Prevalence of Autism Spectrum Disorder risk among Toddlers using M-CHAT-R/F screening tool in a quaternary care hospital outpatient department

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Abstract

Background : Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition requiring early identification for optimal outcomes. The Modified Checklist for Autism in Toddlers-Revised with Follow-up (M-CHAT-R/F) is recommended by the Indian Academy of Pediatrics as the preferred screening tool for ASD in toddlers.

Objectives : To determine the prevalence of autism risk among children aged 16-30 months using M-CHAT-R/F screening tool in the outpatient department of a quaternary care hospital.

Methods : A prospective study was conducted from February 15th to March 31st, 2025, at our quaternary care hospital, in Kochi. Children aged 16-30 months attending the paediatric outpatient department for routine check-ups, illness, or vaccination were screened using M-CHAT-R/F questionnaire that was provided in both English and Malayalam by staff at the registration counter. The parents who gave consent to participate completed a 20-item yes/no questionnaire, with explanatory support, if needed. Scoring was performed by the junior resident.

Results : Out of 67 children aged between 16 and 30 months who visited the outpatient department of general paediatrics, 58 received the M-CHART R/F forms; 6 were incomplete and 4 contained false information. All children screened in this study were in the low risk group..

Conclusion : Early screening using M-CHAT-R/F enables timely identification and intervention for children at risk of ASD. In this short prospective study, all children screened were in the low risk group.

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- Autism Spectrum Disorder
- M-CHAT-R/F
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- Prevalence
- Early Detection
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Introduction

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition characterized by persistent deficits in social communication and interaction, alongside restricted and repetitive patterns of behaviour, interests, or activities.[1] The prevalence of ASD has been steadily increasing globally, with early identification and intervention being crucial determinants of long-term outcomes for affected children.

The Modified Checklist for Autism in Toddlers (M-CHAT) has emerged as one of the most widely validated and utilized screening instruments for identifying children at risk for ASD. The current version, M-CHAT-R/F (Revised with Follow-up), is a parent-completed screening tool designed to identify children between 16 and 30 months of age who require comprehensive assessment for possible early signs of ASD or developmental delay.[2]

The Indian Academy of Pediatrics Consensus Statement on Evaluation and Management of Autism Spectrum Disorder specifically recommends M-CHAT-R/F as the preferred screening tool[1]. This recommendation is based on the tool's superior sensitivity, specificity, and ease of administration in clinical settings.

The M-CHAT-R/F consists of 20 yes/no questions that assess key developmental milestones and behaviors associated with autism. The scoring algorithm categorizes children into three risk levels: low-risk (total score 0-2), medium-risk (total score 3-7), and high-risk (total score 8-20). Children in the medium-risk category must be administered the follow up questionnaire to confirm the risk status, while children in the high-risk group should be directly referred for diagnostic evaluation.

Despite the availability of validated screening tools, there remains a paucity of data on the prevalence of autism risk in Indian pediatric populations, particularly in hospital-based settings. Understanding the prevalence and distribution of autism risk in clinical populations is essential for healthcare planning, resource allocation, and development of appropriate referral pathways.[3]. Our hospital has robust referral pathways and adequate capacity in specialized developmental services where a diagnosis of autism spectrum disorder could be confirmed and managed.

Materials and Methods

Study Design and Setting: This prospective study was conducted at a quaternary care centre in Kochi, from February 15th to March 31st, 2025.

Study Population: Children aged 16-30 months attending the pediatric outpatient department were enrolled in the study.

Inclusion Criteria

- All Children aged 16-30 months attending pediatric outpatient department for routine check-up, illness or vaccination
- Parents providing informed consent for participation

Exclusion Criteria

- Previously diagnosed cases of autism spectrum disorder (ASD)
- Children with global developmental delay and genetic disorders
- Parents declining consent for participation
- Critically ill children requiring emergency care
- Incomplete submission of questionnaire
- False information with regards to hospital id.

Data Collection: After obtaining informed consent, parents completed the M-CHAT-R/F screening tool which was made available in both English and Malayalam. The registration staff distributed the questionnaire to the parents according to their preferred language.

For parents unable to understand the questions, explanations were provided by the junior resident who also scored the questionnaire after consulting the 1st author.

Follow-up Protocol: Parents of children who screened positive were given the appropriate follow up questionnaire to fill, if they were in the medium risk group. Those in the high-risk group were to be advised diagnostic evaluation at our child development centre.

Statistical Analysis: Data analysis for calculation of mean standard deviation of age was done using calculator.net.

Results

A total of 67 children aged between 16 and 30 months visited the outpatient department of general paediatrics. Out of the 67 children, 58 M-CHART filled forms were obtained; out of which 6 were incomplete while 4 contained false information thereby making a data collection of 48 patients possible; 25 were females and 23 were males. All were in the low Risk Group.

Discussion

This study identified 100% of children as in the low-risk category for autism spectrum disorder using M-CHAT-R/F screening. Within the Indian context, limited studies have examined ASD prevalence using standardized screening tools, with community-based studies reporting rates between 0.09% to 1.07% in different regions[5]. The absence of medium and high-risk groups in this cohort suggests that all were developing typically and do not require further testing for autism at this time. It could also suggest that in the high socioeconomic and highly literate strata of society that we cater to in our corporate set up, the parents may be consulting directly at our well-publicised neurodevelopment centre.

The study however highlights the need for robust referral pathways and adequate capacity in specialized developmental services, while demonstrating the feasibility of implementing M-CHAT-R/F screening in busy outpatient settings.

Several strengths characterize this study, including the use of the Indian Academy of Pediatrics-recommended M-CHAT-R/F tool, ensuring alignment with national guidelines and facilitating international comparisons.[6] The hospital-based setting provides access to diverse populations, while comprehensive demographic data collection allows risk factor identification. However, important limitations significantly impact the study's general ability as the exclusion of children with previously diagnosed ASD, global developmental delay, and genetic disorders may have artificially reduced high-risk prevalence, as these conditions often accompany ASD.

Based on these findings, healthcare institutions should implement routine M-CHAT-R/F screening for all children aged 16-30 months attending pediatric services, regardless of visit purpose. This universal screening approach could facilitate early identification of children requiring developmental assessment. Training programs should be developed for pediatricians and nursing staff to ensure consistent administration and interpretation of results [7]. Healthcare facilities must establish clear referral pathways for positive screens, ensuring timely access to specialized developmental services. Adequate capacity planning for follow-up services is essential to prevent assessment delays. Documentation systems should be enhanced to track screening results and follow-up outcomes, enabling quality improvement initiatives and longitudinal monitoring, with electronic health records incorporating automated reminders for age-appropriate screening and follow-up protocol

Several research priorities emerge from this study. Larger, multi-centre studies with extended recruitment periods are needed for robust prevalence estimates and meaningful subgroup analyses. Community-based studies would provide valuable insights into general population ASD prevalence, complementing hospital-based findings. Longitudinal follow-up studies tracking medium-risk children would help determine M-CHAT-R/F predictive validity in the Indian context and inform potential cut-off score refinement. Cultural

adaptation studies examining M-CHAT-R/F item appropriateness for Indian populations could enhance screening accuracy[8]. Studies examining early screening and intervention impact on developmental outcomes would provide evidence for systematic screening program clinical utility. Integration of screening data with electronic health records and artificial intelligence approaches may enhance future prediction accuracy and clinical decision-making[9].

Conclusion

This small study demonstrates the feasibility and importance of systematic autism screening in hospital outpatient settings using the M-CHAT-R/F tool. Early identification through structured screening programs can facilitate timely intervention and improve outcomes for children with ASD.

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