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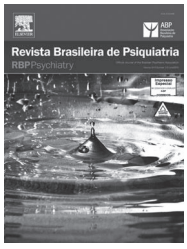

ORIGINAL ARTICLE

Psychometric properties of the sixth version of the Addiction Severity Index (ASI-6) in Brazil

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Abstract
Background: There are few research tools in Brazil to assess more broadly the alcohol and other drug related problems. *Objective*: To test the psychometric properties of ASI in its sixth version (ASI-6). *Methods*: A multicenter cross-sectional study was conducted in four Brazilian state capitals. Four research centers interviewed 150 adult inpatients or outpatients, and one research center interviewed 140 patients. A total of 740 substance abusers were selected. Training and supervision of interviewers were performed to assure the quality of dada collected. *Results*: Most areas of the ASI showed good reliability between the instrument and the interviewers, with no statistically significant differences between the ASI-6 Summary Scores for Recent Functioning (SS-Rs) of both interviews. Cronbach's alpha for ASI-6 subscales ranged from 0.64 to 0.95. Correlations between the ASI-6 Alcohol and Drug scores and the concurrent instrument (ASSIST) were high (0.72 and 0.89, respectively). There was a significant negative correlation between the scores in psychiatric, medical and drug areas and the scores of WHOQOL. *Conclusion*: Analysis of the psychometric properties of ASI-6 both in outpatients and inpatients in Brazil indicate a good reliability and validity of this instrument for the Brazilian culture. The development of this instrument in Brazil is an important advancement, which will certainly have implications for the prevention, clinical research, and social rehabilitation fields.

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DESCRITORES:
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Multicultural.

Propriedades psicométricas da sexta versão da Escala de Gravidade de Dependência (ASI-6) no Brasil

Resumo
Introdução: Existem poucos instrumentos de pesquisa no Brasil que avaliam de forma mais ampla os problemas relacionados ao álcool e a outras drogas. *Objetivo*: Testar as propriedades psicométricas da ASI, em sua sexta versão (ASI-6). *Métodos*: Um estudo transversal e multicêntrico foi conduzido em quatro capitais de estados brasileiros. Quatro centros de pesquisa entrevistaram 150 pacientes adultos internados ou em tratamento ambulatorial. Foram selecionados um total de 740 abusadores de substâncias. A qualidade dos dados coletados foi assegurada pelo treinamento e supervisão aos entrevistadores. *Resultados*: A maioria das áreas da ASI mostraram boa confiabilidade entre o instrumento e os entrevistadores, sem diferenças estatisticamente significativas entre os Escores Sumários de Funcionamento Recente da ASI-6. O alfa de Cronbach para as subescalas da ASI-6 variou de 0,64 a 0,95. Correlações entre os escores da área Álcool e Drogas da ASI-6 e o instrumento concorrente (ASSIST) foram altas (0,72 e 0,89, respectivamente). Existiu uma correlação negativa estatisticamente significativa entre os escores nas áreas psiquiátrica, médica e drogas, e os escores da WHOQOL. *Conclusão*: A análise das propriedades psicométricas da ASI-6 tanto em sujeitos internados quanto em tratamento ambulatorial no Brasil apontam para uma boa confiabilidade e validade deste instrumento para a cultura brasileira.

Introduction

The burden of alcohol and other drug problems on the public health system is heavy. However, the relevance of substance abuse problems in Brazil has not been paralleled by the availability of research in this area. Lack of standardized methods for evaluation and treatment of substance abuse or dependence may be due to the paucity of instruments tailored for the Brazilian culture that ascertain the severity of the problems associated with substance use in the country.[1,2]

Transcultural adaptation and validation of an instrument demands careful methodological steps and must consider local, social, and cultural aspects.[3] This endeavor is particularly challenging in Brazil, where multicenter studies of substance users face the tasks of dealing with the country's large territorial size, internal cultural diversity, and the characteristics of substance-abusing populations, which are specific to the different regional areas.[4-8] Substance use disorders are particularly susceptible to cultural variation, which makes the validation process even more complex.[9]

Another point of concern is that the chosen evaluation instrument must be objective, clinically useful, and encompass a broad timeframe for the target population. It also must have easy rules for training in order to diminish costs for its implementation. Thus, there is a need for more comprehensive instruments with dimensional scores and good reliability to be used with substance users both for assessment and follow-up.

