

Validation of the Sinhala version of the Autism Treatment Evaluation Checklist (ATEC)

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Abstract

Background

Autism Spectrum Disorder is a neuro developmental disorder which has a trend in its increasing prevalence globally. Measuring the outcome of intervention will have a great value for parents and clinicians. At present, there are no tools validated in the Sri Lankan setting to assess treatment outcomes in Autism Spectrum Disorder. Autism Treatment Evaluation Checklist (ATEC) is a self-administered questionnaire in Sinhala for parents/caregivers that is a feasible method of evaluating outcome in a busy clinic.

Aims

This study was conducted to translate and culturally adapt the ATEC to the Sinhala language and to establish the validity and reliability of the translation to the local setting.

Methods

Permission was sought from the developers of the ATEC questionnaire and ethical approval was obtained for the study. Study was conducted in two stages. In the first stage, ATEC was translated using the translation-back translation method. An expert panel produced a pre-final questionnaire which was pre-tested prior to formulating the final Sinhala version of ATEC. The second stage of the study was conducted to establish validity and reliability of Sinhala ATEC questionnaire in the Sri Lankan population. Content validity was assured in each step of the translation by the expert committee. Construct validity of the Sinhala ATEC questionnaire was assessed by comparing the sample of 119 parent/caregiver filled final version of the Sinhala ATEC score against the Consultant Child and Adolescent Psychiatrist assessment of the same children con-

ducted independently and recorded according to DSM-5 (level 1, 2 or 3). Test-retest reliability was determined by the same parent/caregiver filling the Sinhala ATEC one week later, in a sample of 14 children. Intra-rater reliability was taken by comparing 18 pairs of parents/caregivers Sinhala ATEC scores for the same child.

Results

Sinhala ATEC showed high validity and reliability. Its concurrent validity has a strong positive Pearson correlation of 0.856 with the Consultant Psychiatrist assessment. Correlation was higher in total score and as well as in subscale II- Sociability score of the Sinhala ATEC. Internal consistency was revealed by Cronbach's alpha 0.778. Cut off points to distinguish mild autism spectrum disorder from the rest taken as "48 or less" with sensitivity 82%, specificity 94% and area under the curve 0.968. Cut off to separate severe autism spectrum disorder from the rest were taken as "76 or more" with sensitivity 84%, specificity 90% and area under the curve 0.971. Reliability tests, intra class correlation was 0.98 and 0.96 for test-retest and intra rater reliability showed high reliability of Sinhala ATEC. For developing burnout in this study population.

Conclusions

Translated version of Sinhala ATEC is suitable for the use in the Sri Lankan population as it shows high validity and reliability. However, further studies are recommended in other areas of the country to assess its usefulness across diverse subcultures and clinical settings.

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Introduction

Autism is a neurodevelopmental disorder that arises from atypical brain development. It is characterized by abnormalities in social interactions, communication and by restricted repetitive behaviours and interests. The term ASD (Autism Spectrum Disorder) is used in the Diagnostic and Statistical Manual of Mental Disorders, 5th edition to describe mild to severe symptoms of the disorder (1). Symptoms become evident in early life, generally before 3 years of age. It is of interest due to its rising prevalence and impact on the quality of life of the child as well as the parent/care giver and family (2).

The Autism Treatment Evaluation Checklist (ATEC) was designed to assess treatment evaluation in 1990 by Bernard Rimland, Ph.D. and Stephen M. Edelson, Ph.D., of the Autism Research Institute, USA. It has been translated into approximately 25 languages and is used worldwide. The ATEC contains a total of 77 questions, and is classified into four subscales: Speech/Language/Communication (I); Sociability (II); Sensory/Cognitive Awareness (III); and Health/Physical/Behaviour (IV). ATEC is a caregiver-administered checklist designed to evaluate the efficacy of treatments and individual progress in ASD. Its scores range from 0 to 179, inversely indicating the severity of symptoms, and by comparing ATEC scores, one can assess the efficacy of treatment and symptom improvement (3).

