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Original Research Article

Application of M-CHAT or M-CHAT-R/F for autism spectrum disorder screening by general pediatricians across India

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ABSTRACT

Background: Early screening of autism at 16-30 months using M-CHAT or M-CHAT-R/F enables early diagnosis and timely intervention. The objective is comparing M-CHAT or M-CHAT-R/F use for autism screening on children aged 16-30 months between general pediatricians who have attended and who have not attended workshops, conferences or training on autism.
Methods: The study design was a cross-sectional comparative study. Study participants were pediatricians living and working in India. Data collected through google questionnaire included basic demographic questions and reasons for using or not using M-CHAT or M-CHAT R/F. After removing participants as per exclusion criteria, rest were divided into two groups those who had attended autism-related training, workshops or conferences and those who had not. Data was compared between the two groups. The outcome variables were the number of general pediatricians screening children aged 16–30 months for autism spectrum disorder using M-CHAT or M-CHAT-R/F and the association between screening practices and autism-related training.
Results: Screening rate using M-CHAT or M-CHAT-R/F was 43.4%. Screening of all children aged 16-30 months constituted only 8.11% of the indications. Only less than a third of the participants had attended autism-related training. Despite attending training, over half of them still did not perform screening. Overall, most still felt the need for more training in using the screening tools. Screening increased with attendance of autism-related training, but not with the increase in training duration.
Conclusions: Increasing comprehensiveness, frequency and access to short-duration trainings will increase early screening, diagnosis and intervention, hence positively changing the disease trajectory.

Keywords: Autism screening, Autism training, Early screening, Early diagnosis, Indian pediatrician

INTRODUCTION

Autism Spectrum Disorder (ASD) is a lifelong neurodevelopmental disorder characterized by impaired socialization, impaired verbal and non-verbal communication, restricted interests and repetitive behaviours.[1] Its prevalence has increased from 1 in 100 children in the year 2000 to 1 in 36 children in 2020.[2,3] The prevalence in India in 2019 was 1 in 68 children aged 2-9 years.[4] Boys are 4 times more likely to be diagnosed than girls.[5] The risk in siblings is 7% and 4% if the affected child is a girl and boy respectively. It increases to 25-35% if a second child has ASD.[6]

The early markers of ASD are no babbling or waving bye by 12 months, no single words by 16 months, no 2-word spontaneous phrases by 24 months, and language or social regression at any age.[7] It can be diagnosed as early as age 1 year.[8] Diagnostic stability is high at 18-36 months.[9] Screening can be performed earliest at 16

months, yet many cases are not diagnosed until school age.[10]

Hence, the AAP (American Academy of Pediatrics) recommends universal ASD screening using developmental surveillance at 9, 18 and 30 months of age and ASD-specific screening at 18 and 24 months.[11] The M-CHAT (Modified Checklist for Autism in Toddlers) is the most widely used screening tool for age 16-30 months.[12] The Indian Academy of Pediatrics (IAP) also advocates universal ASD screening at 18 and 24/30 months with M-CHAT-R/F (Modified Checklist for Autism in Toddlers-Revised with Follow-Up).[13] Currently, universal ASD screening beyond 30 months is not recommended.[12]

Pediatricians are often the first to encounter children with developmental disorders. Timely referral and treatment improves when they use standardized ASD screening tools.[14] Despite there being many ASD-specific tools, diagnosis is delayed.[10] Several studies showed that pediatricians training increased ASD screening, hence increasing its timely diagnosis, referral and management and eventually leading to better outcomes. This highlights the role of training in addressing the Knowledge, Attitude and Practices (KAP) gap.[15]

The aim is to study the application of M-CHAT or M-CHAT-R/F for ASD screening on children aged 16-30 months by general pediatricians across India. The objective of the study is to compare the application of M-CHAT or M-CHAT-R/F for ASD screening on children aged 16-30 months between general pediatricians who have attended workshops, conferences or training on ASD and general pediatricians who have not attended any of these.

