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Reliability and Validity of Urdu Version of Autism Spectrum Quotient (AQ) for Children and Adolescent

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ABSTRACT

Aim of the Study: In Pakistan, there is a dearth of contextualized tools for measuring the traits of children having Autism Spectrum Disorder (ASD). The current study was conducted to determine the validity and reliability of the Urdu version of the Autism Spectrum Quotient (UAQ) for children with ASD.

Methodology: The study was conducted in two stages. In the first stage, forward and backward Urdu translation by the researcher with the help of six bilingual (English and Urdu) experts, was carried out. Content and face validity were carried out by experts in this stage. Suggestions and recommendations given by the experts were administered for the pilot testing on 30 children. In the second stage reliability, test-retest reliability, inter-rater reliability, predictive validity and Content Validity Index (CVI) were analyzed.

Findings: Findings showed that coefficient of Alpha reliability for Urdu version of Autism Spectrum Quotient (UAQ) was 0.952, test-retest was found as 0.738, inter-rater reliability was found to as 0.828, and Scale wise Content Validity Index (S-CVI) was found as 0.93. Results showed that UAQ was proved to be appropriate, acceptable, reliable and valid tool to use in Pakistan.

Conclusion: The scale was found to be linguistically and culturally suitable for the Pakistani context. Findings of this study could be beneficial to psychologists, teachers, parents, and researchers who intend to investigate symptoms of autism for children and adults of average intelligence.

Keywords: Autism Spectrum Quotient (AQ), Children with ASD, Urdu Version of AQ.

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Introduction

Autism spectrum disorder (ASD) is a neurodevelopment disorder that affects communication, social interaction, repetitive behaviors, and interests during the first three years of life (American Psychiatric Association, 2013). Children with ASD range from High Functioning Autism to Low Functioning Autism. The term High Functioning Autism (HFA) refers to people on the autism spectrum who, in comparison to other autistic people, show verbal and cognitive ability. Low Functioning Autism (LFA) refers to those who have significant impairment in communication, social interaction, behavior as well as

intellectual disabilities. There are different tools for screening children with ASD i.e. Autism Behavior Checklist (ABC); Childhood Autism Rating Scale (CARS); Gilliam Autism Rating Scale (GARS), and the Autism Diagnostic Observation Schedule (ADOS) Lord et.al, (2012). The Mullen Scale of Early Learning (MSEL) measures the cognitive functioning of young children with ASD from birth to 68 months of age. The Bayley Scale of Infant and Toddler Development (Bayley-III) measures the cognitive and adaptive skills of young children with ASD from birth to 42 months of age. The Leiter International Performance Scale (Leiter-3) is a tool to measures the nonverbal assessment of cognitive abilities for the children with ASD. Autism Spectrum Screening Questionnaire (ASSQ) developed by Ehlers & Gilberg (1999) and translated in Urdu by Saeed et. al. (2022) is a linguistically appropriate tool for screening out children for Autism in Pakistan.

It is crucial for social and psychological integration to explore the individual having traits of ASD for the children with age ranges 4-15 years. The Autism Spectrum Quotient (AQ) developed by Baron Cohen (2001) was found to be a reliable tool for finding out the children having symptoms with ASD. AQ gives ways to get the answer in different subsections i.e. social skills, attention switching, attention to detail, communication, and imagination. It is a teacher/parent-reported tool. It takes 15-20 minutes to fill out the questionnaire based on four four-point Likert scale addressing different subsections. Total score of the tool ranges from 0-150. Individual score above 76 are considered as severe autistic traits.

It is a standardized tool and has been translated into different languages i.e. Malaysia, Spanish, Italian, Chinese, Dutch, French, Persian, and Russian, etc. Pakistani culture and language is different from other countries. Urdu is our national language and a few of English words may not have appropriate meanings in Pakistani context. Same like other countries linguistically and culturally validation of AQ, it required to be translated into Urdu language and validated according to Pakistani context and culture. It is a detailed test required to confirm the diagnosis of autism in children and adolescence. Autism Spectrum Screening Questionnaire (ASSQ) translated in Urdu by Saeed et. al. (2022) can be used for screening purposes only. What to do afterwards? We need a tool that can diagnose and help in proper placement of children with ASD. AQ gives us information about functioning level of children with Autism in Pakistan.