In Sri Lanka, in an Autism spectrum disorder diagnosed child, current practice in a clinic setting is to re-evaluate these symptoms by a clinician and to arrive at a clinical judgement about symptom improvement and effectiveness of therapy. There are no validated tools currently used to assess the treatment outcome in clinic settings. This study was carried out to translate and validate the ATEC, a self-administered questionnaire, which can be used in clinic settings in Sinhala language.

Methods

The study was conducted in two phases. In the phase 1, translation and cultural adaptation of the ATEC questionnaire to Sinhala language were done and in phase 2 we established the validity and reliability of the translated ATEC-Sinhala questionnaire.

First phase – Translation and cultural adaptation of the ATEC questionnaire

Permission was obtained from the developers of the ATEC questionnaire through Dr Stephen M. Edelson, Ph.D., Executive Director of the Autism Research Institute, San Diego, California, United States of America. Ethical approval was sought from the Ethics Review Committee of the Lady Ridgeway Hospital for Children, Colombo 08.

Translation was conducted in 6 stages according to the guidelines for the cross-cultural adaptation by Beaton et al.; translation-back translation method (4). Forward translation, translation of the ATEC questionnaire from English to Sinhala was done by two bilingual translators – an informed person (a Senior Registrar in Child and Adolescent Psychiatry – T1) and a person who was naive regarding the subject of autism and fluent in English and Sinhala (T2). In Stage 02, synthesizing of T1 and T2 was conducted by resolving discrepancies in the translations. Subsequently in Stage 03, back translations (BT1 and BT2) were made by the two experts in English and Sinhala languages who were blind to the original questionnaire. During the stage 04, expert committee consisting of a community medicine specialist, a qualified person in the English language, all translators involved and a consultant child and adolescent psychiatrist reviewed all translations and back translations. 5th stage produced a pre-final version of the questionnaire by considering semantic, idiomatic, conceptual experiential equivalence by the expert committee. The pre-final questionnaire was pretested on 20 parents/caregivers of a child with ASD. The understanding of the questions and practical issues that arose while filling out the checklist by the parent or caregiver were assessed in the final 6th stage by the expert committee and the final version of the Sinhala-ATEC questionnaire was drafted accordingly.

Second phase – Establishing validity and reliability of Sinhala ATEC questionnaire

Content validity

The content of the translated ATEC questionnaire was reviewed by two Consultant Child and Adolescent Psychiatrists. Each item on the checklist was evaluated for its relevance to ASD and its comprehension in the Sri Lankan cultural setting.

Construct validity

The construct validity of the translated ATEC questionnaire was assessed by comparing the parent/caregiver filled final version of the Sinhala translated questionnaire against the assessment by the Consultant Child and Adolescent Psychiatrist. It was recorded according to Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) as level 1, 2 or 3 (1).

This phase of the study was carried out in the outpatient child and adolescent mental health clinics at the Lady Ridgeway Hospital for Children, Sri Lanka. Parents or caregivers were given a Sinhala ATEC to fill. A sample of 119 parents/caregivers of children with ASD aged 2 to 14 years, who were able to read and write in Sinhala were included. The average time spent on filling the Sinhala

ATEC was approximately 10 minutes. Parents fill the Sinhala ATEC before meeting the Child and Adolescent Psychiatrist and the diagnosis of autism spectrum disorder was revealed to the parents/caregivers after the assessment by the Psychiatrist only. Assessing Psychiatrist was blind to the ATEC score at the time of diagnosing the child.

Reliability – test-retest

Fourteen parents/caregivers included in the above sample filled the Sinhala ATEC again after one week, to determine test-retest reliability.

Reliability – intra rater reliability

ATEC questionnaire scores in Sinhala were evaluated in 18 pairs of parents/caregivers of the same child. These were filled individually and they were requested not to discuss it among themselves.

Data analysis

Data was analysed using IBM SPSS 25 version software. Concurrent validity of the Sinhala ATEC was analysed using Pearson correlation and internal consistency using Cronbach's alpha comparing it with DSM-5 severity level. Cut off for the Sinhala ATEC total score to distinguish mild from the rest of the children and severe from the rest of the children were determined comparing DSM-5 rating by Receiver Operating Curve analysis (ROC). Test-retest and intra rater reliability were analysed using intra class correlation coefficient (ICC).