The ASI, developed by McLellan and coworkers[10] at the University of Pennsylvania has already been translated into many languages and validated in countries, such as France, Italy, Spain, Netherlands, Germany, Russia, Hungary, and Japan. It has been used by addiction specialists and clinicians, investigators, and policy makers to evaluate the severity of alcohol and drug dependence, intervention referrals, and treatment results.[11-16] The ASI is a semi-structured interview that provides a multidimensional assessment of a patient's lifetime and recent status in seven functional areas of life (e.g., medical, employment, legal aspects, family/social, psychiatric, alcohol use, and other drug use). It estimates problem severity in each area; therefore, making it useful for clinical evaluation and investigation. Given these advantages, the instrument may be utilized in longitudinal studies of treatment outcome.[17] It may also help to correct therapeutic directions, establishing lines of priority action.

The existing 5th edition of the ASI (ASI-5) has only undergone relatively minor revisions, since the original ASI was developed approximately 25 years ago.[10,16] Nevertheless, there has been increasing recognition over the years of a number of limitations to the ASI, yielding reasons for the instrument modification.[18] Also, in the last three decades, there have been profound changes in the nature of the psychoactive substances available, as well as in the characteristics of both patient and treatment. Thus, over the past several years, the authors of the original instrument have undertaken a major revision of the instrument for the sixth version of the ASI. Items with poor reliability in the ASI-5 have been deleted or refined and others were included (e.g., use of free time, trauma, child burden, HIV, smoking, gambling etc.). The ASI-6 obtains considerably more information than the ASI5, but takes no longer to administer. Most items of the ASI-6 are more structured than the ASI5, which facilitates training. It has added a 6-month time frame for key items, especially those relevant to cost analysis, and a date of last occurrence probe for key items, especially those items related to critical clinical decisions. These timeframes were selectively employed in addition to the standard ASI 30-day and lifetime intervals. One change in the sixth version was the elimination of the Interviewer Severity Ratings, subjective global ratings which had variations in reliability. Another point is that ASI-5

arithmetically calculated seven Composite Scores to assess recent (past 30 day) functioning while in the ASI-6 there are 2 more problem areas calculated by the new Summary Scores for Recent Functioning (SS-Rs).

There are considerable data supporting the validity of the ASI recent status scores. This present version has undergone final reliability and validity testing and latent structure analyses have been conducted. ASI-6 summary measures for historical functioning are being developed.[16]

The fifth version of the instrument was used in Brazil in the 1990s to evaluate patients in treatment. However, the sixth version modification and its formal validation have not been undertaken yet. The Brazilian ASI-6 has already been translated and adapted to Brazilian Portuguese and involved efforts by investigators from many Brazilian regions. Other details of the adaptation process are documented elsewhere[I].[19]

In this study, the sixth version of the Addiction Severity Index (ASI-6) was submitted to its validation process in Brazil. Adaptation and validation to other Portuguese-speaking countries contexts will still be necessary, but the present work is the first step to make it available to the nearly 250 million Portuguese-speaking people around the world. The main aims of this study were to test the reliability, test-retest, and the concurrent validity of the ASI-6 in the Brazilian context, demonstrating and discussing the instrument's psychometric properties.

Methods

Research centers and data collection sites

This was a multisite, cross-sectional study. The sample was collected in five research centers located in four Brazilian state capitals. These centers were strategically chosen due to their ability to conduct large studies in this area:

- The Center for Drug and Alcohol Research (CPAD) of the Universidade Federal do Rio Grande do Sul (UFRGS) was the coordinating site for this study. CPAD is located inside the Hospital de Clinicas of Porto Alegre, a large teaching hospital connected with UFRGS, which has inpatient and outpatient services for alcohol and drug problems.
- The Drug Dependence Unit (UDED) is a section of the Department of Psychobiology of the Federal Universidade de São Paulo. It has an outpatient clinic for those with alcohol and drug abuse/dependence as well as their families, and is constituted by a multidisciplinary staff. The Women's Drug Dependent Treatment Center (PROMUD) is located at the Psychiatric Institute of Hospital das Clínicas, the largest Brazilian teaching hospital, which is connected with the Universidade de São Paulo Medical School. PROMUD is a women-only treatment program, and provides mainly outpatient multidisciplinary services for alcohol and drug dependent patients.
- The Research Program and Assistance in Drug Addiction (PROJAD) develops research activities and services in the field of problems related to drug and alcohol abuse on an outpatient basis, in connection with the Universidade Federal do Rio de Janeiro.
- The Center for Drug Abuse Studies and Therapy (CETAD) is a permanent extension of the Department of Pathology at the Universidade Federal da Bahia. Its outpatient clinic is responsible for psychiatric and psychosocial care of drug users and their families.