Statement of the Problem

Psychological and professional assessment for children with special needs is very costly in our system. There is no instrument which a teacher or parent can use to assess the child having features of Autism. Teachers and parents are confused after screening their children. They are unaware of proper placement and intervention avenues available for their children. Sometimes parents send their children to special schools despite having abilities like a normal child. Due to the shortage of linguistically and culturally validated methods for measuring autistic symptoms in children, a cost effective, reliable and valid instrument according to the Pakistani context is immediately needed.

Study Objectives

The objectives of the study were to:

- Translate Autism Spectrum Quotient (AQ) in Urdu language.
- Establish validity and reliability of Urdu version of Autism Spectrum Quotient (UAQ).

Hypotheses

H_O: There is no significant difference in the AQ scores of children with ASD with respect to gender.

H_1: There is significant difference in the AQ scores of children with ASD with respect to gender.

Methodology

Research Design

It was a validated study. It investigates the reliability and validity of the Urdu version of Autism Spectrum Quotient (AQ). The study was conducted in two stages.

Stage I: In the first stage translation and development of Urdu version was done.

Stage II: In the second stage reliability and validity of the Urdu version of Autism Spectrum Quotient (UAQ) was established.

Population

The population consisted of two stages. Population-1 was selected for translation and population-2 was selected for the validation and reliability of Urdu version of Autism Spectrum Quotient (UAQ).

1. All professionals (Special educators/lecturers) belonging to general and special education institutes of Punjab and Islamabad fulfill the following:
    - Having at least a Masters degree in Urdu/English
    - More than three years of teaching experience working with ASD children in a recognized institute.
2. Children studying in a general education school and children with ASD (age group 5-15 years) of the special education institutes of Rawalpindi and Islamabad were the population of the second phase of the study.

Figure given below shows the number of children with ASD in special education institutes in Rawalpindi and Islamabad. It also depicts the number of children from selected normal institutes. It can be examined that there were six institutes in Islamabad and seven institutes in Rawalpindi. Two institutes from general education were also taken.

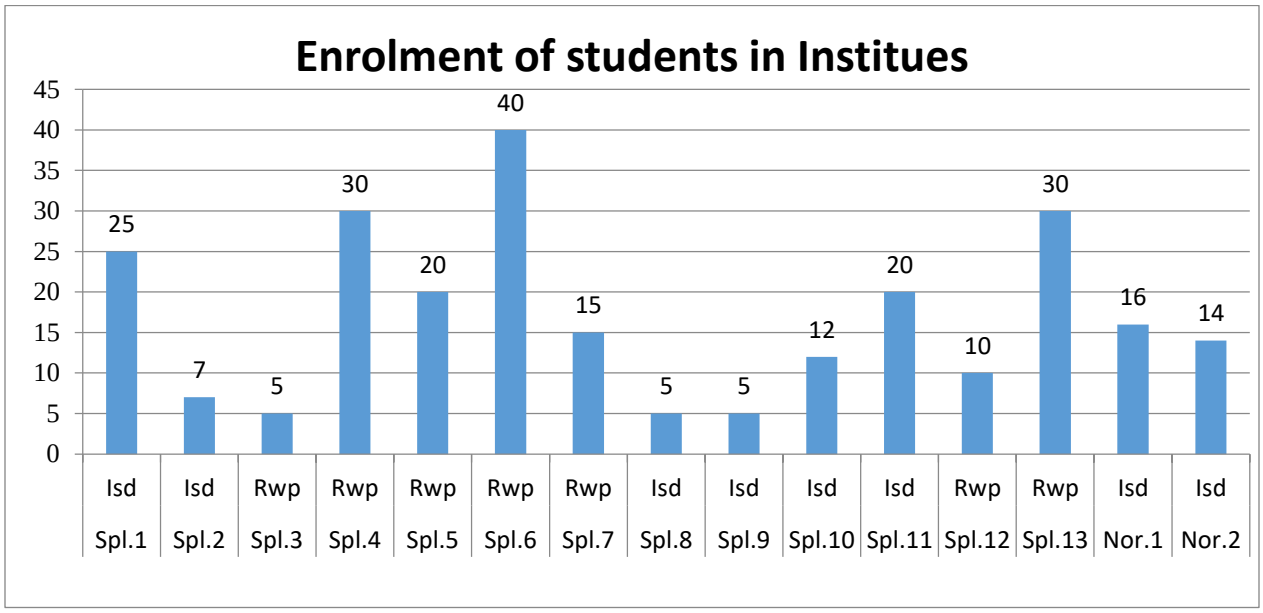

Figure 1: Number of children in Special education & selected normal Institutes in Rawalpindi and Islamabad.

