

Validity and Reliability of Social Validity and Maintenance Rating Scale in Parents of Children with Autism Spectrum Disorder in West Bengal, India

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Abstract: ***Aim:** The study aimed to access the validity and reliability of Social Validity and Maintenance Rating Scale in Indian setting among Bengali population in parents of children with autism spectrum disorder in various special schools in Kolkata, West Bengal, India. **Materials and Methods:** This study was conducted at the Guru Nanak Institute of Dental Sciences and Research and several special schools in Kolkata. The Original Social Validity and Maintenance Rating Scale (2016) questionnaire was used as the assessment tool. The questionnaire was translated from English to Bengali and English to Hindi, with multiple stages of validation involving bilingual teachers, language experts, and collaboration with social and psychiatric professionals. The final Bengali and Hindi versions were employed to gather data from 22 parents of children with autism spectrum disorder in various special schools in Kolkata. Two investigators independently used the scale, and statistical methods were applied to assess content validity, inter-observer reliability (ICC), and Cronbach's alpha. **Results:** The Content Validity Ratio (CVR) ranged from 0.8 to 1, indicating acceptable validity. Inter-observer reliability (ICC) was 0.6 to 0.9, and Cronbach's alpha was 0.767, signifying good validity and reliability for the Social Validity and Maintenance Rating Scale. **Conclusion:** Social Validity and Maintenance Rating Scale (2016), is very simple and valid scale which can be used with respect to the Bengali population as the finding support the psychometric properties of questionnaire.*

Keywords: autism spectrum disorder, Social Validity and Maintenance Rating Scale, Validity, Reliability

1. Introduction

Autism spectrum disorder (ASD) is a neurological and developmental disorder characterized by difficulty in communication with other people, Restricted interests and repetitive behaviours and altered sensory functions. Children diagnosed with ASD are at high risk of developing challenging behaviours such as aggression and self-injury in comparison to both typical children and children with other developmental disabilities (Baker et al., 2003; Chadwick, Kusel, & Cuddy, 2008). Autism spectrum disorders (ASDs) involve persistent loss of mutual social communication and social interaction and are associated with repetitive patterns of behaviour, interest, and activity. Verbal communication with such patients become difficult in dental clinic and performing various dental procedures also becomes difficult. Different behaviour management strategies which can be implemented on autistic children are non-verbal communications, visual supports, picture exchange communication system (PECS), by being affectionate and respectful. A recent study in dentistry has shown that mobile apps can be promising tool to motivate compliance with an oral hygiene routine and dental hygiene procedure in children with autism. [1, 2, 3]

Social Validity and Maintenance Rating Scale is used to quantify the behaviour before and after using various behaviour management strategies during dental checkup.

The purpose of this study is to measure reliability and content validity of Social Validity and Maintenance Rating scale in Indian setting among Bengali population by parents having children with autism spectrum disorder and coming for hospital treatment in Guru Nanak Institute of Dental

Sciences and Research, attending various special schools in Kolkata, West Bengal.

2. Methodology

I) Questionnaire: English version of Social Validity and Maintenance Rating Scale included 10 item scales. It is a Likert Scale questionnaire which value each question 1 (strongly agree), 2 (agree), 3 (disagree), 4 (strongly disagree). Original English version.

II) Study Setting, Study subjects and Study Duration

This validation study was conducted in Guru Nanak Institute of Dental Sciences and Research, Panihati, Autism Society West Bengal, Mukundpur. Data was collected from either parent of children with ASD coming at Guru Nanak Institute of Dental Sciences and Research, Panihati for their child's treatment, and also of children from Autism Society West Bengal in the month of February and March 2022. All the parents of children with ASD coming in these time were included in this study. Social Validity and Maintenance Rating Scale questionnaire (English version) was given to 22 parents, Bengali version was given to another 22 Parents by investigator one to be filled by parents and after 15 days investigator two was given same questionnaire to same parents to be filled again.

III) Procedure

Assessment of validity

Face and Content Validity were tested by administering the questionnaire to the domain experts (10 experts). The experts were provided with a 4-point content validity assessment tool to assess the relevancy of the tool. At the same time, the original English version of the questionnaire

was sent to a bilingual teacher (English-Bengali) for translation into Bengali (version1, V1). After that, V1 was given to a Bengali language teacher for any semantic correction and made idiosyncratic variants (version 2, V2). V2 was compared to the final version of Bengali with the help of a researcher, a social worker, and other mental health care specialists. The scale was then back translated into the original (English) language. In this sense, the intention was to reduce the ambiguity and misinterpretation, to ensure a good adaptation to the Bengali population. Similar thing was done for the Hindi questionnaire.

