



Translation and validation of modified checklist for autism in toddlers-revised version in Tamil (T-MCHAT-R)

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Received : 22.05.2020
Accepted : 08.11.2020
Published : 30.12.2020

Abstract

The Modified Checklist for autism in toddlers - revised (MCHAT-R) (Robin et al 2001) is a simple questionnaire for parents which improves discrimination between autism and other developmental disorders. This screening tool is currently available in more than 20 languages of the World. The aim of the current study is adaptation and validation of the Modified Checklist for Autism in Toddlers (M-CHAT-R) in the Tamil language. A total of 450 children from both sexes between 16 to 30 months of age were taken, and those who have any comorbid serve chronic diseases were excluded. For the reliability of T-MCHAT-R, statistical analysis was done by using SPSS version 20.0. The Cronbach's Alpha test found out that the T- MCHAT- R has an alpha score of 0.894 on a standardized item, which is categorized as excellent reliability. Pearson's two-tailed correlation was performed to compare T-MCHAT-R scores with ISAA scores which reveal a positive correlation ($r=0.01$). The 'p' value for T-MCHAT-R and ISAA for both the normal and abnormal groups was >0.001 indicating that the results are highly significant. Our results yielded reliability and validity estimates similar to the values of the original M-CHAT validity study (Robins et al. 2001). We have shown that the Tamil version of M-CHAT-R has divergent Validity. The Tamil version of M-CHAT-R has shown satisfactory reliability. Hence it is an effective tool for screening for ASD in medium and high-risk children and should be regarded as the first official Tamil version of the M-CHAT-R to be applied in Tamil Nadu.

Keywords: Tamil, Screener, MCHAT-R, Autism Spectrum Disorder

1. Introduction

Autism Spectrum Disorder is a complex developmental disorder. It is most often a lifelong disorder, though there are more and more cases of children with ASD who eventually function independently, leading full lives. Autism differs from person to person in severity and combinations of symptoms. It usually begins in early childhood and eventually causes problems

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functioning in society – socially, in school and at work. Diagnostic and Statistical Manual of Mental Disorder contains revised diagnostic criteria for autism spectrum disorder (ASD). The DSM-V have 12 diagnostic criteria for PDD divided in to 3 domains of impairment: Social Interaction; Communication and Repetitive Behavior or Restricted interest. The onset of impairment must have occurred before age 3 years. Diagnosing autism spectrum disorder (ASD) can be difficult, since there is no medical test, like a blood test, to diagnose the disorders. Doctors look at the child's behavior and development to make a diagnosis. Diagnosing an ASD takes two steps; Developmental screening and comprehensive diagnostic evaluation. Screening plays a major role especially for those who are at a higher risk for developmental problems due to preterm birth, low birth weight, or having a brother or sister with ASD. If a problem is suspected, a comprehensive diagnostic evaluation is needed. The increased prevalence of autism spectrum disorder (ASD) and its detection during the first 3 years of life have substantial relevance for early intervention. Autism is found in every country (Diagnosed in one in every 115 people) (Matthew J et al at September-12, 2012) and region of the world and in families of all racial, ethnic, regions, and economic backgrounds, making up roughly 1percent of the world population. Diagnosing this wide range of prevalence points to a need for earlier and more accurate screening for the symptoms of ASD. In 2010, overall estimated ASD prevalence was 14.7 per 1000 (1 in 68) children age 8 years (U.S. centers for disease control and Prevention [CDC], 2014). It is well known that delayed diagnosis and treatment of Autistic Spectrum Disorders (ASDs) can worsen the prognosis (Corsello 2005; Dawson and Osterling 1997; Kasari et al. 2006). Current U.S estimates suggest that 1out of 68 children carry an ASD diagnosis (Center for Disease control, 2014). Recent Global ASD Prevalence estimates indicate 62 out of 10000 children meet criteria for ASD. American Academy of Pediatrics (AAP) recommends that ASD –Specific standardize screening should be performed at 18 – 24-month preventive check-ups; even though a 2009 survey among pediatricians found that only 28% routinely used it and most common barrier included lack of time and lack of familiarity with screening tools.