Sampling

Between January and November 2006, a target sample of 740 subjects — either under assessment or already under inpatient (first 15 days after admission) or outpatient (first 10 days) treatment for substance abuse or dependence — was obtained. There were 150 subjects at each study site, except for CETAD, which could not reach the data collection goal during the programmed period and evaluated only 140 patients. Clients were included in the study if they sought medical assistance for alcohol and drug problems and had been using at least one of these substances in the 30 days prior to the interview. Exclusion criteria were neurological or severe psychiatric illness with symptoms at the moment of the interview. These parameters were clinically determined by trained interviewers. They did not use any standard instrument for this purpose. Regarding data collection in all centers, seven patients were not included in the sample due to severe depressive or psychotic symptoms and four patients refused to participate in the study. The strategy of including patients from both inpatient and outpatient programs was specifically intended to generate a sample with characteristics similar to that of the typical Brazilian population who seek specialized alcohol and drug treatment.

Instruments

The ASI-6 is a multidimensional semi-structured interview, which takes between 45 to 90 minutes to be completed and must be administered by a trained interviewer. The instrument comprises information in seven areas of life functioning, which are as follows: medical, employment status, legal aspects, family/social, psychiatric, use of alcohol, and use of other drugs. In each area, the symptoms/problems are evaluated during the patient's lifetime, the six previous months and specifically in the 30 days that preceded the evaluation. Currently, there is one set of summary scores available, the ASI-6 Summary Scores for Recent Functioning (SS-Rs). The SS-Rs refer to status/functioning in the past 30 days, and provides objective information derived from items based on a combination of rational and empirical methods. They are psychometrically derived using nonparametric item response theory (NIRT) and classical psychometric methods and are standardized, which has the advantage of reducing the extent of skewness in the scores. There is one score in each problem area, except for family/social in which there are 3 different scores: family/social problems, family/social support, and child problems. They represent standardized T-scores with a mean of 50 and a SD of 10, theoretically ranging from 0-100. Higher scores indicate greater problem severity.

Concurrent Validity: each study site was responsible for collecting ASI-6 data on 100 subjects besides three other additional instruments in order to compare them

I The Brazilian Portuguese version of the ASI6, its manual and a training video are available online at the Brazilian Observatory for Drug Information -OBID (www.obid.senad.gov.br) and (www.cpad.org.br). They are downloadable for free.

with ASI-6 scores in each area (except for the legal area[II]), thus generating data for concurrent validation analyses. This method was aimed at reducing interview time and expenses after calculating the power for each validation analysis. Instruments that had been previously validated for the Brazilian culture were selected according to their psychometric properties and capacity to provide individual and global estimates in each specific area, generating scores that could be compared to the SS-Rs of the ASI-6.

- The WHO Quality of Life-BREF (WHOQOL-BREF): a short version of the World Health Organization Quality of Life (QOL) assessment instrument that is a widely used self-report instrument to measure QOL. It comprises 26 items, which measure the following broad domains: a) physical health (pain, medication, energy, mobility, sleep, work); b) psychological health (positive feelings, spirituality, think, body, esteem, negative feelings); c) social relationships (relationships, sex, support); and environment (safety, finances, information, leisure, home, services, transport). It was developed simultaneously in 15 international centers and validated in Brazilian Portuguese, proven to be useful for QOL evaluation and a satisfactory performance concerning all domains for internal consistency (Cronbach's alpha of 0.77) and test-retest reliability (coefficients > 0.69).[20]
- The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST): this instrument was developed by a team of investigators supported by the World Health Organization to detect substance use and abuse and was validated for Brazilian Portuguese. It shows high sensitivity and specificity in the detection of alcohol, cannabis, and cocaine abuse/dependence and good reliability (Cronbach's alpha of 0.80 for alcohol, 0.79 for cannabis, and 0.81 for cocaine).[21]
- The Social Adjustment Scale-Self Report (SAS-SR): the scale is a 54-item questionnaire comprised by of 2 domains, social and work-related functioning, with a 5-point response scale ranging from 1 (most positive) to 5 (most negative). The Brazilian validation of the instrument showed good internal consistency (Cronbach's alpha of 0.85). Higher scores on this instrument indicate poorer functioning.[22]

