

# Validation of addiction severity index (5<sup>th</sup> edition) bahasa melayu version (ASI-5-BM)

## Abstract

The Addiction Severity Index (ASI) is a measurement tool to assess the problems experienced by people who use substance through six domains, namely health/medical status, employment, drug and alcohol use, legal, family/social relationships, and psychiatric status. This study was conducted to obtain data validation, pertaining validity and reliability of the ASI-5-BM. The study population was clients from the AADK drug treatment and rehabilitation centers. A total of 209 participants were selected from five addiction treatment centers (C & C) and a district rehabilitation center (CCSC). Three instruments were used for validation purposes, namely ASI-5-BM, 12-Item Short Form Health Survey (SF-12) and Beck Depression Inventory (BDI). The study found high and significant coefficient scores for 'convergent' validity. Clients who use drugs are closely correlated with health/medical problems ( $r=0.145$ ;  $p<0.05$ ); family problems ( $r=0.282$ ,  $p<0.001$ ); and psychiatric morbidities ( $r=0.207$ ,  $p<0.01$ ). The use of alcohol is also significantly associated with health/medical problems ( $r=0.179$ ,  $p<0.01$ ) and legal problems ( $r=0.215$ ,  $p<0.01$ ). The "concurrent" validity was measured with the SF-12, which examines the physical and mental health status of an individual, and the BDI, to confirm the psychiatric domain in the ASI-5-BM. SF-12 has a significant relationship with the medical ( $r=-0.261$ ,  $p<0.01$ ) and psychiatric ( $r=-0.318$ ,  $p<0.001$ ) domains. BDI was also found to be closely correlated with the psychiatric domain ( $r=0.219$ ;  $p<0.01$ ). In terms of reliability, the internal consistency of data through Cronbach's alpha was satisfactory (between 0.581-0.873), and external reliability through inter-rater (0.283-0.7) and test-retest (0.251-0.946) was also good. In conclusion ASI-5-BM had good psychometric values and can be used in Malaysia.

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**Abbreviations:** ASI, addiction severity index; PWUD, people who use drugs; BDI, beck depression inventory; ICCE, international center for credentialing and education for addiction professionals; UTC, universal treatment curriculum.

## Introduction

Addiction Severity Index (ASI) is a WHO and UNODC recognized clinical and research based measurement tool, which has been widely used for the purposes of assessing and evaluating problems experienced by people who use drugs (PWUD). The assessment and evaluation conducted by the ASI identifies the severity of substance use and its harm to the individual.<sup>1</sup> The ASI-5 that was developed in 1992 is a modified version of the instrument.<sup>2</sup> Currently the ASI has developed a sixth version that is utilized for clinical and research purposes.<sup>3</sup> ASI-5 assesses seven domains or aspects of life that can be affected as a result of substance use, namely medical status, employment status, alcohol use, drug use, legal status, family/social relationships, and psychiatric status,<sup>1,4</sup> but only 6 domains when the use of drugs and alcohol are combined. The assessment to evaluate the severity and seriousness of substance use is done over 2 separate time periods, in the previous 30 days and lifelong. For research purposes, the composite score for each domain is also utilized in the summarized scores of individual ASI domains. Since its development, the ASI<sup>1</sup> has been widely utilized to assess the disruption and deterioration caused by substance abuse in individuals.<sup>1</sup> The ASI has been translated and validated in China,<sup>5</sup> Japan,<sup>6</sup> Turkey,<sup>7</sup> France,<sup>8</sup> Netherlands<sup>9</sup> and other countries, justifying ASI as an efficient assessment tool. The translated instrument is used to formulate treatment and rehabilitation plans<sup>10</sup> at a variety of settings, such as addiction clinics, rehabilitation centers, mental health clinics and prisons, in a variety of population

(people who use substances and alcohol) who volunteer for treatment and rehabilitation and substance abusers with dual diagnosis.

