

Translation and validation of Autism Diagnostic Interview-Revised (ADI-R) for autism diagnosis in Brazil

Tradução e validação da ADI-R (Autism Diagnostic Interview-Revised) para diagnóstico de autismo no Brasil

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ABSTRACT

Objective: To translate into Brazilian Portuguese the Autism Diagnostic Interview-Revised (ADI-R), an extremely useful diagnostic tool in autism. **Methods:** A case-control study was done to validate the ADI-R. After being translated, the interview was applied in a sample of 20 patients with autism and 20 patients with intellectual disability without autism, in order to obtain the initial psychometric properties. **Results:** The internal consistency was high, with α of Cronbach of 0.967. The validity of criterion had sensitivity and specificity of 100%, having as a gold standard the DSM-IV diagnostic criteria. The interview had high discriminant validity, with higher scores in the group of patients with autism, as well as high interobserver consistency, with median kappa of 0.824. **Conclusion:** The final version of ADI-R had satisfactory psychometric characteristics, indicating good preliminary validation properties. The instrument needs to be applied in bigger samples in other areas of the country.

Key words: neurology, pediatrics, autistic disorder, child, adolescent, diagnosis, translating, validation studies.

RESUMO

Objetivo: Traduzir para o português do Brasil a ADI-R (*Autism Diagnostic Interview-Revised*), uma ferramenta diagnóstica extremamente útil em casos de autismo. **Métodos:** Foi realizado um estudo caso-controle para validar a ADI-R. A fim de se obter as propriedades psicométricas iniciais da entrevista, após a tradução, a ADI-R foi aplicada em uma amostra de 20 pacientes com autismo e 20 controles com retardo mental sem autismo. **Resultados:** A consistência interna foi alta, com um α de Cronbach de 0,976. A validade de critério mostrou uma sensibilidade e uma especificidade de 100%, tendo os critérios diagnósticos do DSM-IV como padrão ouro. A entrevista teve uma alta validade discriminante, com maiores escores no grupo de pacientes com autismo, bem como uma alta consistência entre observadores, com um Kappa médio de 0,824. **Conclusão:** A versão final da ADI-R teve características psicométricas satisfatórias, indicando boas propriedades preliminares de validação. O instrumento necessita ser aplicado em amostras maiores em outras áreas do país.

Palavras-Chave: neurologia, pediatria, transtorno autístico, criança, adolescente, diagnóstico, tradução, estudos de validação.

The landmark paper in autism came in 1942, when Kanner described a behavioral syndrome in eleven children¹.

Autism is characterized by three core behavioral manifestations: qualitative deficits in social interaction and communication; repetitive and stereotyped behavior patterns; and restricted interests².

In the 1980s, questionnaires and scales were created in an attempt to standardize the diagnosis and evaluation of children with autism. The Autism Diagnostic Interview-Revised (ADI-R)³ is one of the most detailed instrument. Today, it is considered the gold standard for the diagnosis of autism worldwide^{4,5}. The ADI-R is one of the most frequently used

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instrument in research and publications in the autism field^{6,7}. Its diagnostic properties and validity are well documented⁴. The ADI-R is a useful diagnostic tool in distinguishing between children with autism and children with receptive language disorders⁸. The ADI-R diagnostic classification remains relatively stable over time in prospective studies⁹, although it does not rank the syndrome as mild, moderate or severe forms¹⁰.

In this study, the authors translated the ADI-R into the Brazilian Portuguese language and validate it as a diagnostic instrument of autism in Brazil. The preliminary validation properties are described.

METHODS

A case-control study was done in a convenience sample of children from the Hospital de Clínicas de Porto Alegre (HCPA). The inclusion criteria were: 7-18 years of age, diagnosis through the DSM-IV criteria for patients with autism and through the Weschler Intelligence Scale for the group of patients with moderate intellectual disability and no autism. The patients with autism were diagnosed by one of the authors (R.S.R). In the group of patients with intellectual disability, autism was ruled out by the Autism Screening Questionnaire¹¹. The study excluded patients with sensorial or physical impairment, as well as patients with syndrome-associated diseases. The groups were paired by age.

An informed consent was obtained. This study was approved by the Ethics and Research Committee (n° 06-539).

Study tool

The ADI-R is a standard semi-structured interview, applied to parents and/or caregivers of individuals with possibility of autism¹².

The ADI-R produces a scoring algorithm that is similar to the diagnostic criteria of CID-10 (World Health Organization, 1992) and DSM-IV^{3,4}.