Interviewers

The 25 interviewers were either psychologists or psychiatrists. The selection of interviewers was done based on the candidate's abilities in multiple areas, including: a) experience in dealing with sensitive questions, such as drug use and its consequences; b) comprehension of research principles and experience in obtaining informed consent; and c) interest in the objectives of the study.

Training

The Principal Investigator (PI; FK) was trained by the original authors of the ASI-6.[16] After completion of on-site training in Philadelphia, the standard ASI training and its manual were adapted for the 6th version[III].[19] Co-Principal Investigators (Co-PIs) were trained in Brazil by the original authors and by the PI. Each Co-PI trained his site group, providing an overview of the instrument and general interviewing guidelines, as well as coding rules as they apply to the ASI-6. This was followed by a detailed section-by-section and item-by-item review of the instrument, according to the manual. Interview observation was conducted as part of the training. After these procedures, interviewers achieved a 90% response rate in a 30-question quiz about the ASI in order to be hired. In the final training section, the study PI conducted in loco visits at all centers in order to supervise and check the interviews in a pilot study. Two interviews were video-taped in order to be used for future training, in addition to the manual. Following training, interviewers independently conducted all interviews at their treatment site.

Logistics and quality control

The quality of the data collected was ensured mainly through training, on-site supervision, and support to field interviewers provided by the research center coordinators. Throughout the entire process of data collection, each study site had a weekly meeting to oversee data collection processes, as well as to solve logistical problems. After data collection, each site was responsible for sending the original questionnaires to the coordinating site in Porto Alegre, where all data were entered into a single database by two junior statisticians. On a weekly basis, the PI called or e-mailed the Co-PIs in order to discuss the flow of cases and to solve problems related to data collection.

Test-retest

A random subsample of 51 patients was asked to repeat the initial interview using the ASI-6 with a different data collector in a period ranging from three to seven days after the first interview, in order to ascertain the instrument's test-retest reliability. They had the summary scores compared to calculate inter-rater reliability.

Inter-rater reliability

Although other studies in the literature suggest the use of videos in order to test inter-rater reliability,[12] we decided not to use the taped ASI interviews. Because this instrument is a semi-structured interview, we were interested in measuring the scores in a situation where interviewers would be blind to the questions and answers of other interviewers. Therefore, we compared the scores of 41 random pairs of interviewers from all centers. They applied the questionnaires separately to the same patient (41 patients).

Procedures and analyses

Data were analyzed using version SPSS v.14.0. A statistician was responsible for checking data entry and performing quality checks. The characteristics of the sample were described with means and standard deviation when the variable was symmetrical and quantitative and by median and interquartile range when asymmetric. Qualitative variables were described in percentages. Quantitative variables were compared using Analyses of Variance (ANOVA), followed by Tukey's test; categorical variables were analyzed by Chi-square test

II Another study among prisoners is being conducted in order to validate the legal area.

III Available at www.cpad.org.br or upon request to the authors

and multiple comparisons. Internal consistency of the ASI-6 SS-Rs was evaluated using Cronbach´s alpha. Convergent and discriminant validity were evaluated by Pearson's correlation coefficient between items and scores, as well as within and across sections. In order to evaluate the agreement between judges, we used a paired t-test, Bland and Altman's method and intraclass coefficient correlation and the stability of measures over time with the same analyses. The significance level was set at 5% for all analyses.

Ethics and reimbursement

The study was approved by the Institutional Review Board (IRB) of Hospital de Clínicas of Porto Alegre and by the respective IRBs of each study site. All participants underwent approved informed consent procedures. Patients received the equivalent of U$15 for each interview as compensation for their costs of food and transportation.

Results

The overall sample (n = 740) is summarized in Table 1, and consisted mostly of Caucasian males in their thirties, not living with a partner. Most participants also had not finished high school and had no regular job. Other findings that were not included in this table showed that most subjects (81%) reported using alcohol in the 30 days prior to the interview, while 51% used cocaine/crack, followed by marijuana (41%), sedatives (27%), and stimulants (4%). Cocaine (44%) and alcohol (43%) were considered the main drugs that led patients to seek treatment.