## Reliability

Much of the ASI psychometric studies done in the U.S. show strong reliability data with 'inter-rater reliability' of 0.89 and above.<sup>1,11</sup> In addition, the ASI is also proven to be sensitive in detecting changes in clients during treatment<sup>12</sup> while predicting treatment and recovery outcomes.<sup>13</sup> For that purpose, local adaptations of the ASI enable execution of psychometric tests to evaluate the suitability and strength of the instrument in assessing addiction severity, to evaluate change during treatment and to monitor outcomes of the recovery program. In a survey of internal consistency among 115 alcohol abusers using Cronbach's alpha coefficient, Demirbas et al.<sup>7</sup> found satisfactory result, namely 0.74 for medical status; 0.64 for employment status; 0.70 for legal status; 0.69 for alcohol use; 0.64 for family/social relationships; and 0.77 for psychiatric status. Studies on French speaking Swiss addicts also showed good internal consistency, between 0.58s-0.81.

A study by Leonhard et al.<sup>14</sup> on 8,984 participants in the US revealed good Cronbach's alpha coefficient for internal consistency, namely 0.89 for medical status; 0.65 for employment status; 0.84 for alcohol use; 0.69 for drugs use; 0.65 for legal status; 0.74 for family/social relationships and 0.84 for psychiatric status. A Chinese study by Luo et al.<sup>5</sup> also found good internal consistency of 0.86 for medical status; 0.55 for employment status; 0.79 for alcohol use; 0.49 for drug use; 0.76 for legal status; 0.66 for family/social relationships; and 0.71 for psychiatric status. In another Dutch study among 142 addicts, the internal consistency was also good, namely 0.81 for medical status; 0.58 for employment status; 0.92 for alcohol use; 0.70 for drug use; 0.71 for legal status; 0.53 for family/social relationships;

and 0.84 for psychiatric status.<sup>9</sup> In Japan, the internal consistency of the ASI data was also found to be good; 0.79 for medical status; 0.67 for employment status; 0.67 for alcohol use; 0.49 for drug use; 0.76 for legal status; 0.66 for family/social relationships; and 0.71 for psychiatric status.<sup>6</sup>

Demirbas et al.,<sup>7</sup> in testing external reliability through test-retest correlation among 31 subjects for 10 days, found correlation values of 0.85 for medical status; 0.75 for employment status; 0.84 for legal status, 0.85 for alcohol use; 0.83 for family / social relationships and 0.91 for psychiatric status. Good correlation values (0.70 - 0.92) were also obtained by Luo et al.<sup>5</sup> of between 0.70-0.92. In testing inter-rater reliability among 33 subjects, Demirbas et al.<sup>7</sup> found a high range of correlations, between 0.74-0.99, assigned by three raters. In China, Luo et al.<sup>5</sup> found an inter-rater correlation of between 0.74-0.98 among addicts.

### Validity

The validity of ASI obtained in the US and other countries showed good results. ASI has good 'concurrent' and 'discriminant' validity (>0.92).<sup>4</sup> Leonhard et al.<sup>14</sup> also noted significant correlation between the ASI domains except between the medical with drug use domain and the legal with the psychiatric domain. Demirbas et al.<sup>7</sup> reported satisfying coefficient correlation scores in the rating of severity and ASI composite scores, namely, 0.89 for the medical; 0.54 for employment; 0.59 for alcohol use; 0.87 for legal; 0.61 for family/social; and 0.81 for psychiatric domain. Discriminant validity between Beck Depression Inventory (BDI) and the use of alcohol was also found to be good ( $r=0.45$ ,  $p<0.01$ ).

Inversely in China, Luo et al.<sup>15</sup> found multiple domains in significantly related to each other, namely medical with drug use and legal; employment with alcohol use, drug use and family/social relationships; alcohol use with drug use, legal issues and family/social relationships; drug use with legal domain; and legal with family/social relationships and psychiatric domain. This finding is surprising based on the significant correlation between domains observed in many other countries. A suggested factor affecting the results of this research could have been the selection of samples among alcohol users whom had no serious dependence. Similar results in a Swiss study by Krenz et al.<sup>8</sup> reported significant correlation only between certain domains, namely, legal with occupational domain ( $r=-0.280$ ,  $p<0.05$ ); drug use with family/social relationship domain ( $r=0.271$ ,  $p<0.05$ ) and family/social relationship with psychiatric status domain ( $r=0.385$ ,  $p<0.01$ ). Based on previous studies, the ASI-5 demonstrated good reliability and validity in both versions, original and translated.