It is comprised of 93 items, 42 of which are able to be ranked into the following four scores with the respective cut-off values for diagnostic purposes. Score A: 10; Score B: verbal 8, non verbal 7; Score C: 3; and Score D: 1¹². The answers are transcribed into the interview protocol^{3,10,12}.

The instrument provides only three diagnoses: patient with autism, autistic signs without the classic form of the disease, patient without autism.

Statistical analysis

Cronbach's α reliability coefficient was calculated to evaluate the internal consistency. The interobserver consistency was evaluated using Kappa statistics, and, for this purpose, the possible answers to the questions were grouped into two groups: 0 and 1 (no symptoms and mild symptoms); 2 and

3 (moderate symptoms and severe symptoms). For discriminant validity, the Student's *t*-test was utilized for the interview and Fisher's exact test for the interview items. The validity of criterion was evaluated with sensitivity and specificity measurements, having the DSM-IV diagnostic criteria as the gold standard.

The significance level established for this study was $p < 0.05$.

LOGISTICS

First, the project was evaluated and authorized by the Western Psychological Services (WPS), the publisher that owns the copyrights of the ADI-R. Then, the purchase of the kit for the instrument translation, the royalty payment and the training to interviewers were arranged. It is important to note that the ADI-R is a diagnostic scale belonging to WPS and that its use requires prior training in a recognized Center by the copyright holder. Its use in Brazil is still restricted to research field.

The ADI-R was translated as earlier proposed^{13,14}. Two investigators with fluent English made independent translations of the instrument into Portuguese. After that, a final version was produced, which was translated into English by a translator specialized in translation and retro-translation processes, and later sent for analysis of the interview authors. Then, the final version of the interview was applied to parents and/or caregivers.

The interview was made by one of the other three investigators who had been previously trained, blindfolded to the patient's diagnosis. They filled out the interview protocol and handed it to two of the investigators without the initial part of the protocol containing the identification and information that could affect the study blindness. Then, these two investigators, based on the behavior descriptions, gave the scoring algorithm to each patient. Half of the interviews were submitted to the scoring algorithm filled by the two investigators for the interobserver consistency evaluation.

RESULTS

The study assessed 20 children and adolescents with autism and 20 with intellectual disability without autism. Both groups presented age ranging from 8 to 16 years, with mean age 11, as well as a predominance of boys, especially in the group of patients with autism (80.0%; 52.9%). The mean interview duration was similar in both groups, with 2.69 hours of duration in the patients with autism and 2.77 hours in patients without autism, totaling over 100 hours of interviews. Total intelligence quotient (IQ) in the group of patients with moderate intellectual disability ranged from 40 to 55, with median value of 51.

Table 1. Assessment of discriminant validity of the Autism Diagnostic Interview-Revised Brazilian Adaptation.

	Autistic patients (n=20)		Non-autistic patients (n=20)		Diff	95%CI
	x	SD	x	SD		
Domain 1	24.45	3.18	6.12	4.97	18.33	15.59-21.08
Domain 2	19.4	4.24	4.47	3.28	14.93	12.36-17.50
Domain 3	7.9	2.65	0.94	1.24	6.96	5.59-8.32

Domain 1: Qualitative impairment in social interaction; Domain 2: Qualitative impairment in communication; Domain 3: Restricted, repetitive and stereotyped behavior patterns; x: median; SD: standard deviation; CI: confidence interval; Diff: difference.

The Cronbach's α reliability coefficient was 0.967 (95%CI 0.952–0.982). In the evaluation for the validity of criterion, the ADI-R correctly identified all autism cases diagnosed through the DSM-IV criteria, with sensitivity of 100% (95%CI 83.2–100.0) and specificity of 100% (95%CI 80.5–100.0). In the discriminant validity evaluation, mean scores obtained in each of the three diagnostic domains of the instrument were significantly higher in the group of patients with autism, showing that this instrument can discriminate both groups (Table 1). The discriminant validity of each of the 42 scoring items of the interview was also evaluated. A significantly higher number of score 2 in the group with autism and scores 0 and 1 in the group without autism was obtained, showing that the items are valid as they

Table 2. Assessment of discriminant validity for each item of the Autism Diagnostic Interview-Revised Brazilian Adaptation.