Sample

The sampling procedure consisted of two stages.

Stage-I: Convenient sampling was done in stage-I with three lecturers in English and three in Urdu having master's, MS, or M.Phil in the related subject.

Stage-II: Convenient sampling was done in stage II, all children with ASD having age range (5-15 years) from special education institutions and thirty children from a general education institute of the Punjab and Islamabad. A total of responses (68%) from twenty-two institutes of children with ASD and one institute for normal children were obtained which gave the data about 224 children.

Ethical Consideration

Children with ASD in special education institutes and in a general education school were asked to participate in the study willingly. Surety of confidentiality was given to parents, teachers and the administrations of the institutes. Data were only used for research purposes. Data were not shared with any other person, institute, or department.

Procedure

The study was completed in two phases. Phase I included translation of Autism Spectrum Quotient (AQ) and Phase II consisted of validation of the Urdu version of Autism Spectrum Quotient (AQ).

Phase-I: Translation of the Autism Spectrum Quotient (AQ)

In the first stage, the researcher with the help of six bilingual experts conducted a forward translation of Autism Spectrum Quotient (AQ) into Urdu. Three bilingual experts were familiar and skilled in reading & writing both in Urdu and English languages. They had five years of experience working with ASD children and a master's degree in special education as well. The researcher asked these experts to do a forward translation of Autism Spectrum Quotient (AQ)into the targeted language (Urdu) in such a way that the meanings of the items remain the same and can be comprehended.

In the second stage, backward translation from Urdu to English language was conducted by three bilingual experts (other than those bilingual experts, who had conducted forward translation), and had not seen the original scale.

Urdu-version of Autism Spectrum Quotient (UAQ) was then, evaluated by the committee. The committee included three members: the researcher and two bilingual experts from the Higher Education Institute. One had a PhD degree in Education and the second had a PhD degree in Urdu language. Committee members assessed the semantic similarity between the Urdu version of Autism Spectrum Quotient (UAQ) and the original scale of Autism Spectrum Quotient (AQ). They also discussed cultural differences in the use of both languages and their interpretation. The discrepancy between back translated version and the English-translated version was seen and the difference was corrected in the Urdu version.

Phase-II: Validation of Urdu version of Autism Spectrum Quotient (UAQ)

Face and content validity were established with the help of experts. Language structure and vocabulary of three item numbers (19, 25, and 35) were amended by experts teaching children with ASD. Finally, after changing the language of items according to the suggestions and recommendations of experts, the final questionnaire was carried out for the pilot testing. The resultant Urdu version of Autism Spectrum Quotient (UAQ) was administered to 10children with ASD from the Army Special Education Academy (ASEA), Rawalpindi and 10 children from a normal education institute in Islamabad. Purpose of pilot test was either teachers/psychologist able to understand the translated tool or not. Reliability of the tool was found as 0.738. Understanding of the questionnaire was tested, and face validity and content validity of UAQ were established.

Data Collection

Google form for the Urdu version of Autism Spectrum Quotient (UAQ) was made. It was sent to the psychologists, teachers and parents of children with ASD and general education teacher/parents in different institutes for data collection. Psychologists, teachers and parents were requested to fill out the forms for all the children and respond to each item. Data was collected both in soft and hard form. The response rate of data collection from different institutes was 68%.

Data Analysis

The reliability of Urdu version of Autism Spectrum Quotient (UAQ) was computed using SPSS version 21. The procedure of data analysis was (i) overall reliability of UAQ, (ii) inter-rater reliability, (iii) test-retest reliability, and (iv) Content validity index (CVI) were analyzed to find the internal consistency of each item.

Construct Validity

For establishing validity for the Urdu version of Autism Spectrum Quotient (UAQ), the reliability of each item, Item wise Content Validity Index (I-CVI) was analyzed. Scale-wise Content Validity Index (S-CVI) was also established. It was found as 0.93. Item-wise Content Validity Index (I-CVI) results are shown as under:

Table 1: *Validity of used data collection tools*.