### Objective

The objective of this study was to obtain data validation on the validity and reliability of the translated ASI-5 Bahasa Malaysia Version (ASI-5-BM).

### Methodology

This study utilized a variety of approaches in the data collection phase, beginning with the training of officers and counsellors from the National Anti-Drug Agency (AADK) through interviews, questionnaires and data analysis. The study population consisted of clients from the public drug rehabilitation centers. Samples were selected from five public addiction treatment centers and a district rehabilitation center, as shown in Table 1.

**Table 1** Participants by Treatment/Rehabilitation Center

Rehabilitation centres	n	%
CCSC Hulu Langat	35	16.7
C&C Kuching	35	16.7
C&C Papar	35	16.7
C&C Bukit Mertajam	35	16.7
C&C Sg. Besi	35	16.7
C&C Dengkil	34	16.5
Total	209	100

### Study administration & instruments

Three instruments were used in this validation study. The first is ASI-5-BM. The ASI version used for the validation study is ASI-5 UNODC Treatment version utilized by the 'International Center for Credentialing and Education for Addiction Professionals' (ICCE) Colombo Plan in their Universal Treatment Curriculum (UTC). It was translated into Bahasa Malaysia by "back translation" method.<sup>16,17</sup> Second is the SF-12 (12-Item Short Form Health Survey), developed by Ware et al.<sup>18</sup> from the longer 36-Item Short Form Health Survey (SF-36), as a summarized version of the physical and mental health component for the U.S. population. The test-retest reliability (2 weeks) was good (0.89 to 0.76 for physical and mental) and the validity of the 'convergent' obtained was also good, ranging from 0.62 - 0.88. The SF-12 was also utilized by Denis et al.<sup>19</sup> to obtain data validity of ASI. The third is the BDI (Beck Depression Inventory). The BDI that was founded by Aaron T Beck<sup>20</sup> contains 21 items. It has been widely used to examine the severity of depression. The internal consistency of the BDI is 0.9 and test re-test reliability ranged from 0.73-0.96.<sup>21</sup> BDI was also used by Demirbas et al.<sup>7</sup> to validate the ASI among alcohol users and by Hendriks et al.<sup>9</sup> among drug addicts.

The ASI-5-BM was administered by officers and counsellors specially trained to administer the instrument. The training was provided by three experts (a psychologist, a psychiatrist and a physician) with more than 10 years experience of administering the instrument for the assessment of substance addiction. Training of the trainers was conducted over two days in the form of lectures, practical demonstrations, exercises, reflective and practical sessions till satisfactory standards were achieved. The trained ASI trainers were expected to conduct at least three additional ASI interviews before training others. Following this, the officers and counsellors at the individual centers would continue conducting training session on administering the ASI-BM-5 for purposes of assessing severity of substance addiction.

### Participants

Participants of this study consist of clients undergoing treatment and rehabilitation at six public treatment and rehabilitation centers under the National Anti-Drugs Agency (AADK) as shown in Table 1. Participants were selected among clients newly admitted to treatment and recovery centers. Clients undergo detoxification for 14 days. After this period, the counsellor would determine the client's stability to undergo the ASI-5-BM interview. All 209 participants had given consent to be interviewed. The trained counsellors interviewed the participants by administering the ASI-5-BM. The range of the interview time was between 50 - 80 minutes. After the ASI-5-BM

interview, clients proceeded to complete the 12 Item Short Form Health Survey (SF-12) and Beck Depression Inventory (BDI).

## Analysis

Analysis of validity was performed using the internal and external methods (convergent and concurrent). As for reliability, analysis of internal consistency using Cronbach's alpha, as well as external reliability factors, such as test-retest correlation and inter-rater analysis was performed.

## Findings

A total of 209 participants were interviewed by officers and counsellors who have been specially trained to administer the ASI-5-BM. Information pertaining to the participants are shown in Table 2.

