio in ASD is approximately 4:1.[3-6]

The absence of male predominance in our study could be attributed to the relatively small sample size and limited number of screen-positive cases.

Mode of delivery

In our study population (Table 1), among 8 screen-positive cases, 2 were born by normal vaginal delivery (20%) and 6 by lower segment caesarean section (80%).

Previous studies have reported a higher prevalence of ASD among children delivered by caesarean section. Curran et al observed that caesarean born children were about 20% more likely to be diagnosed with autism, although this association disappeared in sibling-controlled analyses, suggesting familial or environmental confounding.[18]

Breastfeeding

In our study population (Table 1), among 8 screen-positive cases, 3 were exclusively breastfed (37.5%).

Among the screen-negative cases, 405 children (81.3%) were exclusively breastfed, while 93 (18.7%) were not. The p=0.002 indicates a statistically significant association between exclusive breastfeeding and screening positivity.

Exclusive breastfeeding appears to have a protective effect against ASD. An Indian study by Ravi et al reported a lower prevalence of ASD among children exclusively breastfed during the first six months.[19] Similarly, Harshini Manohar et al found that children with suboptimal breastfeeding were more vulnerable to ASD than their siblings.[20]

Hence, our findings, in line with previous studies, suggest that exclusive breastfeeding during early infancy may reduce the risk of neurodevelopmental disorders such as ASD.

Immunization

In our study population (Table 1), among 8 screen-positive children, 3 were fully immunized (37.5%). Among the screen-negative children, 455 (91.3%) were fully immunized, while 43 (8.6%) were partially immunized. The p=0.001 indicates a statistically significant association between immunization status and screening positivity.

Partially immunized children showed a higher rate of screening positivity in our study. Although earlier public concern linked the measles mumps rubella (MMR) vaccine to ASD, extensive research has disproven this claim. Wendy Roberts and subsequent large-scale studies (Jain et al and DeStefano et al) confirmed that there is no causal association between MMR vaccination and autism.[21-23]

Children with ASD are often found to have lower immunization coverage due to parental hesitancy or misconceptions, which increases their susceptibility to vaccine-preventable diseases. Thus, while our study shows an association between incomplete immunization and screening positivity, current evidence indicates that immunization itself does not cause ASD.

Gestational age

In our study population (Table 1), 5 out of 8 screen-positive children were preterm (62.5%), and 3 were term (37.5%). Among the screen-negative group, 61 (12%) were preterm, 438 (86.5%) were term, and 7 (1.5%) were post-term. The p=0.001 indicates a statistically significant

association between gestational age and screening positivity.

Preterm birth was strongly associated with a higher rate of screening positivity in our study. Similar observations have been reported in earlier studies, where preterm and low birth weight (LBW) infants were found to have a greater risk of developing ASD compared with term-born children. Breslau et al reported that preterm and LBW infants are at increased risk for later psychiatric and neurological disorders.[24] Hultman et al also demonstrated a significant association between LBW (<2500 g) or small-for-gestational-age status and autism, showing nearly a twofold increased risk compared to controls.[25]

Leavey et al further observed a gradual increase in ASD risk with shorter gestation, particularly between 29 and 40 weeks, independent of sex/fetal growth parameters.[26] These findings suggest that reduced gestational age and LBW may serve as important early markers of neurodevelopmental vulnerability and risk for ASD.

Mean age of identification

In our study (Table 1), the mean age of ASD identification was 21.63 months (range: 17-26 months). A similar observation was made by Manohar et al with an average age of 22.22±9.47 months.[38]

Early identification and intervention are known to improve developmental outcomes. The AAP recommends autism screening at 18 and 24 months, while the national centre on birth defects and developmental disabilities (NCBDD) suggests screening at 9, 18, and 24 or 30 months.[3-6]

These screenings help detect early signs requiring further evaluation but do not replace a formal diagnosis. Following such guidelines facilitates timely intervention and better long-term outcomes.

Parent's education status

In our study population (Table 1), parental education level did not show significant association with screening positivity. Among the 8 screen-positive cases, 3 (37.5%) had one parent who completed 12th grade, and 4 (50%) had both parents who completed 12th grade. Only 1 (12.5%) screen-positive child had parents who had not completed 12th grade. Among the screen-negative group, 156 (31.4%) had one educated parent, 208 (41.9%) had both educated parents, and 133 (26.8%) had neither parent who completed 12th grade. P=0.663 indicates no statistical significance. Hence, parental education status did not affect screening positivity in our study population.

Relative positivity of each question

In our study (Table 4), the relative positivity of individual items in the revised M-CHAT questionnaire revealed that questions 1, 2, 7, 10, and 12 were positive in more than 50% of screen-positive cases. Questions 1 and 10 were positive in 87.5%, question 6 in 75%, and questions 2 and 7 in 62.5% of screen-positive cases. This suggests that questions 1 and 10 have higher discriminative value in identifying screen-positive cases using the revised M-CHAT tool.