Test-retest reliability measures showed no significant differences between summary scores of both interviews, except for the employment area, as reported in Table 2. The differences between groups means were also calculated according to treatment setting and there were no statistical significances in the inpatient group, while significant differences was found in the outpatient group with regard to employment subscale (p = 0.008 and effect size = 0.61) and family/social support (0.038 and effect size 0.43). The limits of agreement show that the two evaluations agree in most areas. Generally, variations are not higher than 10 points in SS-Rs (CI = 95%), which is lower than most standard deviations of each ASI-6 sub-area. We can observe that most correlations are also strong, especially between interviews related to alcohol and drug areas.

Inter-rater comparisons also demonstrated similar scores between interviewers in all areas of the ASI, except for employment and alcohol (Table 3). The effect size for the differences between groups means was moderate (0.75) for the employment ASI subscale and it was small (0.43) for the alcohol subscale. Similarly to the test-retest, the limits of agreement show that the evaluations of the two interviewers agree in most areas. Particularly, in the medical area, the agreement and correlation were lower than other areas.

Cronbach's alphas for the ASI-6 subscales ranged from 0.64 to 0.95, and correlations between these areas ranged from 0.09 to 0.40, as may be seen in Table 4. Correlations between the ASI-6 Alcohol and Drug scores and the ASSIST were high (0.72 and 0.89, respectively). There was a significant negative correlation between scores in psychiatric,

Table 1 Sample characteristics in all centers (n = 740)

Characteristics	TOTAL
Male sex (%)	78.0
Mean age (SD)*	36 (12)
Steady partner (%)	34.0
White ethnicity (%)	52.5
Outpatient (%)	60.5
Elementary and High School (%)	70.3
Unemployed (%)	47.4

* Symmetric quantitative variables are described with mean and standard deviation.
Categorical variables are described in absolute frequencies and percentages.

Table 2 Test-retest: summary scores (SS-R) of the ASI-6 (three to seven days after initial interview), (n = 51)

ASI subscales	Mean SS-R* interview 1	Mean SS-R* interview 2	p-value	95% CI*** limits of agreement	ICC**** (CI 95%)
Drug	47.4 (12.4)	47.1(12.5)	0.62	-0.35 (-10.57 to 9.87)	0.92 (0.86 to 0.95)
Family/Child	52.2 (7.5)	51.8 (7.5)	0.25	-0.39 (-5.25 to 4.47)	0.95 (0.91 to 0.97)
Alcohol	58.6 (10.1)	58.5 (9.9)	0.84	-0.08 (-5.68 to 5.52)	0.96 (0.93 to 0.98)
Psychiatric	51.5 (7.8)	51.2 (7.5)	0.60	-0.31 (-8.87 to 8.25)	0.84 (0.74 to 0.91)
Medical	46.0 (8.3)	46.7 (8.5)	0.35	0.68 (-9.46 to 10.82)	0.82 (0.70 to 0.89)
Legal	50.4 (6.5)	50.8 (6.6)	0.47	0.39 (-7.23 to 8.01)	0.83 (0.72 to 0.90)
Employment	44.7 (10.3)	41.6 (7.6)**	0.002	-3.08 (-16.44 to 10.28)	0.73 (0.57 to 0.84)
Family/Social Support	46.3 (10.7)	44.7 (10.3)	0.10	-1.59 (-15.17 to 11.99)	0.79 (0.66 to 0.88)
Family/Social Problem	55.0 (10.7)	55.3 (9.9)	0.71	0.34 (-12.54 to 13.22)	0.89 (0.81 to 0.94)

* Summary scores are described by mean (standard deviation); ** Scores differ significantly from first interview; *** Confidence Interval; **** Intraclass coefficient correlation.