**Table 2** Characteristics of participants

Variables	Study Sample (n = 209)
Malen (%)	201 (96.2)
Women n (%)	8 (3.8)
Race	-
Malay n (%)	154 (73.3)
Chinese n (%)	13 (6.2)
Indian n (%)	8 (3.8)
Others n (%)	34 (16.3)
Religion	-
Islam n (%)	180 (86.1)
Hindu n (%)	7 (3.3)
Buddhist n (%)	7 (3.3)
Christianity n (%)	17 (7.2)
Mean Age (SD)	31.11 (8.74)
Mean Years of Education (years) (SD)	10.4 (1.78)
Mean Duration of Employment (in the past 30 days) (SD)	12.9 (6.82)
Marital Status	-
Married n (%)	55 (23%)
Single n (%)	143 (59.8%)
Widow/er n (%)	2 (0.84)
Divorced/Separated n (%)	38 (16.1%)
Living With Children n (%)	48 (20.1%)
Days Spent in a Controlled environment	-
Rehabilitation Center n (%)	42 (23.1)
Medical/Psychiatric Center n (%)	2 (1.0)
Nil n (%)	141 (67.5)

## Validity

'Convergent' validity refers to the degree to which two measures of construct that theoretically should be related are in fact related. To establish the 'convergent' validity a correlation analysis was performed between domains within the ASI-5-BM. Correlation analysis showed

high and significant coefficient scores. Analysis Table 3 found that participants who use drugs were closely correlated with health/medical problems ( $r=0.145$ ;  $p<0.05$ ); family/relationship problems ( $r=0.282$ ,  $p<0.001$ ); and psychiatric problems ( $r=0.207$ ,  $p<0.01$ ). The use of alcohol was also significantly correlated with health/medical problems ( $r=0.179$ ,  $p<0.01$ ) and legal problems ( $r=0.215$ ,  $p<0.01$ ). In addition, participants who were facing fewer legal problems also had fewer psychiatric problems ( $r=0.234$ ,  $p<0.01$ ) and those with family/social problems also had psychiatric problems ( $r=0.410$ ,  $p<0.001$ ). Theoretically, all these domains were closely correlated with each other.

The second step was to measure the "concurrent" validity which measures the extent to which results of a test/measure correlates with a measure that has previously been validated, on the same construct. To examine the validity of the ASI-5-BM, two instruments with genuine capabilities to measure domains within the ASI were identified for purposes of comparison, namely the SF-12 and the BDI. The SF-12 that examines the physical and mental health status of an individual is then compared against the health/medical domain and the psychiatric domain of the ASI-5-BM, while the BDI was used to confirm the psychiatric domain of the ASI-5-BM. Table 4 shows that participants who scored high in the health/medical domain (multiple health/medical problems) scored low in the SF-12 ( $r=-0.261$ ,  $p<0.01$ ). This meant that the 'concurrent' validity was established. Concurrently, those who scored high on the SF-12 (healthy) were less likely to use drugs ( $r=-0.126$ ,  $p<0.05$ ); less likely to use alcohol ( $r=-0.182$ ,  $p<0.01$ ), had less legal problems ( $r=-0.193$ ,  $p<0.05$ ), less family/social relationship issues ( $r=-0.170$ ,  $p<0.05$ ) and less psychiatric problems ( $r=-0.318$ ,  $p<0.001$ ). These results supported the 'concurrent' validity. Participants who scored high on the BDI also scored high in the psychiatry domain of the ASI-5-BM ( $r=0.291$ ,  $p<0.01$ ). This also suggested that the 'concurrent' validity was established. There were no other significant correlations observed.

## Reliability

Reliability is related to the quality of a measurement. Three forms of analysis were conducted, an internal consistency and two analysis of external reliability. The internal consistency examined the extent to which a set of items measured the construct consistently within the group. This was measured with Cronbach's alpha. The analysis results can be seen in Table 5. A reliable measurement is also a consistent measurement, which meant that similar results could be obtained consistently or almost similar. The two methods used are firstly, the inter-rater reliability to measure the degrees of agreement among raters. The second method utilized is the test-retest reliability that examines consistency of a measurement over a period of time. The inter-rater correlation between raters across all domains of the ASI-5-BM. Table 6 was found to be positive and significant ( $r=0.231$  to  $0.700$ ,  $p<0.05$ ). Despite the different raters, the scores were consistent.