The M-CHAT which stands for Modified Checklist for Autism in toddlers – Revised with follow up, is a screening tool for parents to assess their child is at risk of Autism Spectrum Disorder (ASD). This unique diagnostic tool was first developed in USA as a tool for detecting ASD in children aged under 2 years in low-risk population, and does not require specialized direct observation. This tool was developed by Diana Robins, PhD. M-CHAT-R tool may be administered as part of a child wellness visit with a health care provider, or it may be used by other professionals, such as a school psychologist or counselor. The ultimate goal of the M-CHAT-R is to accurately detect as many causes of Autism Spectrum Disorder as possible in a timely manner. All M-CHAT studies have yield similar results and indicate that M-CHAT could be effective tool for early ASD screening. (Inada et al. 2010; Pandey et al. 2008; Robins et al. 2001; Robins and Dumont-Mathieu 2006; Ventola et al. 2007). As Tamil pediatricians have no detection tool for developmental screening in ASD, The Modified Checklist for Autism in Toddlers (M-CHAT-R) was first translated in to and culturally adapted to



Tamil. Validity and reliability studies were carried out in two different geographical areas of Tamil Nadu.

The aim of the current study is adaptation and validation of the Modified Checklist for Autism in Toddlers (M-CHAT-R) in the Tamil language.

2. Methodology

2.1. M-CHAT-R (Robins et al., 2001)

The M-CHAT-R is a parent-report screening tool to assess the risk of ASD. Initially, the parents have to answer 20 yes/no questions using the M-CHAT-R form, which takes 5 minutes. If the child is screened positive, the parent is asked to follow-up for detailed evaluation. A total score of 0-2 is considered as low risk, 3-7 is considered as medium risk and 8-20 is considered as high risk. If the M-CHAT –R score remains at 2 or higher, the child is positive and if the score is 0-1, the child has screened negative. A total score of M-CHAT-R of 8-20 shows a need to refer immediately for diagnostic evaluation. The T-MCHAT-R can be administered and scored and also can be used by other professionals to assess risk for ASD. For all items except 2, 5 and 12 the response “no” indicates ASD risk; for items 2, 5 and 12, “yes” indicates ASD risk.

2.2. ISAA (National Institute for Mentally Handicapped. 2009)

The Indian Scale for Assessment of Autism (ISAA) is also another tool used for diagnosing and measuring the severity of autism. This tool was developed and was standardized in the Indian population to diagnose the severity of autism. The Ministry of Social Justice & Empowerment, Government of India constitute an Expert Committee comprising of professionals working in the field of autism and related developmental disabilities to standardize an Indian tool for assessment of autism. ISAA is an objective assessment tool for a person with autism which uses observation, clinical evaluation of behavior, testing by interaction with the subject and also information supplemented by parents or caretakers to diagnose autism. ISAA consist of 40 items rated on a 5-point scale ranging from 1 (never) to 5(always). The 40 items ISAA are divided into six domains. The domains are Social Relationship and Reciprocity, Emotional Responsiveness, Speech-Language and Communication, Behavior Patterns, Sensory Aspects, and Cognitive Components. A score of < 70 indicates no autism, 70- 106 (mild autism), 107-153 (moderate autism) and > 153 (severe autism).

2.3. Study framework

The Tamil MCHAT-R study was undertaken in the following three phases:

- (i) translation and back translation
- (ii) the validity of the study itself and
- (iii) the reliability of the study