Table 3 Inter-rater reliability: ASI-6 summary scores (SS-R) between interviews (n = 41)

ASI subscales	Mean SS-R* interviewer 1	Mean SS-R* interviewer 2	p-value	95% CI*** limits of agreement	ICC**** (CI 95%)
Drug	49.3 (10.0)	48.7 (8.2)	0.44	-0.61 -10.51 to 9.29)	0.85 (0.74 to 0.92)
Family/Child	54.4 (9.7)	54.9 (9.8)	0.66	0.46 (-12.94 to 13.86)	0.76 (0.60 to 0.87)
Alcohol	55.5 (9.3)	57.5 (9.3)	0.01	2.0 (-7.28 to 11.28)	0.86 (0.78 to 0.93)
Psychiatric	50.9 (7.8)	49.7 (6.8)	0.21	-1.20 (-13.18 to 10.78)	0.67 (0.45 to 0.81)
Medical	47.6 (9.4)	48.5 (8.7)	0.54	0.83 (-16.37 to 18.03)	0.55 (0.29 to 0.73)
Legal	48.4 (6.5)	48.6 (6.1)	0.68	0.20 (-5.86 to 6.26)	0.89 (0.80 to 0.94)
Employment	44.0 (10.4)	40.1 (8.2)**	0.001	-3.90 (-14.32 to 6.52)	0.85 (0.73 to 0.92)
Family/Social Support	45.6 (9.2)	45.3 (8.9)	0.79	-0.29 (-14.33 to 13.75)	0.70 (0.50 to 0.83)
Family/Social Problem	55.7 (8.8)	55.2 (9.8)	0.61	-0.51 (-13.13 to 12.11)	0.87 (0.76 to 0.93)

* Summary scores are described by mean (standard deviation); ** Scores differ significantly from first interview; *** Confidence Interval; **** Intraclass coefficient correlation.

Table 4 Internal consistency of ASI-6 subscales and correlation between summary scores (SS-R) of each area (n = 740)

ASI subscales	Cronbach's alpha	Drug	Family/Child	Alcohol	Psychiatric	Medical	Legal	Employment	Family/ Social support	Family/ Social problem
Drug	0.95	1	0.07	- 0.37*	0.29*	0.05	0.37*	0.09*	-0.06	0.28*
Family/Child	0.79		1	-0.02	0.15*	0.13*	0.08*	-0.004	-0.09*	0.22*
Alcohol	0.93			1	0.15*	0.18*	-0.11*	-0.03	0.10*	-0.04
Psychiatric	0.82				1	0.40*	0.25*	0.17*	0.11*	0.38*
Medical	0.82					1	0.13*	0.10*	0.11*	0.17*
Legal	0.73						1	0.14*	-0.02	0.29*
Employment	0.90							1	0.19*	0.06
Family/Social Support	0.81								1	-0.16*
Family/Social Problem	0.64									1

* $p < 0.05$.

Table 5 Correlations between ASI-6 summary indexes and concurrent validity measures

ASI subscales	Score ASSISTAlcohol	Score ASSIST Drugs**	Whoqol Physical	Whoqol Psychological	Whoqol Social Relation	Whoqol Environment	SAS Work	SAS Leisure	SAS Family	SAS Finances
Alcohol	**0.72***	-0.38*	-0.16*	-0.02	-0,11	0.01	0.06	0.19*	-0.05	-0.005
Family/Child	-0.07	0.06	-0.25*	-0.14	-0.08	-0.23	0.04	-0.04	0.11	
Drug	-0.39*	**0.89***	-0.11	-0.38*	-0.07	-0.12	0.14*	0.02	0.09	0.22*
Psychiatric	0.11*	0.25*	**-0.76***	**-0. 75***	**-0.43**	**-0. 67***	0.20*	0.17*	0.22*	0.20*
Medical	0.11*	0.06	**-0.41***	-0.14	-0.11	-0.14	0.14*	0.21*	0.07	0.07
Legal	-0.19*	0.37*	0.35	-0. 09	0.20	**0.42**	0.17*	0.001	0.20*	0.17*
Employment	-0.03	0.08	-0.31*	-0.21*	-0.10	-0.32*	**0.47***	0.16*	0.20*	**0.34***
Family/Social Support	0.09	-0.07	-0.03	-0 .06	-0.07	-0.12*	0.16*	**0.47***	0.15*	0.15*
Family/Social Problem	-0.02	0.26*	-0.16*	-0.15*	**-0.16***	0.10	0.04	-0.01	**0.25***	0.14*

*$p < 0.05$; Pearson correlation coefficients; ASSIST: The Alcohol, Smoking and Substance Involvement Screening Test; WHOQOL: World Health Organization Quality of Life-BREF questionnaire; SAS: Social Adjustment Scale.

medical and drug areas and the WHOQOL scores. The positive correlation between employment problems and social adjustment scores was significant, but moderate. These data are summarized in Table 5.