Assessment of reliability

Inter – observer reliability was tested to measure reliability. Data was collected from either parent of children with ASD coming at Guru Nanak Institute of Dental Sciences and Research, Panihati for the treatment of their child in the month of February and March 2022, and also parents of children from Autism Society West Bengal. All the parents of children with ASD who came during this period were included in this study. English, Bengali & Hindi version of the questionnaire was given to 66 parents (22 in each group) by a trained investigator to be filled by parents. Same questionnaire was administered by a second investigator to the same set of parents within 2 weeks of administering the questionnaire by the first investigator.

Internal Consistency

It is assessed by computing Cronbach's alpha for each item, sub scale and for entire study instrument after the data collection from all the study subjects. Cronbach's alpha was computed for each scale to assess internal consistency with 0.7 considered minimally acceptable.

Statistical Analysis

Data were tabulated and analyzed using the IBM SPSS version 26 and the statistical methods used were Content Validity Ratio, ICC and Cronbach's alpha. Content Validity Ratio (CVR) measures the essentiality of an item [4]. The formula of content validity ratio is $CVR = (N_e - N/2) / (N/2)$, in which the N_e is the number of panellists indicating "essential" and N is the total number of panellists. The

numeric value of content validity ratio is determined by Lawshe content validity ratio Table. For validity ratio the number of experts, who rated 3 and 4 for any item, are considered as N_e , where 0.8 ratio are considered as acceptable.

Cronbach's alpha intensity was used to assess the internal consistency of the instrument. It is expressed as a number between 0 and 1 (Fig. 1). Internal consistency describes the extent to which all the items in a test measure a similar concept or construct [5]. If alpha is too high it may suggest that some items are expendable as they are testing the same question but in a different guise. A maximum alpha value of 0.90 has been recommended [6]. The Interclass correlation coefficient (ICC) was used to assess Inter – observer reliability. The ICC is a value measures between 0 and 1, where values below 0.5 indicate poor reliability, between 0.5 and 0.75 moderate reliability, between 0.75 and 0.9 good reliability, and any value above 0.9 indicates excellent reliability. Spearman's rho was also calculated to measure overall correlation of items during the two investigators. These results were used to evaluate the psychometric properties of the questionnaire and to confirm that each item directly measured what it intended.

3. Results

English Version

The Cronbach's Alpha value of 0.767 depicts that the internal consistency of the questionnaire is **Good**. (where, ≥ 0.9 , Excellent; $0.9 > 0.8$, Good; $0.8 > 0.7$, Acceptable; $0.7 > 0.6$, Questionable) (As shown in Table 1.)

Table 1: Internal Consistency -

Sl No.	Dimension	Chronbach's Alpha
1.	Overall	0.767

Construct Validity -

The obtained correlation values of the Questions numbered 1,2,3,5,6,9,10 are > critical value and are highly significant, hence these are valid questions. (As presented in Table 2)

Table 2: Construct Validity of the questionnaire (English version) -

Sl no.	Questions	Item to total correlation	Cronbach's Alpha if item removed
1	I enjoyed implementing the behaviour management strategy with my child.	0.601**	0.742
2	I think I will use the behaviour management strategy with my child in the future.	0.813**	0.701
3	The behaviour management strategy was easy to use with my child.	0.797**	0.705
4	The behaviour management strategy was a good fit for my child.	0.351	0.777
5	Using the behaviour management strategy did not interfere with my home routines.	0.652**	0.735
6	Using the behaviour management strategy did not take up too much of my time.	0.644**	0.736
7	The behaviour management strategy improved my child's behaviour at home.	0.373	0.784
8	The addition of the behaviour management strategy improved the atmosphere in my home.	0.245	0.791
9	I use the behaviour management strategy as trained.	0.434*	0.764
10	Based on training from the study, I use some principles of the behaviour management strategy to help manage my child's behaviour.	0.733**	0.719

** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level

Inter – observer reliability

All the item of Questionnaire has ICC value range from 0.6 to 0.9 in two different group. ICCs were classified as follows: 'excellent' ($\geq .81$), 'good' (.61 - .80), 'moderate' (.41 - .60), 'poor' ($\leq .40$) [7]. Item no 1 and 4 scored 0.730

and 0.625 which indicate moderate reliability, Here the excellent reliability is seen in Question 7. Good reliability is seen in Questions 2, 3, 5, 6, 8, 9, 10. However, overall ICC value indicates that the questionnaire is reliable. (As shown in Table 3)

Table 3: Inter-observer Reliability of the questionnaire (English version) -

Sl. No	Questions	ICC	95% Confidence Interval	
			Lower	Upper
1	I enjoyed implementing the behaviour management strategy with my child.	0.730	0.454*	0.878*
2	I think I will use the behaviour management strategy with my child in the future.	0.855	0.683*	0.937*
3	The behaviour management strategy was easy to use with my child.	0.8	0.578*	0.912*
4	The behaviour management strategy was a good fit for my child.	0.625	0.285*	0.825*
5	Using the behaviour management strategy did not interfere with my home routines.	0.896	0.766*	0.955*
6	Using the behaviour management strategy did not take up too much of my time.	0.729	0.453*	0.878*
7	The behaviour management strategy improved my child's behaviour at home.	0.947	0.878*	0.978*
8	The addition of the behaviour management strategy improved the atmosphere in my home.	0.881	0.735*	0.949*
9	I use the behaviour management strategy as trained.	0.877	0.728*	0.947*
10	Based on training from the study, I use some principles of the behaviour management strategy to help manage my child's behaviour.	0.826	0.626*	0.924*

*statistically significant.

Content validity

All the item of questionnaire shows CVR from 0.8 to 1. Item 1,2,3,4,7,8 have CVR value of 0.8 and Item 5,6,9,10 have CVR value of 1. For a number of 10 experts, CVR value of

0.8 is considered acceptable . Hence, this questionnaire elicited overall acceptable content validity. (As presented in Table 4 and Figure 1)

Table 4: Content validity ratio of the questions (English version) -

Sl. No	Questions	CVR	Decision
1	I enjoyed implementing the behaviour management strategy with my child.	0.8	Acceptable
2	I think I will use the behaviour management strategy with my child in the future.	0.8	Acceptable
3	The behaviour management strategy was easy to use with my child.	0.8	Acceptable
4	The behaviour management strategy was a good fit for my child.	0.8	Acceptable
5	Using the behaviour management strategy did not interfere with my home routines.	1	Acceptable
6	Using the behaviour management strategy did not take up too much of my time.	1	Acceptable
7	The behaviour management strategy improved my child's behaviour at home.	0.8	Acceptable
8	The addition of the behaviour management strategy improved the atmosphere in my home.	0.8	Acceptable
9	I use the behaviour management strategy as trained.	1	Acceptable
10	Based on training from the study, I use some principles of the behaviour management strategy to help manage my child's behaviour .	1	Acceptable

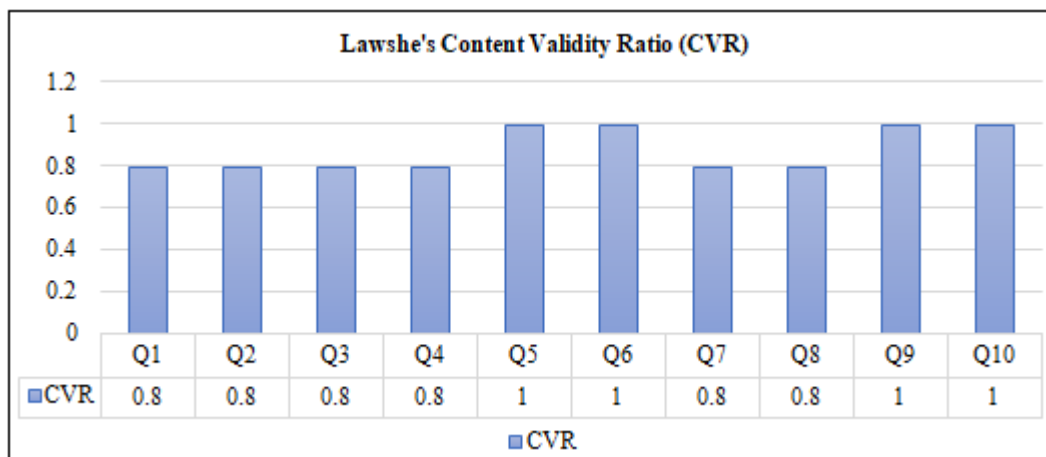


Figure 1: Lawshe's Content Validity Ratio (CVR)