Items No.	**Alpha**	**I-CVI**
(Social Skills)		
Item 1	.952	0.83
Item 11	.950	0.66
Item 13	.952	1
Item 15	.950	1
Item 22	.950	1
Item 36	.950	0.5
Item 44	.950	1
Item 45	.950	1
Item 47	.950	1
Item 48	.950	1
(Attention Switching)		
Item 2	.950	1
Item 4	.950	0.66
Item 10	.950	1
Item 16	.950	0.83
Item 25	.951	0..5
Item 32	.950	1
Item 34	.951	1
Item 37	.950	1
Item 43	.953	1
Item 46	.950	1
(Attention to detail)		
Item 5	.950	0.66
Item 6	.951	1
Item 9	.952	0.83
Item 12	.951	1

Item 19	.951	0.5
Item 23	.951	1
Item 28	.952	1
Item 29	.953	0.83
Item 30	.952	1
Item 49	.953	1
(Communication)		
Item 7	.950	1
Item 17	.951	0.83
Item 18	.950	1
Item 26	.950	1
Item 27	.950	1
Item 31	.951	1
Item 33	.950	1
Item 35	.952	0.5
Item 38	.950	1
Item 39	.950	1
(Imagination)		
Item 3	.952	0.83
Item 8	.950	1
Item 14	.950	1
Item 20	.951	1
Item 21	.952	1
Item 24	.950	1
Item 40	.950	0.83
Item 41	.952	1
Item 42	.951	1
Item 50	.950	1

Predictive Validity

The mean scores of normal children as well as children with ASD were calculated for each age group from 5 to 15 years and plotted together in the form of bar chart. This bar chart shown in Figure 2 gave the evidence of the predictive validity of the UAQ as the mean scores of children with ASD in each age group were far below the scores of normal children.

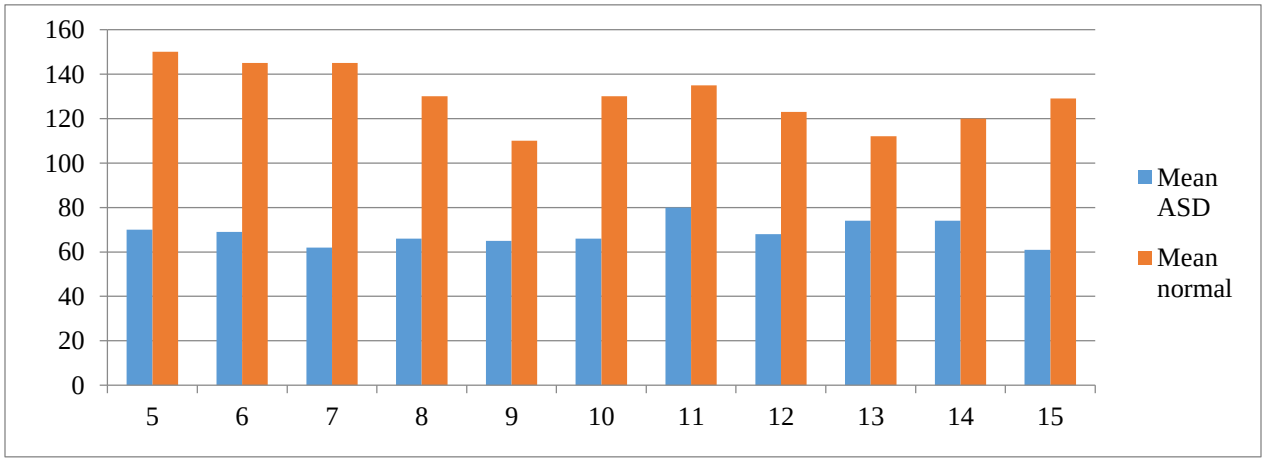

Figure 2: Mean scores of normal and ASD children.

Reliability of Urdu version of Autism Spectrum Quotient (UAQ)

Alpha, test re-test, and inter-rater reliability were computed and tabulated as shown in the following tables.

Table 2: *Reliability of UAQ*

UAQ (Overall)	**Items**	**Alpha**
Reliability	50	0.952

Table 1 defines the overall reliability of Urdu version of Autism Spectrum Quotient (UAQ) Scale was found as 0.952. The reliability of five subsections of the tool was also computed.

Table 3: *Reliability of subsection of Urdu version of Autism Spectrum Quotient (UAQ)*

Sr.	**Sub-scales**	**Items**	**Alpha**
1	Social Skills	10	0.840
2	Attention Switching	10	0.822
3	Attention to details	10	0.760
4	Communication	10	0.869
5	Imagination	10	0,798

Table 3 defines the reliability of subsections of Urdu version of Autism Spectrum Quotient (UAQ). Reliability for social skills was found 0.840, attention switching was 0.822, attention to detail was 0.760, communication was 0.869, and imagination was 0,798.