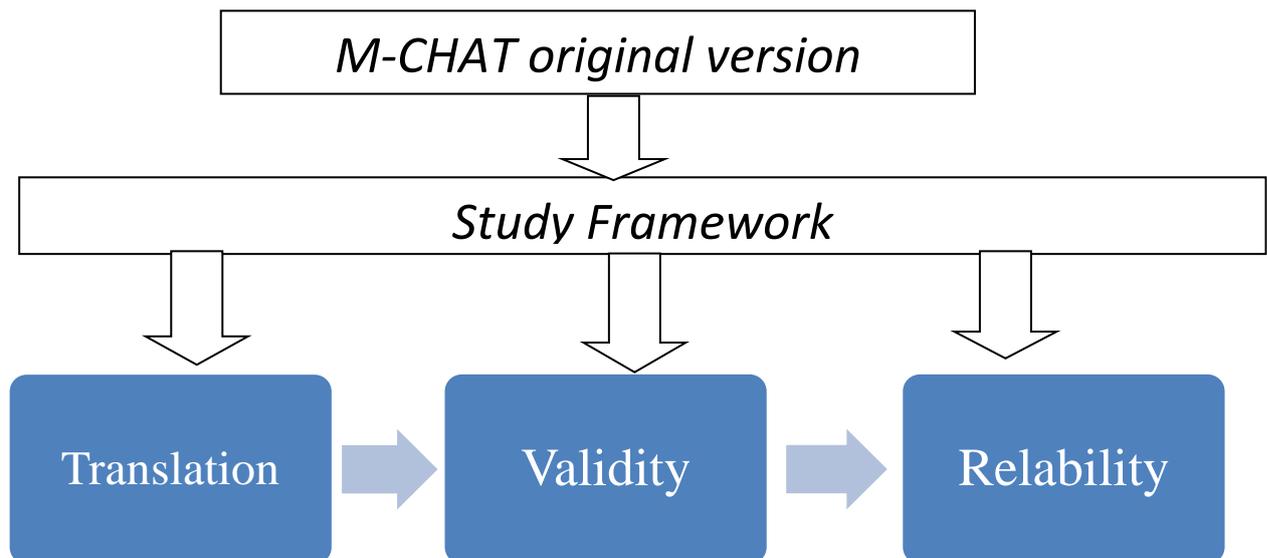


Figure 1. M-CHAT study framework

2.4. Translation and Adaptation of MCHAT-R to MCHAT-R in Tamil

MCHAT-R was translated into the Tamil language by one bilingual Speech Language Pathologist (SLP) who is proficient in Tamil as well as the English language. This version was given to three SLPs and one linguist. Then back-translated by a native English speaker who was bilingual, who is fluent in English as well as Tamil and the revised version was compared to the original M-CHAT-R. Finally, the Tamil M-CHAT-R was prepared. A slight adaptation of wordings was required, to match the cultural differences. [6]

2.5. Participants

This is a study to evaluate the validity of the Tamil version of MCHAT-R. The study was conducted in Tamil Nadu. 420 children who fulfilled the inclusion and exclusion criteria were included for the study. The data was collected from kindergarten schools and day care centres. The inclusion criteria were children from both genders between 12 months to 46 months of age. Children were excluded if they had known co-morbid conditions that had the potential to bias the M-CHAT scores, such as Hearing impairment, Intellectual disability, Down's syndrome, and ADHD. Participants' parents were required to sign an informed consent form.

2.6. Procedure

Tamil-Modified Checklist for Autism in Toddlers - Revised (T-MCHAT-R) was Prepared. This T-MCHAT-R was administered for 420 children. The children were divided based on their scores obtained in T-MCHAT-R. Based on the scores, the children were categorized into 2 groups, group-A and Group-B. Group-A consists of the children who passed the criteria, and Group-B included the children who fell into the ASD criterion. We administered ISAA for both of the groups to find the reliability of the T-MCHAT-R.

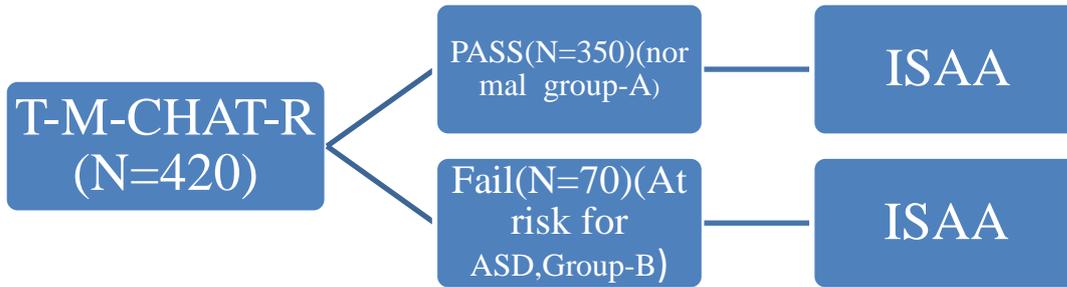


Figure 2. The categories in T-MCHAT-R

3. Findings and discussion

T-MCHAT-R was administered to 420 children. Among the 420, 350 children (Group-A) passed the criteria and 70 (Group-B) had failed the M-CHAT-R criteria.