Item	Autistic patients (n=20) answers			Non-autistic patients (n=20) answers			p-value
	0	1	2	0	1	2	
	31	10.5%	5.3%	84.2%	82.3%	5.9%	
33	6.6%	6.7%	86.7%	81.2%	18.8%	0.0%	<0.001
34	0.0%	20.0%	80.0%	81.2%	18.8%	0.0%	<0.001
35	0.0%	0.0%	100.0%	81.2%	18.8%	0.0%	<0.001
36	35.7%	14.3%	50.0%	50.0%	37.5%	12.5%	<0.05
37	13.3%	66.7%	20.0%	81.2%	18.8%	0.0%	<0.001
38	35.7%	21.4%	42.9%	100.0%	0.0%	0.0%	<0.001
39	23.1%	7.7%	69.2%	100.0%	0.0%	0.0%	<0.001
42	5.6%	11.1%	83.3%	100.0%	0.0%	0.0%	<0.001
43	0.0%	0.0%	100.0%	94.1%	0.0%	5.9%	<0.001
44	0.0%	0.0%	100.0%	88.2%	0.0%	11.8%	<0.001
45	0.0%	0.0%	100.0%	70.6%	11.8%	17.6%	<0.001
47	0.0%	0.0%	100.0%	41.1%	11.8%	47.1%	<0.001
48	0.0%	0.0%	100.0%	58.8%	29.4%	11.8%	<0.001
49	0.0%	0.0%	100.0%	50.0%	21.4%	28.6%	<0.001
50	0.0%	15.8%	84.2%	81.2%	12.5%	6.3%	<0.001
51	0.0%	6.7%	93.3%	73.4%	13.3%	13.3%	<0.001
52	0.0%	25.0%	75.0%	64.3%	14.3%	21.4%	<0.001
53	0.0%	0.0%	100.0%	58.8%	5.9%	35.3%	<0.001
54	0.0%	12.5%	87.5%	81.2%	12.5%	6.3%	<0.001
55	0.0%	17.6%	82.4%	46.1%	30.8%	23.1%	<0.001
56	5.2%	5.3%	89.5%	64.3%	14.3%	21.4%	<0.001
57	0.0%	29.4%	70.6%	60.0%	33.3%	6.7%	<0.001
58	6.7%	13.3%	80.0%	88.2%	11.8%	0.0%	<0.001
59	0.0%	0.0%	100.0%	81.2%	18.8%	0.0%	<0.001
61	0.0%	16.7%	83.3%	33.4%	33.3%	33.3%	<0.001
62	0.0%	5.6%	94.4%	62.5%	25.0%	12.5%	<0.001
63	5.2%	21.1%	73.7%	80.0%	20.0%	0.0%	<0.001
64/65	0.0%	15.8%	84.2%	53.3%	6.7%	40.0%	<0.001
67	30.0%	30.0%	40.0%	94.1%	5.9%	0.0%	<0.001
68	35.0%	20.0%	45.0%	82.4%	17.6%	0.0%	<0.001
69	25.0%	20.0%	55.0%	100.0%	0.0%	0.0%	<0.001
70	30.0%	0.0%	70.0%	70.6%	23.5%	5.9%	<0.001
71	15.0%	80.0%	5.0%	70.6%	29.4%	0.0%	<0.001
77	20.0%	15.0%	65.0%	88.2%	0.0%	11.8%	<0.001
78	25.0%	0.0%	75.0%	82.3%	11.8%	5.9%	<0.001

Table 3. Interobserver consistency of the Autism Diagnostic Interview-Revised Brazilian Adaptation.

Item	kappa	p-value
2	0.72	<0.01
9	0.76	<0.01
10	0.82	<0.01
31	0.88	<0.01
33	1	<0.01
34	0.75	<0.01
35	0.78	<0.01
36	0.824	<0.01
37	*	*
38	0.64	<0.01
39	0.68	<0.01
42	1	<0.01
43	0.89	<0.01
44	1	<0.01
45	1	<0.01
47	0.753	<0.01
48	1	<0.01
49	1	<0.01
50	0.89	<0.01
51	0.76	<0.01
52	0.77	<0.01
53	0.88	<0.01
54	1	<0.01
55	0.89	<0.01
56	0.89	<0.01
57	0.75	<0.01
58	0.62	<0.01
59	0.89	<0.01
61	0.66	<0.01
62	0.89	<0.01
63	0.77	<0.01
64/65	0.89	<0.01
67	0.77	<0.01
68	0.82	<0.01
69	0.47	<0.05
70	0.73	<0.01
71	0.64	<0.01
77	0.89	<0.01
78	0.89	<0.01
86	0.62	<0.01
87	0.77	<0.01
k med	0.824	

*Impossible to calculate k.

discriminate patients with autism from those with intellectual disability without autism (Table 2). Questions 2, 86, 87, 9 and 10, although part of the scoring algorithm, were not considered in the discriminant validity evaluation because they are not able to be discriminant.

