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Help Autism Rating Scale (HARS) Chart: A Validated and Reliable Tool for Autism Screening in Bangladesh

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Abstract

Background: In Bangladesh, several tools like Autism Behavior Checklist (ABC), Modified Checklist for Autism in Toddlers (M-CHAT), Childhood Autism Rating Scale (CARS), and Autism Diagnostic Observation Schedule (ADOS) are widely used for either screening or diagnosis of autism. Recently, Help Autism Rating Scale (HARS), has been locally developed in 2012 but not widely used. **Objective:** To evaluate the diagnostic reliability and validity of Help Autism Rating Scale (HARS) for screening or diagnosis of autism. **Materials & Methods:** This analytical study was conducted on 300 children having autism spectrum disorders (ASDs) recruited from Department of Paediatric Neurology, Dhaka Medical College Hospital, Department of Paediatric Neuroscince, Dhaka Shishu (Children) Hospital, and Institute of Paediatric Neurodisorder and Autism (IPNA) of Bangabandhu Medical University (BMU), Dhaka, Bangladesh, in between July and December of 2022. Item level scores of HARS were collected and analyzed. For internal consistency, Cronbach's α coefficient was calculated. Convergent and divergent validity was calculated. The factor structure of HARS was demonstrated by principal components analysis. **Results:** The adequate face and content validity, HARS demonstrated good internal consistency (Cronbach's α=0.962) and item-total correlation 0.790. The convergent validity between the HARS and the Gesell Developmental Schedules (GDS), as calculated with Pearson's product-moment correlation coefficient was 0.741 (P=0.01). Divergent validity calculated by correlating HARS scores to ADD-H Comprehensive Teacher Rating Scale (ACTeRS) showed non-significant association (r= 0.18; P=0.4) demonstrating that HARS discriminates autism from other childhood psychiatric disorders like ADHD. A 5-factor structure explained 63.34% of variance. **Conclusion:** The HARS has strong psychometric properties and is now readily available for clinical and research work in Bangladesh.

Keywords: Help autism rating scale (HARS), validity, reliability, autism, Bangladesh

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Introduction

Paediatricians often use developmental screenings at 18 and 24 months to look for signs of autism. Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition characterized by persistent challenges in social communication and interaction, as well as restricted and repetitive patterns of behaviour, interests, or activities. It affects individuals across different cultures and populations worldwide.[1] However, an important challenge in early identification of such

developmental disability is having tools that respond to local differences, including cultural perceptions in meaning of disability.[2] Currently in Bangladesh, the

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Autism Behaviour Checklist (ABC), Modified Checklist for Autism in Toddlers (M-CHAT), Childhood Autism Rating Scale (CARS), and Autism Diagnostic Observation Schedule (ADOS) are widely used for either screening or diagnosis of autism. However, cross-culturally appropriate, and affordable tools with good psychometric properties remain limited,[1–3] and using tools developed in high-income countries (HIC) for low and middle-income countries (LMIC) settings like Bangladesh, may not always be appropriate.[2] Moreover, none of those Western rating scales measures have been validated for our population yet. Applying Western-based norms to other cultural contexts may also be problematic since there is a tendency to over-identify children as delayed.[4,5] In addition, many of these tools are copyrighted and require permissions and payment for translation into other languages,[2,5] and thus further restrictions have been posed on their use in LMIC. Help Autism Rating Scale (HARS) chart was developed in Bangladesh by Dr. Mesbah Uddin Ahmed (Professor of Paediatrics) and his team (at Gonoshasthaya Samaj Vittik Medical College & Hospital, Savar, Dhaka, Bangladesh) in 2012. It is a behaviour rating scale intended to help diagnose autistic spectrum disorders. HARS is a diagnostic assessment method that rates children ranging from normal to severe and yields a composite score ranging from non-autistic to mildly autistic, moderately autistic, severely autistic. The present study was conducted with the aim to establish the psychometric properties, namely the diagnostic validity and reliability of HARS as a tool to screen ASDs among children in Bangladesh.