Discussion

To the best of our knowledge, this is the first validation study of the Addiction Severity Index in a Latin-American country. The classical analyses of the psychometric properties of the Brazilian ASI-6 for both inpatient and outpatient subjects indicate good reliability and validity of the existing summary scores of this instrument for our culture.

Test-retest reliability and inter-rater reliability

We used the summary scores in order to evaluate the psychometric properties of the ASI areas, as has been done in the majority of research studies with the ASI.[16] The reliability of the patient self-report data of the ASI-6 over a three to seven day test-retest interval was good, with the exception of the employment area. In other areas, paired statistical comparisons of the summary score measures showed no significant differences ($p > 0.10$) between the interviews conducted by the same technician.

Inter-rater reliability tests found similar results with significant differences only in the employment area. Based upon the available data, as well as de-briefing and discussions with the interviewers, we believe that the variation in responses to the employment section was due to difficulties in asking about finances and recalling exact figures (e.g., *how much money have you received in the last 6 months?*). Informality, unstable employment status, and the multiplicity of sources of income frequently encountered among alcohol and drug abusers may also account for difficulties in remembering and providing reliable information. It seems that the information provided by the items in the employment section is not always sufficient to achieve reliable ratings of problem severity. The level of information in these areas may improve by adding more detailed questions, in particular about duration of unemployment and specific aspects of problems with significant others.

We also found a higher disagreement and lower correlation of SS-Rs in the medical area when ASI-6, which points to the need of an improvement in training related to the medical diagnosis specified in the instrument, is applied especially by non medical interviewers.

Concurrent validity measures

Comparisons of ASI subscale scores with a battery of previously validated tests indicate clear evidence of discriminant validity, as discussed by Lowe.[23] Most validation studies show a moderate correlation between ASI summary scores and other instruments.[18] For instance, correlations between psychiatric problems and the WHOQOL domains would be expected. Recently, findings from the American ASI6 validation[IV] showed that concurrent validity analyses yielded strong evidence supporting the validity of the six of the SS-R scores (Medical, Alcohol, Drug, Employment, Family/Social Problems, Psychiatric). Evidence was weaker for the Legal, Family/Social Support and Child Problems SS-R.

In our study, summary scores of the psychiatric area presented good correlation with the physical, psychological and environment WHOQOL domains. Many aspects of the ASI evaluation are included in the domains of quality of life, and it has become more clear that substance abuse and other psychiatric comorbidity often lower its scores.[24] The ASSIST alcohol and drug scores showed high correlations with the alcohol and drug ASI sections. This is important, since it demonstrates that these essential sections of the sixth version are highly reliable. We also found a significant but moderate correlation between the employment section and the SAS work and financial scores.

While the problem areas represent distinct dimensions on a conceptual level, in real life situations it is often difficult to keep them apart. This is especially true for the psychiatric scale, because psychiatric symptoms may be induced by substance use, as has been robustly documented.[25-28] In these cases, the judgment of a clinician is needed in order to diagnose the symptomatology appropriately.

The quantity and quality of available information from the family and psychiatric sections are less detailed than the other areas, requiring analysis of specific outcomes. The structured format of the ASI and the fixed-choice questions seem adequate or better for assessing other problem areas, but this format seems less appropriate for the myriad of complex and highly individualized family problems occurring with these patients. The psychiatric summary score also should not be directly compared with psychiatric diagnoses. However, a significant positive correlation was found between ASI-5 composite scores (CSs) and DSM-IV diagnoses of dependence in both the alcohol and drug domains. Results showed good to strong prediction: ASI scores identified dependent clients with approximately 85% sensitivity and 80% specificity.[29] Therefore, future studies are being planned with the goal of comparing ASI scores with other scales as Family Enviroment Scale (FES) scores and the Mini International Neuropsychiatric Interview (MINI).