Screen time exposure

Screen time exposure (Table 5) showed a significant association with screening positivity. Children with screen exposure of more than 2 hours per day accounted for 75% of screen-positive cases, whereas among screen-negative cases, 96.6% had screen exposure below this threshold. The $p<0.001$ indicates a statistically significant relationship between excessive screen exposure and screening positivity by the revised M-CHAT score.

Despite the AAP recommendation that children under 2 years should have no screen exposure and those aged 2-5 years be limited to less than 1 hour per day, most children exceed these limits. Studies have linked excessive early screen exposure and reduced parent-child interaction to an increase in ASD-like behaviours later in childhood (Richter).[27]

Mazurek and Wenstrup reported average screen times of 2.4 hours/day for boys and 1.8 hours/day for girls with ASD.[28] Healy et al found that 13-year-old children with ASD spent 121-150 minutes/day watching television, while MacMullin et al observed screen use averaging 5.67 hours/day among individuals aged 6-21 years.[29,30]

A study published in frontiers in psychiatry involving 158 children (101 with ASD and 57 typically developing) showed that children with ASD had significantly longer screen exposure, and the duration of screen time correlated with both autistic symptom severity and developmental quotients (DQs).[31]

These findings emphasize the importance of minimizing early screen exposure and encouraging interactive parent–child engagement to support optimal neurodevelopment.

Every child should be checked for signs of autism at 18 months and again at 24 months. The M-CHAT-R is a simple, effective, and easily available tool that helps detect autism early. In busy clinics, asking only questions number 1, 2, 7, 10, and 12 from the M-CHAT-R can help identify most children who might be at risk for autism. Exclusive breastfeeding and timely immunization seem to lower the chances of autism. Limiting screen time can also help reduce the risk of autism.

Limitations

The revised M-CHAT was used instead of diagnostic tools such as autism diagnostic observation schedule

(ADOS), childhood autism rating scale (CARS), Trivandrum autism behaviour checklist, INCLEN tool (INDT-ASD) etc, which may affect diagnostic precision.[15] The study was hospital-based rather than community-based, so it may not represent the true community prevalence. As a cross-sectional study, follow-up of screen-positive children was not included, limiting assessment of long-term outcomes.

CONCLUSION

ASD screen positivity by the revised M-CHAT was 1.58 per 100, with a mean detection age of 21.6 months, supporting early screening at 15-24 months. Gender distribution was equal. Preterm and low-birth-weight infants were more affected, emphasizing better perinatal care. Exclusive breastfeeding showed a protective effect, and partial immunization correlated with higher risk, negating the MMR-autism link. Screen time >2 hours/day was significantly associated with positivity, highlighting the need to limit screen exposure. Questions 1, 2, 7, 10, and 12 of the revised M-CHAT showed greater predictive value.