Ethical approval and consent

As mentioned, approval to use original ATEC was sought from the Executive Director of the Autism Research Institute, San Diego, California, USA. Ethical approval was taken from the Ethical Review Committee of the Lady Ridgeway Hospital for Children, Colombo 08. Objectives of the study and process were explained to the parents/caregivers of the children and informed written consent was taken before the commencing of the study.

Results

Validity of Sinhala ATEC

A total of 119 participants were included for the construct validity, out of whom 73% were mothers and 26% were fathers of children with ASD. The children's age ranged from 2 years to 12 years and 83.19% were boys.

Sinhala ATEC concurrent validity was high with Pearson correlation of 0.856 with the assessment by Consultant Child and Adolescent Psychiatrist. Correlation was higher in total Sinhala ATEC score as well as the sub scale II – Sociability score in the Sinhala ATEC (Table 1).

Cut off for separation of those with mild (level 1 severity) features from the rest of the sample was chosen using Receiver Operating Curve Analysis. A cut off point of score 48 or less gave a sensitivity of 82%, specificity of 94% and area under the curve 0.968 (Figure 1). Similarly, cut off for the separation of severe ASD (level III) from the rest was taken as score 76 or more with sensitivity of 84%, specificity of 90% and area under the curve 0.971 (Figure 2).

Table 1.

Inter-Item Correlation Matrix of Pearson correlation						
ASD Severity according to DSM 5 – Child and Adolescent Psychiatrist assessment	Sinhala ATEC Total score	ASD Severity-DSM 5 Child and Adolescent Psychiatrist assessment	Sinhala ATEC subscales			
			I	II	III	IV
ASD Severity according to DSM 5 – Child and Adolescent Psychiatrist assessment	0.856	1.000	0.549	0.774	0.699	0.644

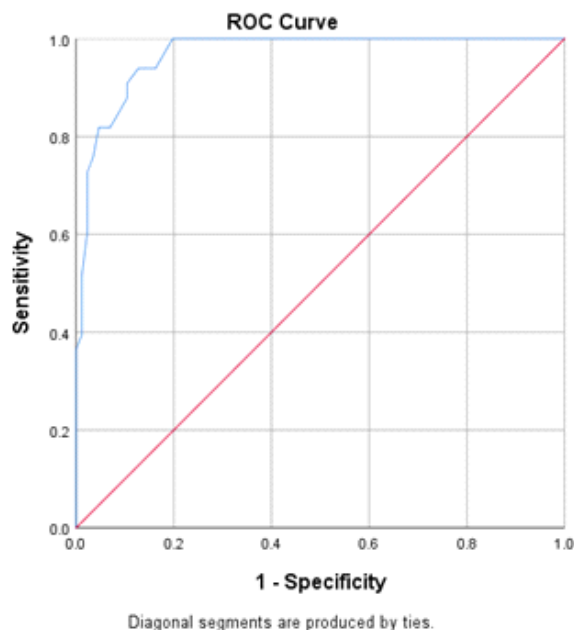


Figure 1. Receiver operator curve analysis for “Mild” cutoff of Sinhala ATEC.

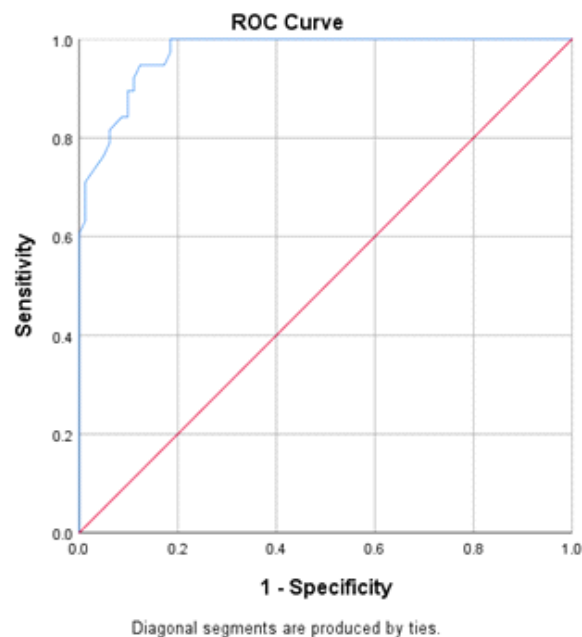


Figure 2. Receiver operator curve analysis for “Severe” cutoff of Sinhala ATEC.