METHODS

Study design and study setting

This is a cross-sectional comparative study. It was conducted using an online survey.

Study population

Pediatricians living and working in India.

Participant selection

Pediatricians voluntarily participating in this study were automatically considered to have consented for it.

Definition of general pediatricians

Pediatricians without further degrees beyond M.D (Doctor of Medicine)/D.Ch (Diploma in Child Health)/D.N.B (Diplomate of National Board) pediatrics or pediatric super-specialists (except those in the exclusion criteria) who see all pediatric patients, not just limited to their speciality.

Inclusion criteria

Doctors holding at least a D.Ch/M.D/DNB in pediatrics and pediatricians living and working in India.

Exclusion criteria

Pediatricians with a completed/ongoing Fellowship or Doctorate of Medicine (D.M) in Pediatric Neurology. Pediatricians with a completed/ongoing Fellowship in Developmental and Behavioural Pediatrics. Pediatricians with a completed/ongoing Post Graduate Diploma in Developmental Neurology (PGDDN). Pediatricians with other completed/ongoing certified/recognized course related to child development and/or neurology. Other pediatric super-specialists who do not see patients other than of their respective specialities.

Sampling procedure

Random sampling.

Sample size

The sample size consists of minimum 500.

Study duration

The study duration was for 2 months.

Data collection

Pediatricians were contacted directly or through phone calls, short messaging service, WhatsApp messages or electronic mail. Data was collected through an anonymous google form. The data collected included age, gender, years of experience, qualification and location. Super-specialists were asked if they saw patients outside of their speciality or not. Also, all the pediatricians were asked if they had attended ASD workshops, conferences or training and if they screened children aged 16-30 months for ASD using M-CHAT or M-CHAT-R/F. The reasons for screening or not screening were asked.

Pediatricians were excluded as per the exclusion criteria. The remaining general pediatricians were put into two groups- those who had attended ASD conferences, workshops or training and those without training. The data collected from the two groups was compared and analyzed statistically.

Outcome variables

Number of general pediatricians screening children aged 16-30 months for autism using M-CHAT or M-CHAT R/F, and its correlation with training.

Study tool

The study tool use for this study was a Google form containing relevant questions.

Statistical analysis

Microsoft Excel and R Studio (Open-source analytical tool V 1.2.335) were used for data collection, basic calculations, statistical analysis and result presentation. The Chi-square test was applied to determine the significance of association between two different variable distributions. A p value <0.05 was considered as significant.

Ethical considerations

The study was approved by the Ethics Committee.

RESULTS

The total of 683 pediatricians had participated in the study during 9th August to 8th October 2024. 171 participants were excluded: PGDDN-88, Fellowship in Developmental and Behavioural Paediatrics-13, Fellowship Neurology-8, DM Neurology-4, other courses related to child development/neurology-16, more than one of the above degrees-19, super-specialists seeing patients of exclusively their speciality-22, leaving us with 512 general pediatricians.

Among the 512 pediatricians, 222 (43.4%) had used the M-CHAT or M-CHAT-R/F, while 290 (56.6%) had not. Among the users, 73.42% (n=163) had screened on clinical suspicion, 97 (43.69%) for parental concerns about their child's development. Only 8.11% (n=18) followed the recommended practice of screening all children aged 16-30 months. Five participants (2.25%) had screened for other reasons (Figure 1).

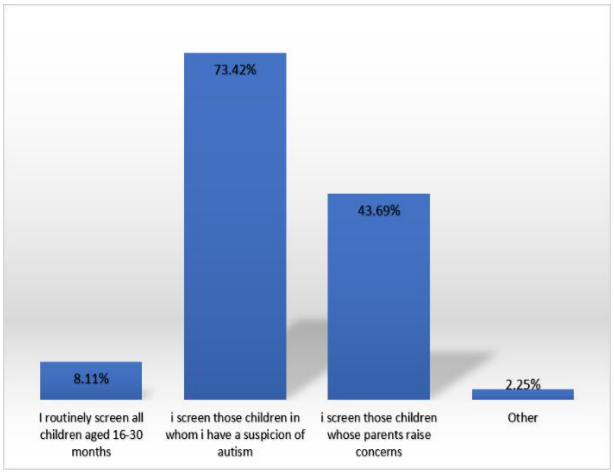


Figure 1: Reasons for using M-CHAT or M-CHAT-R/F.