Patient's Name:

Age:

Sex:

Parent's Name:

Parent's Age:

Parent's Sex:

Parent's Educational Qualification:

Date:

Location:

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
I enjoyed implementing the behavior management strategy with my child					
I think I will use the behavior management strategy with my child in the future					
The behavior management strategy was easy to use with my child					
The behavior management strategy was a good fit for my child					
Using the behavior management strategy did not interfere with my home routines					
Using the behavior management strategy did not take up too much of my time					
The behavior management strategy improved my child's behavior at home					
The addition of the behavior management strategy improved the atmosphere in my home					
I use the behavior management strategy as trained					

Bengali Version

Content validity

All the item of questionnaire shows CVR from 0.8 to 1. Item 1,2,3,6,7,8,9 have CVR value of 0.8 and Item 4,5,10 have CVR value of 1. For a number of 10 experts, CVR value of 0.8 is considered acceptable . Hence, this questionnaire elicited overall acceptable content validity.

Sl. No	Questions	CVR	Decision
1	I enjoyed implementing the behaviour management strategy with my child.	0.8	Acceptable
2	I think I will use the behaviour management strategy with my child in the future.	0.8	Acceptable
3	The behaviour management strategy was easy to use with my child.	0.8	Acceptable
4	The behaviour management strategy was a good fit for my child.	1	Acceptable
5	Using the behaviour management strategy did not interfere with my home routines.	1	Acceptable
6	Using the behaviour management strategy did not take up too much of my time.	0.8	Acceptable
7	The behaviour management strategy improved my child's behaviour at home.	0.8	Acceptable
8	The addition of the behaviour management strategy improved the atmosphere in my home.	0.8	Acceptable
9	I use the behaviour management strategy as trained.	0.8	Acceptable
10	Based on training from the study, I use some principles of the behaviour management strategy to help manage my child's behaviour .	1	Acceptable

Inter – observer reliability

All the item of Questionnaire has ICC value range from 0.689 to 0.955 in two different group. ICCs were classified as follows: 'excellent' ($\geq .81$), 'good' (.61 - .80), 'moderate' (.41 - .60), 'poor' ($\leq .40$) [7]. Item no 1 and 4 indicate moderate reliability , Here the excellent reliability is seen in Question 7. Good reliability is seen in Questions 2, 3, 5, 6, 8, 9, 10 .However, overall ICC value indicates that the questionnaire is reliable.

The Cronbach's Alpha value of 0.767 depicts that the internal consistency of the questionnaire is **Good**. (where, ≥ 0.9 , Excellent; $0.9 \geq 0.8$, Good; $0.8 \geq 0.7$, Acceptable; $0.7 \geq 0.6$, Questionable)

Internal consistency -

Sl No.	Dimension	Chronbach's Alpha
1.	Overall	0.767

Construct Validity –

Sl no.	Questions	Item to total correlation	Cronbach's Alpha if item removed
1	I enjoyed implementing the behaviour management strategy with my child.	0.605**	0.742
2	I think I will use the behaviour management strategy with my child in the future.	0.813**	0.701
3	The behaviour management strategy was easy to use with my child.	0.797**	0.705
4	The behaviour management strategy was a good fit for my child.	0.351	0.777
5	Using the behaviour management strategy did not interfere with my home routines.	0.652**	0.735
6	Using the behaviour management strategy did not take up too much of my time.	0.667**	0.756
7	The behaviour management strategy improved my child's behaviour at home.	0.373	0.784
8	The addition of the behaviour management strategy improved the atmosphere in my home.	0.245	0.791
9	I use the behaviour management strategy as trained.	0.464*	0.764
10	Based on training from the study, I use some principles of the behaviour management strategy to help manage my child's behaviour .	0.755**	0.719

** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level

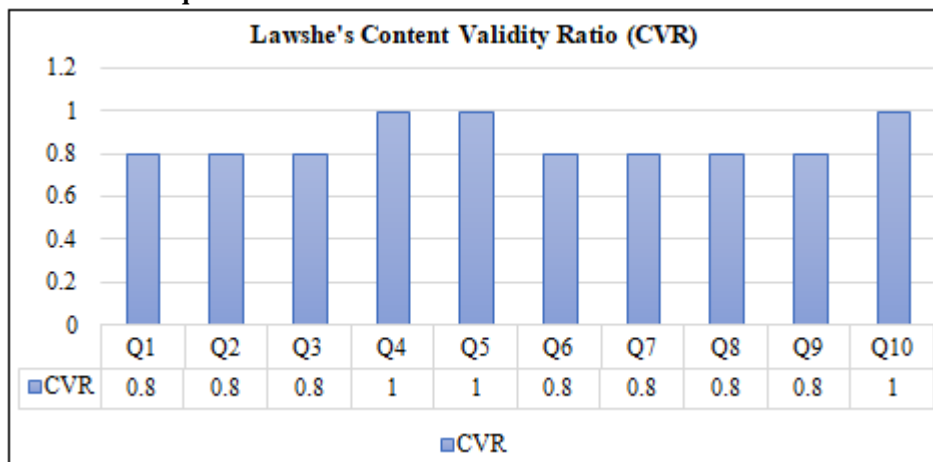
N= Sample Size

Degree of Freedom = N-2

Obtained value of correlation > critical value in the table.

Here the critical value will be = 22-2 = 20, for which critical value (0.05) is = 0.422

Hence the obtained correlation values of the Questions numbered 1,2,3,5,6,9,10 are > critical value and are highly significant, hence these are valid questions.



Inter-observer Reliability-

Sl. No	Questions	ICC	95% Confidence Interval	
			Lower	Upper
1	I enjoyed implementing the behaviour management strategy with my child.	0.707	0.454*	0.878*
2	I think I will use the behaviour management strategy with my child in the future.	0.865	0.683*	0.937*
3	The behaviour management strategy was easy to use with my child.	0.808	0.578*	0.912*
4	The behaviour management strategy was a good fit for my child.	0.689	0.285*	0.825*
5	Using the behaviour management strategy did not interfere with my home routines.	0.896	0.766*	0.955*
6	Using the behaviour management strategy did not take up too much of my time.	0.711	0.453*	0.878*
7	The behaviour management strategy improved my child's behaviour at home.	0.955	0.878*	0.978*
8	The addition of the behaviour management strategy improved the atmosphere in my home.	0.881	0.735*	0.949*
9	I use the behaviour management strategy as trained.	0.88	0.728*	0.947*
10	Based on training from the study, I use some principles of the behaviour management strategy to help manage my child's behaviour .	0.806	0.626*	0.924*

রোগীর নাম:

রোগীর বয়স:

রোগীর লিঙ্গ:

অভিভাবকের নাম:

অভিভাবকের বয়স:

অভিভাবকের লিঙ্গ:

অভিভাবকের শিক্ষাগত যোগ্যতা:

তারিখ:

অবস্থান:

	দৃঢ়ভাবে একমত নয়	একমত নয়	নিরপেক্ষ	একমত	দৃঢ়ভাবে একমত
আমি আমার সন্তানের সাথে আচরণ পরিচালনার কৌশল বাস্তবায়ন, উপভোগ করেছি					
আমি মনে করি আমি ভবিষ্যতে আমার সন্তানের সাথে আচরণ পরিচালনার কৌশলটি ব্যবহার করব					
আচরণ পরিচালনার কৌশলটি আমার সন্তানের সাথে ব্যবহার করা সহজ ছিল					
আচরণ ব্যবস্থাপনা কৌশল আমার সন্তানের জন্য একটি ভাল মাগসই ছিল					
আচরণ পরিচালনার কৌশল ব্যবহার করা , আমার বাড়ির রুটিনে হস্তক্ষেপ করেনি					
আচরণ পরিচালনার কৌশল ব্যবহার করা , আমার খুব বেশি সময় নেয়নি					
আচরণ ব্যবস্থাপনা কৌশল বাড়িতে যোগ করে,আমার সন্তানের আচরণ উন্নত					
আচরণ পরিচালনার কৌশল যোগ করা, আমার বাড়ির পরিবেশকে উন্নত করেছে					
আমি তো প্রশিক্ষিত হিসাবে আচরণ পরিচালনার কৌশল ব্যবহার করি					
অধ্যয়ন থেকে প্রশিক্ষণের উপর ভিত্তি করে, আমি আমার সন্তানের আচরণ পরিচালনা করতে সহায়তা করার জন্য আচরণ পরিচালনার কৌশলের কিছু নীতি ব্যবহার করি					

সাক্ষাৎকারগ্রহীতার স্বাক্ষর:

Hindi Version

Results were exactly same as that of Bengali Version.