Table 1

Mean, Standard Deviation and Cronbach's alpha values for T-MCHAT-R

	Mean	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	.08	.269	.559	.882
2	.02	.137	.260	.890
3	.25	.436	.295	.898
4	.04	.203	.374	.887
5	.05	.228	.541	.883
6	.07	.254	.631	.880
7	.08	.269	.683	.878
8	.09	.291	.662	.879
9	.09	.287	.732	.876
10	.05	.218	.448	.886
11	.04	.203	.548	.883
12	.05	.223	.519	.884
13	.01	.084	.215	.890
14	.04	.186	.511	.885
15	.06	.241	.634	.880
16	.11	.313	.798	.873
17	.13	.332	.327	.891
18	.07	.254	.606	.881
19	.16	.364	.575	.882
20	.05	.223	.387	.887

Table 2

Mean, standard deviation and *p* value for T-MCHAT-R and ISAA for both the groups.

	Group A Normal		Group B ASD		P value
	Mean	SD	Mean	SD	
T-MCHAT-R	0.39	.547	7.27	3.438	>0.001
ISAA	41.33	2.744	124.44	33.137	>0.001

The Group-B children passed the critical items, which indicates the risk for ASD. In Group-A for children who fall on low risk for ASD, ISAA was administered, which reveals no autism for Group-A children. Group B shows 55% of children in T-M-CHAT-R showed medium risk and ISAA scores reveal 47% of those children have autism and 41% of children in M-CHAT-R showed high risk and ISAA scores reveals 79% of those children got greater than 70. In T- MCHAT-R the children who failed and fall in the medium and high risk they got greater than 70 scores in ISAA.

To check the internal consistency of the items, Cronbach's Alpha scores were calculated for the whole 20 items in the questionnaire. The Cronbach's Alpha test found out that the T- MCHAT- R has an alpha score of 0.894 on a standardized item, which is categorized as excellent reliability. Each item of the questionnaire obtained an alpha value ≥ 0.6 , thereby confirming higher internal consistency. An item-total correlation was also carried out and results are depicted in Table 3.

Table 3

Cronbach's Alpha test scores.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.889	.894	20

For the reliability of T-MCHAT-R, statistical analysis was done by using SPSS version 20.0. Pearson's two-tailed correlation was performed to compare T-MCHAT-R scores with ISAA scores which reveal a positive correlation ($r=0.01$) and results are depicted in Table 4.

Table 4

Pearson two-tailed correlation

	GROUP A		GROUP B	
	M-CHAT-R	ISAA	M-CHAT-R	ISAA
Pearson Correlation	1	.191**	1	-.085
Sig. (2-tailed)		.000		.483
N	350	350	70	70



4. Conclusion

A The increased prevalence of autism spectrum disorder (ASD) and its detection during the first 3 years of life have substantial relevance for early intervention. Autism is found in every country (Diagnosed in one in every 115 people) (Matthew J et al at September-12, 2012) and region of the world and in families of all racial, ethnic, regions, and economic backgrounds, making up roughly 1 percent of the world population. Diagnosing this wide range of prevalence points to a need for earlier and more accurate screening for the symptoms of ASD. The M-CHAT-R is currently available in more than 20 languages of the world including many Asian languages. Tamil is a Dravidian language spoken by the people of Tamil Nadu in South India and there is a need for a screening tool in this language to detect the presence of ASD among the population of the state. This is the first study to validate the M-CHAT-R in the Tamil language and the process involved were translation; validity and reliability analysis. The Tamil version of M-CHAT-R has shown satisfactory reliability. Children who fall under the medium and high risk category when M-CHAT-R was administered on them, were also diagnosed to fall under the autism spectrum when assessed using the Indian Scale for Assessment of Autism (ISAA). Hence it is an effective screening tool to identify individuals who fall under the autism spectrum disorder in medium and high-risk children and should be regarded as the first official Tamil version of the M-CHAT-R to be applied in Tamil Nadu.

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