The most significant barrier for not screening was a preference to refer (n=148, 51.03%) patients directly to pediatric neurologists or developmental pediatricians for assessment. The second-largest reason was a lack of awareness about the M-CHAT or M-CHAT-R/F (24.48%, n=71). 44 participants (15.17%) had cited a busy OP (Out-Patient) practice, 14.83% (n=43) reported a lack of confidence in using the screening tools and 11 (3.79%) reported not knowing the protocol after a positive screen, 10 (3.45%) cited parental skepticism and 2.41% (n=7) didn't feel screening to be necessary (Figure 2).

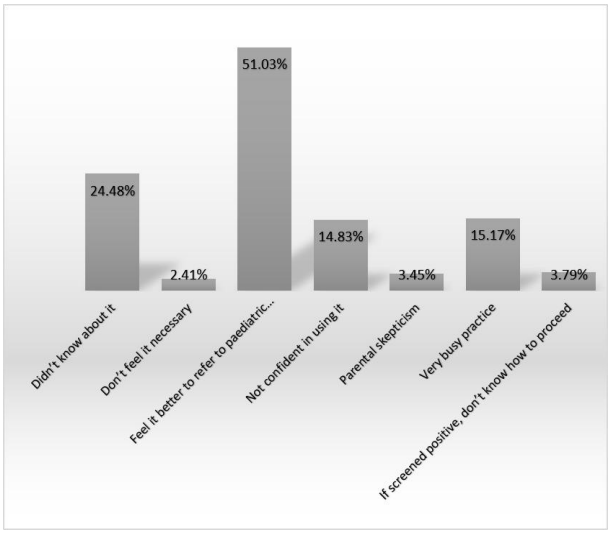


Figure 2: Reasons for not using M-CHAT or M-CHAT-R/F.

Only 147 (28.7%) participants had attended ASD training and 71.3% (n=365) had not. M-CHAT usage among the trained and untrained was 59.2% and 37% respectively. A statistically significant relationship was found between training and M-CHAT or M-CHAT-R/F usage (Table 1).

Among the 147 trained pediatricians, 87 had used M-CHAT or M-CHAT-R/F. Among the latter, most had attended training of less than one day's duration (n=59, 67.8%), followed by 12 (13.8%) attending training for 2-3 days, 11 (12.6%) attending training for more than 7 days and 5 (5.7%) attending training for 4-7 days. Our data did not reveal any increase in M-CHAT or M-CHAT-R/F use with an increase in the training duration (Table 2).

Most (90.6%, n=464) of all our respondents indicated a need for more training. This included 85.7% (n=126) of those who had attended training and 92.6% (n=338) of those who had not attended training. A significant relationship was found between training attendance and the perceived need for more training (Table 3).

Table 1: Association between autism training and M-CHAT or M-CHAT-R/F use.

Have you ever used M-CHAT or M-CHAT-R/F in children aged 16-30 months?		Attended any training/conferences/workshop on autism		Total
		Yes	No	
No	Count	60	230	290
	%	40.8%	63.0%	56.6%
Yes	Count	87	135	222
	%	59.2%	37.0%	43.4%
	Count	147	365	512
	%	100.0%	100.0%	100.0%
Pearson chi-square	Value	df	p value	Result
	21.025a	1	0.000	Sig

Table 2: Association between usage of M-CHAT and training duration.