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REFERENCES

1. Wieckowski AT, Hamner T, Nanovic S, Porto KS, Coulter KL, Eldeeb SY, et al. Early and Repeated Screening Detects Autism Spectrum Disorder. J Pediat. 2021;234:227-35.
2. Zhang Y, Zhou Z, Xu Q, Li H, Lv Y, Zhu G, et al. Screening for Autism Spectrum Disorder in Toddlers During the 18- and 24-Month Well-Child Visits. Front Psychiat 2022;13:879625.
3. Zwaigenbaum L, Bauman ML, Fein D, Pierce K, Buie T, Davis PA, et al. Early Screening of Autism Spectrum Disorder: Recommendations for Practice and Research. Pediatrics. 2015;136(1):S41S59.
4. Jullien S. Screening for autistic spectrum disorder in early childhood. BMC Pediatr 2021;21(1):349.
5. Zwaigenbaum L, Bauman ML, Fein D, Pierce K, Buie T, Davis PA, et al. Early Screening of Autism Spectrum Disorder: Recommendations for Practice and Research. Pediatrics. 2015;136(1):S41S59.
6. Robins DL, Dumont-Mathieu TM. Early screening for autism spectrum disorders: update on the modified checklist for autism in toddlers and other measures. Journal of developmental and behavioral pediatrics: JDBP. 2006;27(2):S111-9.
7. Wieckowski AT, Hamner T, Nanovic S, Porto KS, Coulter KL, Eldeeb SY, et al. Early and Repeated Screening Detects Autism Spectrum Disorder. Pediat. 2021;234:227-35.
8. Miller LE, Dai YG, Fein DA, Robins DL. Characteristics of toddlers with early versus later diagnosis of autism spectrum disorder. Autism. 2021;25(2):416-28.
9. Amit G, Bilu Y, Sudry T, Avgil Tsadok M, Zimmerman DR, Baruch R, et al. Early Prediction of Autistic Spectrum Disorder Using Developmental Surveillance Data. JAMA Network Open. 2024;7(1):e2351052.
10. Okoye C, Obialo-Ibeawuchi CM, Obajeun OA, Sarwar S, Tawfik C, Waleed MS, et al. Early Diagnosis of Autism Spectrum Disorder: A Review and Analysis of the Risks and Benefits. Cureus. 2023;15(8):e43226.
11. Sobieski M, Sobieska A, Sekułowicz M, Bujnowska-Fedak MM. Tools for early screening of autism spectrum disorders in primary health care - a scoping review. BMC Primary Care. 2022;23(1):46.
12. Øien RA, Vivanti G, Robins DL. Editorial SI. Early Identification in Autism Spectrum Disorders: The Present and Future, and Advances in Early Identification. J Autism Dev Disord. 2021;51(3):763-8.
13. Salgado-Cacho JM, Moreno-Jiménez MDP, de Diego-Otero Y. Detection of Early Warning Signs in Autism Spectrum Disorders: A Systematic Review. Children (Basel). 2021;8(2):164.
14. Okoye C, Obialo-Ibeawuchi CM, Obajeun OA. Early Diagnosis of Autism Spectrum Disorder: A Review and Analysis of the Risks and Benefits. Cureus. 2023;15(8):e43226.
15. Dalwai S, Ahmed S, Udani V, Mundkur N, Kamath SS, Nair MK. Consensus statement of the Indian academy of pediatrics on evaluation and management of autism spectrum disorder. Indian pediatrics. 2017;54(5):385-93.
16. Maenner MJ, Warren Z, Williams AR, Amoakohene E, Bakian AV, Bilder DA et al. Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 8 Years-Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2020. MMWR Surveill Summ. 2023;72(2):114.
17. Chauhan A, Jitendra KS, Nishant J, Kiran K, Amit A, Jasleen K, et al Prevalence of ASD in Indian children: A systematic review and metaanalysis. Neurol India 2019;67(1):100-4.
18. Curran EA, O'Neill SM, Cryan JF, Kenny LC, Dinan TG, Khashan AS, et al. Research review: Birth by caesarean section and development of autism spectrum disorder and attention-deficit/hyperactivity disorder: a systematic review and meta-analysis. J Child Psychol Psychiatry. 2015;56(5):500-8.
19. Ravi S, Venkatesh C, Shivanand K, Mahadevan S. Maternal and birth risk factors for children screening positive for ASDs on M-CHAT-R. Asian J Psychiatry. 2016;22:17-21.
20. Manohar H, Rajkumar RP. Role of exclusive breastfeeding in conferring protection in children at-risk for autism spectrum disorder: results from a sibling case-control study. J Neurosc Rural Pract. 2018;9(01):132-6.

21. Wendy R, Mary H. Immunization and children at risk for autism. Pediatric Child Health. 2002;7(9):623-32.
22. Jain A, Jaclyn M, Ami B, Tim B, Jonathan PK, Craig JN. Autism occurrence by MMR vaccine status among US children with older siblings with and without autism. JAMA. 2015;313(15):1534-40.
23. DeStefano F, Shimabukuro TT. The MMR Vaccine and Autism. Annu Rev Virol. 2019;6(1):585-600.
24. Breslau N, Davis GC, Andreski P. Risk factors for PTSD-related traumatic events: A prospective analysis. Am J Psychiat. 1995;152(4):529-35.
25. Hultman CM, Sparén P, Cnattingius S. Perinatal risk factors for infantile autism. Epidemiology. 2002;13(4):417-23.
26. Leavey A, Zwaigenbaum L, Heavner K, Burstyn I. Gestational age at birth and risk of autism spectrum disorders in Alberta, Canada. J Pediatr. 2013;162(2):361-8.
27. Richter SA, Nunes ML. COVID-19 Pandemic and Autism Spectrum Disorder, Consequences to Children and Adolescents-A Systematic Review. Rev J Autism Develop Disorders. 2022;23:1-26.
28. Mazurek MO, Shattuck PT, Wagner M, Cooper BP. Prevalence and correlates of screen-based media use among youths with autism spectrum disorders. J Autism Develop Disorders. 2012;42(8):1757-67.
29. Healy S, Nacario A, Braithwaite RE, Hopper C. The effect of physical activity interventions on youth with autism spectrum disorder: A meta-analysis. Autism Res. 2018;11(6):818-33.
30. MacMullin JA, Lunsky Y, Weiss JA. Plugged in: Electronics use in youth and young adults with autism spectrum disorder. Autism. 2016;20(1):45-54.
31. Dong HY, Wang B, Li HH, Yue XJ, Jia FY. Correlation Between Screen Time and Autistic Symptoms as Well as Development Quotients in Children with Autism Spectrum Disorder. Front Psychiatry. 2021;12:619994.

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