Materials & Methods

This analytical study was conducted in the Department of Paediatric Neurology, Dhaka Medical College Hospital, Department of Paediatric Neuroscince, Dhaka Shishu (Children) Hospital, and Institute of Paediatric Neurodisorder and Autism (IPNA) of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, on 300 Autistic Spectrum Disorder children in between July and December of 2022. Children with a diagnosis of overactive disorder associated with mental retardation and stereotyped movements were excluded because of their uncertain nosological status. The diagnoses were made by the attending physician or counsellor at the outpatient department of the corresponding hospitals by direct observation of children in semi-structured play-based activities and parent interviews. The Help Autism Rating Scale (HARS) is a 14-item behavior-rating scale designed to detect and quantify symptoms of autism as well as to distinguish them from other developmental disabilities. Each item on the HARS is scored on a Likert scale, from 1 (no signs of autism) to 4 (severe symptoms). The maximum HARS score is 56, and the cut-off for a diagnosis of autism is 28. Children with scores of 28.5 to 35 are rated as mild to moderately autistic, and 35.5 to 56 as severely autistic. The scale and item level scores of HARS were collected from the patient's records as well as psychologists/occupational or speech therapist's notes, and they were indexes for validation in this study. Item level scores of HARS were collected and analyzed. The nominal area under the curve (AUC) was computed to evaluate the overall diagnostic efficiency of the test.[6] For internal consistency, Cronbach's α coefficient was calculated. Convergent and divergent validity was calculated. The convergent validity between the HARS and the Gesell Developmental Schedules (GDS)[7] was calculated with Pearson's product-moment correlation coefficient. The divergent validity was calculated by correlating HARS scores to ADD-H Comprehensive Teacher Rating Scale (ACTeRS);[8] this was done to demonstrate whether the HARS

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could discriminate autism from other childhood psychiatric disorders like ADHD. To investigate the construct validity, we explored the factor structure of the items in the HARS. We extracted those factors with an eigen value of 1 and thus, a 5-factor structure was derived.[9] The factor structure of HARS was demonstrated by principal components analysis.

Ethical clearance for this study was obtained from the Ethical Review Committee of Dhaka Medical College, Dhaka, Bangladesh. We took written informed consent from the parent(s) or caregiver(s) of the children. Assent was also sought from the children enrolled in the study, if applicable.

Results

The diagnostic accuracy of HARS is shown in Fig 1. Based on the Receiver Operating Curve (ROC) characteristics, the area under the curve (AUC) for the HARS was observed 0.80 (p=0.001), which suggests that the overall diagnostic accuracy of the HARS was high. Table 1 shows the validity of individual HARS item (ranging from 2.54 to 3.0). Table 2 shows reliability of individual HARS item (ranging from 35.24 to 35.82). The mean HARS score of 300 autistic children was 35.50. There was a higher representation in boys than in girls, which probably reflected the higher prevalence of autism in boys as against girls globally. When we examined the validity of the HARS, Cronbach's α coefficient for the whole scale was high (α=0.79), suggesting that the HARS in this population has satisfactory internal consistency and the item-total correlation ranged from 0.23 to 0.95. The convergent validity between the HARS and GDS, calculated with Pearson's product-moment correlation coefficient was 0.741 (p=0.01). Divergent validity calculated by correlating HARS scores to ACTeRS showed non-significant associations (r= –0.18; p=0.4) demonstrating that the HARS discriminates autism from other childhood psychiatric disorders like ADHD.

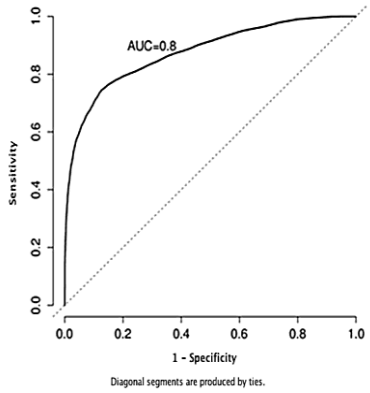

Fig. 1. The receiver operating curve (ROC) characteristics of the HARS.