Test-retest reliability for Urdu version of Autism Spectrum Quotient (UAQ)

Table 4: *Mean and SD of test-retest for Urdu version of Autism Spectrum Quotient (UAQ)*

	Mean	**SD**	**N**	**Cronbach's Alpha**
Items means	85.05	14.676	19	-
Cronbach's Alpha	-	-	50	0.738

Table 3 elaborates the Mean and SD of test-retest reliability for UAQ. To find the reliability, 19 already selected children were tested again after two weeks. It is clear from the table that the mean value was 85.05 and SD 14.676. For fifty items, the value of Cronbach's Alpha was found 0.738.

Table 5: *Intra-class Correlation Coefficient (Test-retest Reliability) for Urdu version of Autism Spectrum Quotient (UAQ)*

	Intra-class Correlation	**95% Confidence Interval**		**F Test with True Value 0**			
		Lower Bound	**Upper Bound**	**Value**	**df1**	**df2**	**Sig**
Single Measures	.050a	.021	.121	3.819	18	882	.000
Average Measures	.724c	.519	.873	3.819	18	882	.000

Table 5 describes the correlation between the test-retest scores of nineteen children. It was found to be 0.724, which was significant at the level of 0.05.

Inter-rater reliability for Urdu version of Autism Spectrum Quotient (UAQ)

Table 6: *Mean and SD of inter-rater for Urdu version of Autism Spectrum Quotient (UAQ)*

	Mean	**SD**	**N**	**Cronbach's Alpha**
Items means	86.80	16.389	20	--
Cronbach's Alpha	-	-	50	0.828

Table 6 describes the Mean and SD of inter-rater reliability for Urdu version of Autism Spectrum Quotient (UAQ). To find the reliability 20 already selected children were tested again after two weeks by another psychologist. It is clear from the table that the mean value was 86.80 and SD 16.389. For fifty items, the value of Cronbach's Alpha was found 0.828.

Table 7: *Intra-class Correlation Coefficient (Inter-rater Reliability) for the Urdu version of Autism Spectrum Quotient (UAQ)*

	Intra-class Correlation	**95% Confidence Interval**		**F Test with True Value 0**			
		Lower Bound	**Upper Bound**	**Value**	**df1**	**df2**	**Sig**
Single Measures	.080a	.040	.171	5.802	19	931	.000
Average Measures	.812c	.677	.912	5.802	19	931	.000

Table 7 explains **t**he correlation between the inter-rater score of twenty children was found to be 0.812 and significant at the level of 0.05.

Table 8: *Gender wise mean scores of children with ASD*

Gender	**Mean**	**SD**
Male	73.92	29.60
Female	77.32	32.59

Table 9: *Significance of mean difference in AQ scores of male and female children with ASD*

Total Score Gender	**Sum of squares**	**Mean Squares**	**F**	**Sig**
Between groups	353.053	353.053	.387	.535
With in groups	175186.127	912.428		
Total	175539.180			

It is evident from table 8 and 9 that the mean value for the boys is 73.92 and for girls is 77.32. Apparently the mean appears to be very close which confirmed through the mean through the table 8 for the mean difference. No significance difference is found in the AQ scores of the children with ASD with respect to gender (p= 0.535 which is greater than 0.05). Therefore null hypothesis was rejected.

Psychometric Properties of Urdu version of Autism Spectrum Quotient (UAQ)

Urdu translated version of the Autism Spectrum Quotient (UAQ) contained of 50 items from which twenty-six items were positively scored and twenty-four items were negatively scored.

Positively scored Items:

The positively scored items i.e. 0-3 include 1, 3, 8, 10, 11, 14, 15, 17, 24, 25, 27, 28, 29, 30, 31, 32, 34, 36, 37, 38, 40, 44, 47, 48, 49 and 50.

Reversed scored Items:

The reversed scored items i.e. 3-0 include 2, 4, 5, 6, 7, 9, 12, 13, 16, 18, 19, 20, 21, 22, 23, 26, 33, 35, 39, 41, 42, 43, 45 and 46.

Scoring criteria depict that an individual who scored greater than 76 was declared as autism. AQ is designed in such a way that it avoids reporting biases through reversed scoring procedures. The tool has five subsections.

Social Skills: It is the ability to comprehend and empathize with others, identify social signs, and standards, and value the opinions or feelings of people from different backgrounds.It includes verbal skills, the ability to stay calm in social situations, listening skills, establishing, maintaining, building rapport with others, and breaking up a relationship. Item numbers include 1, 11, 13, 15, 22, 36, 44, 45, 47, and 48.