Training duration		Have you ever used M-CHAT or M-CHAT-R/F		Total
		No	Yes	
<=1 day	Count	47	59	106
	%	78.3%	67.8%	72.1%
2-3 days	Count	6	12	18
	%	10.0%	13.8%	12.2%
4-7 days	Count	2	5	7
	%	3.3%	5.7%	4.8%
> 7 days	Count	5	11	16
	%	8.3%	12.6%	10.9%
	Count	60	87	147
	%	100.0%	100.0%	100.0%
Pearson chi-square	Value	df	P Value	Result
	2.003a	3	0.572	non sig

Table 3: Association between autism training/workshop and need of more training.

Need for more training in using M-CHAT or M-CHAT-R/F?		Attended any training/conferences/workshop on autism		Total
		Yes	No	
No	Count	21	27	48
	%	14.3%	7.4%	9.4%
Yes	Count	126	338	464
	%	85.7%	92.6%	90.6%
	Count	147	365	512
	%	100.0%	100.0%	100.0%
Pearson chi-square	Value	df	p value	Result
	5.853a	1	0.016	Sig

DISCUSSION

43.4% of the participants had used the M-CHAT or M-CHAT-R/F, much higher than the 5% screening rate among Australian General Practitioners (GPs).[16] The higher rate in our study might be because it was done only among general pediatricians and not GPs. Also, the latter study was done 20 years ago, and ASD prevalence and awareness has increased in the last decade. Screening rate was higher in another Canadian (84%) study.[17]

56.6% pediatricians in our study had never used the M-CHAT or M-CHAT-R/F, showing that its adoption is not widespread, making it important to address implementation barriers and awareness gaps to increase their utilization. The most common cause for screening in our study was a clinical suspicion of autism (73.42%), similar to the Canadian study (85%). The next common cause was screening children on parental concerns regarding their development (43.69%). Even in the Canadian study, this was the second most common cause of screening (78%), although at a much higher rate.[17]

In another study, all the pediatricians had reported looking for developmental milestones in each well-child exam, but none had screened for ASD.[18] As per AAP, ASD screening is the general pediatrician's responsibility.[12] Even in our study, only 8.11% routinely screened all children aged 16-30 months, lower than the Canadian study (18%).[17] Other reasons for screening in our study (2.25%) were high-risk neonates, research, and learning to screen because of personal experiences with ASD. Another study similarly found that personal experiences with autism favorably influenced attitudes towards it.[19]

The largest screening barrier in our study was the preference to refer (51.03%) directly to neurologists or developmental pediatricians for assessment, similar to another study (80%).[17] Likewise, pediatricians in another study were unable to feel confident while diagnosing ASD without specialist consultation. They opined that it was the developmental pediatrician's or the psychologist's work.[18] This delays early screening, due to considerable specialist wait-times. Lack of awareness was the second-largest barrier in our study (24.48%). An African study similarly indicated low ASD knowledge among healthcare workers, which becomes a key barrier to intervention.[20]

14.83% of our participants lacked confidence in using the M-CHAT or M-CHAT-R/F. This estimate was 45% in the Canadian study.[18] Awareness of community resources and greater knowledge of ASD was found to be positively associated with self-perceived competence in ASD management.[21] 15.17% of our participants cited a busy OP practice as a screening barrier, which was lesser than in the Canadian study (35%).[17] Several studies found similar reasons for sub-optimal screening-non-familiarity with tools, specialist referrals or time constraints.[10,16,22,23] 3.7% of participants do not know the protocol after a positive screen. Similarly, despite good ASD knowledge, UK GPs reported limited confidence in its management due to lack of clarity around referral pathways.[24]

2.41% of our participants didn't feel screening as necessary. This again indicates a lack of awareness of the importance of early diagnosis and intervention in changing the disease trajectory. Some participants mentioned difficulty in accessing resources and following up patients in a rural setup. Turkish specialists likewise mentioned difficulties due to insufficient special education services for ASD.[24] Another reason for delayed diagnosis is professionals' concerns about strong parental reactions on revealing ASD as diagnosis.[25] Similarly, 3.45% of our participants cited parental skepticism as a reason for not screening. Majority (71.3%) of respondents had not participated in autism training, way higher than the UK study (39.5%).[24] American pediatricians similarly reported a lack of opportunity and time for obtaining information about ASD through continuing education opportunities.[18]