Table 1: Validity of individual HARS item (Number of valid: 300, Missing: 0)

HARS items	Mean of validity
Behaviour	2.84
Eye Contact	3.00
Concentration Level	2.90
Language Skill	2.82

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HARS items	**Mean of validity**
Motor Activity	2.56
Expression for Communication	2.70
Adjustment	2.76
Playing Activity	2.42
Interest to toys and Object	2.70
Hyperactivity or inactivity	2.54
Sleep pattern	2.82
Movement	2.82
Situation understanding	2.64
Sensitivity	2.72

Table 2: Reliability of individual HARS item

HARS items	**Scale mean if item deleted**	**Scale variance if item deleted**	**Corrected item-total correlation**	**Cronbach's α if item deleted**
Behaviour	35.40	42.452	.827	.959
Eye Contact	35.24	41.711	.852	.958
Concentration Level	35.34	44.125	.663	.962
Language Skill	35.42	44.989	.656	.962
Motor Activity	35.68	43.756	.866	.958
Expression for Communication	35.54	41.415	.917	.956
Adjustment	35.48	43.346	.792	.959
Playing Activity	35.82	44.490	.827	.959
Interest to toys and Object	35.54	48.290	.237	.969
Hyperactivity or inactivity	35.70	44.030	.892	.958
Sleep pattern	35.42	40.325	.951	.956
Movement	35.42	40.325	.951	.956
Situation understanding	35.60	44.704	.817	.959
Sensitivity	35.52	43.708	.820	.959

Discussion

There has been a documented increase in the prevalence of autism worldwide.[10],[11] Children with developmental disabilities are among the most vulnerable members of a society. Without intervention, these difficulties severely restrict children, both academically and socially, from reaching their developmental potential. Developmental delay (DD) and neurodevelopmental disorders such as autism spectrum disorders (ASDs) encompass a range of difficulties that infants and young children may experience in the areas of cognitive, language, social, emotional, behavioural, and neuromotor development.[12],[13] The under-identification

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of children with disabilities is of concern, as early identification and initiation of treatment have been shown to improve child outcomes for autism.[14],[15]

In clinical practice, an autism diagnosis should be based on criteria listed in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) or the International Classification of Diseases 11th Revision (ICD-11); both of these manuals are the standard classification systems used by health care professionals to assess and diagnose autism.[1],[16] There are key similarities between the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, 5th edition, developed and updated by the American Psychiatric Association) and ICD-11 (the 11th revision of the International Classification of Diseases, developed and updated by the World Health Organization) diagnostic criteria.[16] Both reference the 'core characteristics' of autism, which must be present (and must have been present throughout a person's life) for an autism diagnosis to be made. In short, the core characteristics are: i) communication and social interaction differences, and ii) restricted and repetitive behaviours and interests (often referred to by autistic people as self-soothing or self-regulating behaviours, and focused and dedicated interests), including sensory differences.[16]

Diagnostic validity is the ability of the scale to correctly identify individuals as belonged (or not) to a group. Although all measures strive for accuracy, this consideration is especially important for screening process; if a child is misclassified during the screening procedure, it is also a misuse of valuable time for further intervention.[16],[17] To our knowledge, this is the first attempt to see the validity and reliability of HARS in a Bangladeshi population, as there is no published report on using HARS as a tool. Hence, the face and content validity of the HARS as a measure for autism has not yet established by consensus among clinicians of the country. However, while looking at examining with other autism screening tools, methodological differences are evident, such as population characteristics, factor-extraction and factor-retention procedure, language version, and statistical approach, are aspects that might explain the variability of findings across these factor analyses of the HARS, as we did for the first time ever. In community and clinical samples with different prevalence rates of autism, the changing prevalence might lead to different diagnostic scores. However, several studies have been done in different communities by using other tools like ESAT.[18],[20]

There are some limitations of this study. Firstly, for the recruitment of the study participants, we adopted convenience sampling method due to time and budget constraints. Secondly, data was collected partly based on the memory and self-reporting of the respondents, which may be liable to a recall bias. Finally, it was conducted in three tertiary-care hospitals in urban settings (Dhaka city); hence, the participants may not be representative of the children with autism in the general population of the country. Further studies on community samples from different regions of the country are warranted to establish our findings in overall paediatric population.

Conclusion

Our data suggest that the Help Autism Rating Scale (HARS) has strong psychometric properties in a high-risk sample of children for autism. It is now available and can be used for clinical and research work in Bangladesh. However, when asking about a child's medical history or when carrying out direct observations, specialists must use specific tools to make sure that the process is consistent. A diagnosis should not be based on any

autism-specific diagnostic instrument alone but should be informed by information from a range of sources, together with clinical judgement.

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Conflict of interest

The authors declare no financial or personal conflict of interest.

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