In the group of children with intellectual disability without autism, 5 (29.4%) of them reached scoring values in 1 or 2 of the three autism diagnostic domains.

The external consistency was satisfactory in all scoring algorithm items, except for item 37, which did not allow the application of Kappa statistics (Table 3). The median Kappa value was 0.824.

DISCUSSION

In Brazil, in the last years, three autism assessment instruments have been translated into Portuguese and validated. The Scale for the Assessment of Autistic Behavior¹⁵, the Childhood Autism Rating Scale¹⁶ and the Autism Screening Questionnaire¹¹.

The ADI-R is considered as one of the “gold standard” methods for autism diagnosis by the international literature^{4,5} and is the most frequently used clinical instrument in studies and publications. Given its importance, it has been translated in several countries, such as Germany, Island, Japan, China, Italy and Spain, and is in translation process in others, as Holland, Norway, Hungary, Sweden, Korea and France.

Our study adopted the model of translation and transcultural validation process described by Sperber¹⁴, which is one of the most frequently utilized in the literature^{6,17}.

The predominance of male patients in the group with autism was not unexpected. According to some authors, the mean reported proportions varies from 3.5 to 4 boys to one girl, sometimes reaching 6 or more^{18,19}.

The ADI-R Brazilian Adaptation obtained from our sample showed initial validation properties. These results were similar to those of the original interview and its revised edition, as well as the methodology utilized in the instrument validation, with interview application to two groups of patients^{3,10}.

The reliability, also known as consistency, refers to the reproducibility of a measurement and it can be evaluated through several forms. This study evaluated the interobserver consistency, which is the measurement of agreement between two or more observers assessing the same individuals^{20,21}. It was measured in the original interview and in its revision by means of the video recorded interviews.

In this study, the investigators made the evaluation in written records, a more practical and cheaper method. According to Menezes and Nascimento²⁰, these records immediately show whether the appraisers know the adopted criteria and interpret the records the same way. The Kappa

statistics is the most frequently method utilized to assess the external consistency; it is a measurement of interobserver agreement, corrected to chance agreement. Kappa values over 0.61 are considered substantial, according to Menezes and Nascimento²⁰. In our study, high Kappa values were obtained in 40 of the 42 assessed items. In item 37, which assessed the presence of pronoun reversal, it was not possible to apply the statistic test, as it is an orthogonal matrix and not all cells were filled out. Only item 69 presented a non-satisfactory value of external consistency ($k=0.471$). This item assesses the stereotyped use of objects and interest in parts of objects. The authors did not find problems in the retro-translation process of this specific item and suggest that the training on concepts and codes involved in the question might have been insufficient.

The internal consistency of the ADI-R Brazilian Adaptation was fully satisfactory. According to Streiner and Norman²², the minimum value of 0.70 for Cronback's α coefficient is recommended to ensure that the items consistently assess the same construct.

This study assessed not only the discriminant validity of the instrument, but also each instrument item, as performed in the validation studies of the original ADI¹⁰ and its subsequent revision³, with satisfactory results, similar to those of the abovementioned studies. Thus, the instrument showed to be able to differentiate patients with autism from patients without autism, although they presented manifestations of the autism spectrum, a phenomenon already known in the clinical practice and that makes the differential

diagnosis easier between patients with autism and patients with intellectual disability without autism^{3,10,23}.

Our study detected that approximately 30% of the patients with moderate intellectual disability fulfilled the autism diagnosis criteria in at least one of the three diagnostic domains, a percentage that is very similar to that found by Le Couteur et al.¹⁰, when creating the ADI.

This study also showed that the Brazilian adaptation of the ADI-R presents validity of criterion as it identified all children with autism diagnosed through the DSM-IV criteria. Such criteria were chosen because it is the most frequently utilized in the clinical practice and considered accurate, as suggested by Blacker and Endicott²⁴.

The purpose of this study was to translate and validate the ADI-R into Brazilian Portuguese. Although the initial findings have been positive, precaution should be considered. This study was made with a small sample, using a case-control study design that knowingly can overestimate the psychometric properties of behavioral scales. Finally, the sample was obtained in a restricted area of the country. Regional, social and cultural variations should be assessed in a broader way.

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