Among our trained participants (147), most (72.1%) had attended sessions lasting for a day or lesser, which may be due to time constraints because of busy clinical practice. This was followed by 12.2% attending for 2-3 days, 10.9% for over 7 days and 4.8% for 4-7 days.

90.6% of our participants had expressed a desire for more training. This strongly points towards a self-recognized knowledge gap. Likewise, education regarding ASD screening and early signs was perceived as a priority in other studies.[16,24] In another American study, all the pediatricians stated a lack of ASD training in medical schools. The other causes were stated: inadequate continuing education opportunities, and lack of interest. [19]

Among those who had attended training, 85.7% wanted to be trained and among those who were unable to attend the training, 92.6% expressed a need for more. Even among the UK GPs who had received training, 62.6% felt that the training was 'somewhat' or 'very' useful while the remainder (37.3%) felt that it was not very, or not at all, useful.[24]

M-CHAT or M-CHAT-R/F usage among the trained and the untrained participants was 59.2% and 37% respectively. Hence, we can see that training positively influences the adoption of standardized autism screening tools. Another study also found a positive relationship between training and knowledge scores.[15] Increased knowledge increased the use of the M-CHAT or M-CHAT-R/F. The UK study however, found no relationship between the two.[24]

The data did not reveal any increase in M-CHAT or M-CHAT-R/F use with the increase in training duration. Among the M-CHAT or M-CHAT-R/F users, majority had attended training of less than one day duration (67.8%), followed by 13.8% (2-3 days), 12.6% (more than 7 days) and 5.7% attending training for 4-7 days.

There was a statistically significant relationship between training attendance and the perceived need for M-CHAT training. Majority (90.6%) of the respondents indicated a need for more training to use the M-CHAT or M-CHAT-R/F. 85.7% of trained and 92.6% of untrained participants expressed a need for it. Similarly, the UK GPs had expressed a desire for more autism training.[25] Despite demonstrating robust knowledge about autism, UK GPs reported only a modest confidence in suspecting autism. This confidence was related to greater experience and prior training in autism. The study suggested that continuous training would improve their confidence in working with autistic patients.

It was seen previously in the present study that M-CHAT or M-CHAT-R/F usage did not increase with an increase in the training duration. Thus, the present study shows that despite attending training, the participants felt the need for more, indicating that focus must be on improving the comprehensiveness of the training rather

than the duration and also increasing their frequency and accessibility. The study limitations were that the sample size was very small and the representation from the states was very uneven. Hence, larger studies with a fair representation from all over India are needed to study the KAP gap.

CONCLUSION

In this study, screening rate using the M-CHAT or M-CHAT-R/F was 43.4%. The most common indications were- clinical suspicion followed by parental concerns. Screening of all children aged 16-30 months constituted only 8.11% of the indications. Among the 512 respondents, though 43.4% had used the M-CHAT or M-CHAT-R/F, only 3.5% (n=18) were screening all children between 16-30 months. The common barriers for not screening were a preference to refer, lack of awareness, busy clinical practice and low confidence in using the M-CHAT or M-CHAT-R/F. Only less than a third of the participants had attended autism-related training, most of which were of less than one-day duration. It was found that M-CHAT or M-CHAT-R/F use significantly increased with training, but not with training duration. However, despite training, over half of the respondents still did not screen for ASD and overall, most of the paediatricians still felt the need for more training. Hence, it is concluded that increasing the accessibility, frequency and comprehensiveness of training instead of the duration will go a long way in increasing the awareness, screening rates, timely referral and management of ASD, eventually improving the long-term outcome.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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