Therefore, the cut offs for Sinhala ATEC were;

Mild Autism symptoms – 0 to 48

Moderate Autism symptoms – 49 to 75

Severe Autism symptoms – 76 to 179

Reliability of the Sinhala ATEC

Strong internal consistency was revealed by Cronbach’s alpha 0.778 for the total Sinhala ATEC score. Intra class correlation was 0.98 for test-retest and 0.96 for intra rater reliability. Both displayed highly consistent assessments.

Discussion

This is the first formal study to validate the ATEC to Sinhala. Translation was in accordance with the guidelines for cross-cultural adaptation by Beaton et al (4). The expert committee consisted of two Child and Adolescent Psychiatrists, an expert in Community Medicine, two experts in English and Sinhala languages and a bilingual person who was naive to original ATEC.

This was to ensure that the Sinhala ATEC was consistent with the original ATEC. Furthermore, each item was checked for understanding and cultural suitability to Sri Lankan setting.

In original ATEC section IV includes health/physical/behaviour questions other than core autism symptoms, but affect the child and immediate family’s quality of life, so overall score over the time gives each individual child’s improvement holistically and also it can use to identify moderate or serious problems within the child other than autism symptoms which need interventions or treatment.

As this is not a diagnostic test and will be used in Autism spectrum diagnosed children, we sought cutoffs to distinguish mild, moderate and severe symptom ranges as it would potentially aid therapists/clinicians to decide on effectiveness of interventions and decide on ongoing management. We used receiver operator curve ROC analysis to decide on the best cutoffs for the local setting and these cutoffs were different than those of the original scale (8) (Table 2). However these cut offs are closer to Thai-ATEC (Table 2).

Table 2. Comparing cutoff points in Original ATEC vs Sinhala ATEC vs Thai-ATEC

	Original ATEC cutoffs	Sinhala ATEC cutoffs	Thai ATEC
Mild	0-30	0-48	1-38
Moderate	31-103	49-75	39-68
Severe	104-179	76-179	69-179

Different countries had used different validation methods. For a brief comparison in the Thai-ATEC, scores of 160 samples compared to DSM-V criteria. In the Persian ATEC study, 134 samples had compared with ADI-R (Autism Diagnostic Interview-Revised) scores. In Brazil, Brazilian Portuguese-ATEC scores were compared with translated and validated Childhood Autism Rating Scale (CARS) scores of 42 samples filled by autistic children's parents.

However, in all studies results have shown good reliability and high internal consistency. In Sinhala ATEC Cronbach alpha was 0.778 compared to Persian study it was 0.86 to 0.93 and 0.86 in Persian study. Pearson correlation was 0.856 in Sinhala ATEC compared to 0.79 in Persian study.

When compared Intra-class correlation coefficient, in Thai-ATEC 0.97, in Persian ATEC 0.79-0.93, which is similar to Sinhala ATEC, which was 0.98.

Validity and reliability of the Sinhala ATEC was moderate to high. These results are similar to validation studies for Persian, Thai and Brazilian adaptations of ATEC (5,6,7).

Sinhala ATEC shows high reliability over test-retest over short duration, which is similar to the Thai version of ATEC (6). Sinhala ATEC also has high intra rater reliability when checked in pairs of parents/caregivers of the same child.

Limitations

The second phase of the study was conducted at a specialised children's hospital and this could potentially be a source of selection bias. However, as this is the final referral centre for the country, we can hypothesise that the study would have captured a representative cross-sectional sample.

Conclusions

Sinhala ATEC is a reliable and valid self-administered tool to assess symptom severity of ASD, which would be useful in clinical settings to assess the effectiveness of interventions.

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Statement of Contribution

CLA Elvitigala chief investigator – data collection, data entering and paper writing. Nadeeshani Walpita – data analysis, interpretation. D Dahanayake – supervision, drafting the manuscript and revising it critically for important intellectual content. GS Wijetunge – supervision, drafting the manuscript and revising it critically for important intellectual content.

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