Attention switching: It is the capacity to quickly and skillfully change one's attention and move between various tasks, activities, or mental states. It is an essential part of executive functioning, which is made up of several higher-order cognitive functions related to self-control, goal-directed behavior, and problem-solving. Item numbers include 2, 4, 10, 16, 25, 32, 34, 37, 43, and 46.

Attention to detail: It is the ability to identify and concentrate on particular details within a larger environment. It involves making sure that everything is observed with accuracy and carefulness. Item numbers include 5, 6, 9, 12, 19, 23, 28, 29, 30 and 49.

Communication: It is the process of sharing ideas, thoughts, feelings, and messages verbally, nonverbally, and in writing between people or groups. It is an essential component of human contact and is vital to many facets of life, including interpersonal relationships, social interactions, workplaces, and the smooth operation of society. Item numbers include 7, 17, 18, 26, 27, 31, 33, 35, 38 and 39.

Imagination: The ability to think up scenarios, concepts, and images in one's mind that are not direct experienced by the senses. It requires the ability to brainstorm and come up with original and imaginative ideas, see possibilities, and mentally investigate fictitious scenarios or alternate realities. Imagination shapes our views, beliefs, goals, and behaviors, Item numbers include 3, 8, 14, 20, 21, 24, 40, 41, 42, and 50.

Discussion

The purpose of the study was to translate and provide a valid diagnostic tool that can help teachers and parents with proper placement and intervention plans. Autism Spectrum Screening Questionnaire (ASSQ) was translated in Urdu by Saeed et.al (2022). It is Autism screening tool for the age range of 7 to 16 years children having 27 items. Five items refer to repetitive and restricted behavior, six cover on communication, eleven address social interaction problems and remaining deal with motor and vocal tics. Reliability of this tool was 0.584 (Saeed et.al., 2022), whereas Urdu version of AQ has 50 items for the age range of 4-11 years and 12 to 15 years. The tool measures five areas of children with Autism Spectrum Disorder i.e. social skill, attention switching, attention to detail, communication and imagination. Reliability of the tool was 0.952. The tool of Malaya AQ-child version had an internal consistency of 0.82. Translated Malaya of AQ-child version was found reliable (Hashmi et.al., 2021). The reliability for the Urdu version of Autism Spectrum Quotient (UAQ) was found as 0.952.Spanish AQ-short version had found good internal consistency and test-retest reliability (Lugo et.al., 2019). AQ-Chinese had good test and retest reliability. Total reliability of the tool was 0.84 and mixed for subscales0.54-0.88 (Lau et.al., 2013).The translated and culturally adapted version of UAQ showed good reliability and validity. AQ-28 Persian version was found to be a useful tool to assess the social behavior parts of children with ASD. Reliability for this tool was found as 0.78 (Ebrahimi et.al., 2022) whereas reliability for Urdu version of AQ was found as 0.952. The Cronbach's Alpha for the short version Autism Spectrum Quotient (AQ-S) of Iranian students was found satisfactory to find out the autistic traits. Cronbach's Alpha for other subscale was found as 0.95, 0.92, 0.48, 0.94, 0.58, and 0.89.Cronbach's alpha internal consistency for the subscales of the Urdu version of Autism Spectrum Quotient (UAQ) i.e. social skills, attention switching, attentions to detail, communication and imagination were found as 0.840, 0.822, 0.760, 0,869 and 0.798.

Conclusion

Urdu version of Autism Spectrum Quotient (AQ) is linguistically and culturally appropriate. Urdu version of the Autism Spectrum Quotient (UAQ) is a valid and reliable tool to investigate the symptoms of autism for children. It is time effective and easy to employ for teachers, parents, psychologists, and other health professionals to assess autistics traits of children and adolescent. The reliability of UAQ was found as 0.952, test-retest as 0.738, inter-rater reliability as 0.828, and Scale wise Content Validity Index (S-CVI) was found as 0.93. The scale was found to be linguistically and culturally suitable for the Pakistani context as compared to the first designed in a Western society. Gender wise no significant difference was found in AQ scores of children with ASD.

Recommendations

Urdu version of Autism Spectrum Quotient (UAQ) is recommended to measure the symptoms of autism for children and adults of average intelligence. ASD children's diagnosis with CARS can be used to do it.

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Conflict of Interest

Authors have no conflict of interest.

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