Internal consistency and correlation among problem areas

In most ASI validation studies, Cronbach's alpha of subscales is usually between 0.80 and 0.95.[16] Despite the acceptable scores found in Table 5 that are very similar to other studies, data indicate that in some areas, such as legal and family/social, the instrument consistency is still unstable.[30] Our results confirm these findings. A recent study that also analyzed the psychometric properties of the ASI-6 translated and adapted into the Spanish language showed that the degree of the internal consistency of the standardized objective scores ranged between 0.85 and 0.95, except for legal (0.47), family/child (0.58) and family/social (0.70) problems.[31]

Typically, correlation among areas of the ASI is low. Two validation studies of the ASI are pointed out among the publications in this area. Daeppen et al. conducted the first study in France.[11] In our study, the highest correlation occurred between the medical and psychiatric problem areas. The latter was also significantly correlated to the legal, employment, and family

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areas, probably expressing the relevant role of psychiatric symptoms in the problems of substance abusers, reinforcing the importance of including innovative inpatient dual diagnosis treatment programs, especially within the public system.[1] The moderately high correlation between the family/social and the psychiatric summary scores may reflect self-selection, as the study sample consisted only of treatment-seeking addicts. As suggested earlier by Rounsaville and Kleber, the decision to seek treatment is often made during a crisis of a social nature, in which individuals may have the tendency to report more psychological problems.[32] This suggestion is supported by earlier findings that show a decrease in psychological symptoms soon after admission to treatment.[33-35] These findings highlight the importance of independent measurement of different dimensions of the subject's functioning (presenting a specific problem profile) in order to identify specific treatment needs.

Conclusion

The similarity in psychometric characteristics of the ASI in different sociocultural contexts advocates the use of this instrument in cross-cultural research. In this study, the internal consistency of the Brazilian version of the ASI-6 seems to be high and correlations among areas were low, corroborating other studies in the literature. With regard to test-retest reliability, the results were similar to other studies that portrait the ASI as a stable instrument, as its scores do not vary much in a short period of time. The moderate correlation between scores of each problem area with assessments on concurrent validity also confirms the validity of the ASI-6 construct. The subscales also demonstrated to be relatively independent, and the severity ratings showed good concurrent validity; they also could be predicted, to a large extent, by the scale items. In addition, the subscales showed evidence of reliability. These findings add to the results from American and European studies that indicate good reliability and validity of the instrument. In particular, further research is needed on discriminant and predictive validity of the Brazilian version of ASI.

The authors are aware of some limitations. Usually, a heterogeneous and diverse sample is recommended for validation studies, but the cultural differences of these regions from other Brazilian regions were not assessed by the study. Moreover, subjects were selected only from public clinics and hospitals from state capitals, which may jeopardize the generalization of findings. Nevertheless, most research production in the country is developed in these states and they also represent a very broad spectrum of the Brazilian culture and population, especially people who live in urban centers. It is also important to mention that other modern analysis of structural validity evaluation are beyond the scope of this manuscript and the authors intend to do it in the future.

It is relevant to mention that there is an immense difficulty with regard to standardized communication among professionals in the addiction field in Brazil, particularly with regard to the comparison of data from clinical settings in the several networks that are included by the treatment services.[36] Not only is the comparison of research findings problematic, but also the perspective of being able to use an instrument with characteristics that are unanimously acknowledged around the world. The use of a powerful instrument such as the ASI is essential in the country for the reasons mentioned above, as well as the development of further computerized systems of information collection that are already available elsewhere, aiming at the development of sentinel studies (new drugs, new forms of use of drugs already known).[37] The validity of the ASI application was shown through self-completion over the Internet. In this application type, some subjects state a reduced sensation of being judged.[38] Other studies confirm that patients tend to give better information about their drug use and psychiatric symptoms when the format of a self-administered ASI is used.[39] Thus, this is suggested as a feasible alternative to the monitoring of client treatment. Such an application has shown to be faster in determining scores; is more economical; and has less gauging possibility (inter-interviewer reliability).[40]

At this time a number of products have already been obtained with the development of the ASI in Brazil, including an electronic database, a spreadsheet for data insertion, and a collaboration with the validation process in Chile. With the validation process of the ASI-6, Brazilian investigators and clinicians will have a reliable instrument in order to document and continuously follow-up the treatment procedures that are to be offered for such clients. The development of this instrument in Brazil is an important advancement, which will certainly have an impact on the prevention, clinical research, and social rehabilitation fields. In the future, the ASI-6 will certainly be used to evaluate substance abuse treatment services and improve service quality.

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