লিঙ্গ-

অভিभावक का नाम-

अभिभावक की उम्र-

अभिभावक का लिंग-

तारीख-

स्थान-

	दृढता से असहमत	असहमत	निष्पक्ष	सहमत	दृढता से सहमत
मैंने अपने बच्चे के साथ व्यवहार प्रबंधन रणनीति को लागू करने का आनंद लिया.					
मुझे लगता है कि मैं भविष्य में अपने बच्चे के साथ व्यवहार प्रबंधन रणनीति का उपयोग करूंगा					
व्यवहार प्रबंधन रणनीति मेरे बच्चे के साथ उपयोग करना आसान था					
व्यवहार प्रबंधन रणनीति मेरे बच्चे के लिए एक अच्छा फिट था					
व्यवहार प्रबंधन रणनीति का उपयोग करने से मेरे घर की दिनचर्या में हस्तक्षेप नहीं हुआ					
व्यवहार प्रबंधन रणनीति का उपयोग करने से मेरा बहुत अधिक समय नहीं लगा					
व्यवहार प्रबंधन रणनीति ने घर पर मेरे बच्चे के व्यवहार में सुधार किया					
व्यवहार प्रबंधन रणनीति ने मेरे घर में माहौल में सुधार किया					
मैं प्रशिक्षित के रूप में व्यवहार प्रबंधन रणनीति का उपयोग करता हूँ					
अध्ययन से प्रशिक्षण के आधार पर, मैं अपने बच्चे के व्यवहार को प्रबंधित करने में मदद करने के लिए					

4. Discussion

“Validity and reliability are two fundamental components in the estimation of a measurement instrument. Instruments can be divided into conventional knowledge, skill or attitude tests, clinical simulations, or survey questionnaires. Instruments measure concepts, psychomotor skills, or affective values” [4]. “Face validity was assessed using qualitative techniques. However, we assessed content validity quantitatively using content validity ratio. Since, content validity is a prerequisite for other validity tests, it should gain the highest priority during instrument development. Validity is not the property of an instrument, but the property of the values obtained by an instrument used for a specific purpose on a special group of respondents. Therefore, validity evidence should be obtained on each study for which an instrument is used” [5, 6, 8].

Reliability is tasked with the ability of an instrument to measure consistently [4]. It should be observed that the reliability of an instrument is intimately associated with its validity. If an instrument is not reliable, then it cannot be said to be valid. However, the reliability of an instrument does not depend on its validity” [6, 9, 10]. To ensure reliability, Cronbach’s alpha integration and ICC were calculated for the questionnaire. In general, the results were acceptable.

The study proved that proposed scale has acceptable psychometric properties of reliability and validity that would validate its application in parents having children with ASD. These results could be explained by the fact that Social Validity and Maintenance Rating Scale is a one-factor solution. “Our results suggest that they remained acceptable after this process. The internal consistency showed acceptable values (0.778 Cronbach’s alpha), framed in the category of “good” (values > 0.7), as reported” by Steiner et al [6].

5. Conclusion

Autism Spectrum disorder is a neurodevelopmental disorder affecting the communication skills and behaviour of children. Thus, various behaviour modification techniques are required.

This study recommended that Social Validity and Maintenance Rating Scale is a valid and reliable simple, non-invasive tool for evaluation of change in behaviour of children with ASD after introduction of various behaviour management techniques.

6. Limitation

This study has several limitations. It was a small population study. We need to further study with multi-centric and in big population.

Consent

Participant’s written consent has been gathered and retained by the author(s) in accordance with International Standard or University Standards.

Ethical Approval

Requisite ethical clearance & permission to undertake the study was obtained from Guru Nanak Institutional ethical committee of Guru Nanak Institute of Dental Sciences and Research, Kolkata. Ethical approval no is GNIDSR/IEC/21-24/20.

Acknowledgement

We acknowledge and thank to all the staff and authorities of Autism Society, West Bengal, Kolkata.

Competing Interests

Authors have declared that no competing interests exist.

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