For the test-retest correlation, a period of 14 days retest was set in accordance with a previous study.<sup>15</sup> The interviewer randomly interviewed five participants from each of the centers and then re-interviewed them 14 days later. Test-retest correlation of ASI-5-BM composite scores in Table 7 were in the range of 0.251-0.946. Similar analysis was also performed for SF-12 and BDI. Both scales measured good Cronbach's alpha values (Table 8) and test-retest correlation (Table 9). It can be concluded from the reliability and validity tests data that the ASI-5-BM version of the instrument has good psychometric values.

**Table 3** Correlation between domains of ASI-5-BM

Composite score	Min	SD	Occupation	Medical	Alcohol	Legal	Family	Psych
Medical	0.21	0.26	-0.063	.145*	.179**	0.128	-0.011	.255***
Occupation	1.21	1.33	-	-0.029	-0.063	-.136*	-.149*	-0.085
Drug use	0.16	0.1	-	-	0.069	.163*	.282***	.207**
Alcohol use	0.07	0.17	-	-	-	.215**	0.125	0.065
Legal	0.17	0.18	-	-	-	-	0.09	.234**
Family/Social	0.21	0.25	-	-	-	-	-	.410***
Psychiatric	0.13	0.17	-	-	-	-	-	-

**Table 4** Correlation between domains of ASI with SF-12 and BDI

Domains of ASI	Min	SD	Medical	Occupation	Drug	Alcohol	Legal	Family	Psych
SF-12	32.67	4.66	-.261**	.140*	-.126*	-.182**	-.193*	-.170*	-.318***
BDI	13.63	9.79	0.042	0.056	0.009	-0.087	-0.001	0.131	.219**

**Table 5** Cronbach's alpha for ASI composite scores

ASI composite score	No of items	Cronbach's alpha
Medical	3	0.634
Occupation	2	0.581
Drug Use	12	0.798
Alcohol Use	5	0.811
Legal	5	0.732
Family/Social	5	0.765
Psychiatry Status	8	0.873

**Table 6** Inter-rater Correlation for ASI-5-BM composite scores

ASI composite score	r	p
Medical	0.394	0.002
Occupation	0.283	0.028
Drug/Alcohol Use	0.231	0.032
Legal	0.406	0.001
Family/Social	0.7	0
Psychiatry Status	0.621	0

**Table 7** Test-retest Correlation of the ASI-5-BM composite scores (n=30)

ASI composite score	r	p
Medical	0.251	0.021
Occupation	0.749	0.001
Drug Use	0.893	0
Alcohol Use	0.877	0
Legal	0.946	0
Family/Social	0.822	0
Psychiatry Status	0.881	0

**Table 8** Cronbach's Alpha for BDI and SF-12

Instrument	Number of items	Cronbach's alpha
BDI	21	0.891
SF-12	12	0.765

**Table 9** Test-retest Correlation of BDI and SF-12 (n=30)

Instrument	r	p
BDI	0.77	0
SF-12	0.792	0

## Discussion

The aim of this study was to obtain validation data, i.e. the validity and reliability of the ASI-5 instrument that has been translated to Bahasa Malaysia Version (ASI-5-BM). The validity and reliability analysis of ASI-5-BM has been conducted and found to have good psychometric characteristics. Much data about the validity of the ASI has been specified in the US and other countries. The ASI has good 'concurrent' and 'discriminant' validity (>0.92).<sup>1</sup> Convergent analysis found clients who use drugs and/or alcohol to have health/medical problems, family/social problems, and/or psychiatric problems. All these domains are theoretical correlated to one another.<sup>11,19</sup> In Turkey, Demirbas et al.<sup>7</sup> recorded a satisfactory correlation for the severity rating and composite ASI scores (0.54 - 0.87) for all ASI-5 domains.

The discriminant validity of the BDI for the use of alcohol was also good ( $r=0.45$ ,  $p<0.01$ ).<sup>7</sup> In the US, Leonhard et al. (2002), found significant correlation between domains in the ASI-5 excepting in the medical domain with drug use and the legal domain with psychiatry problems. Although the study by Luo et al.<sup>15</sup> found many domains unrelated to each other, but his study was limited to alcohol users who may not have had significant family, legal or psychiatric problems. The Krenz et al.<sup>8</sup> study with Swiss samples reported that significant correlation was found only between legal and occupational domains ( $r=-0.280$ ,  $p<0.05$ ); drug use and family/social relationship domains ( $r=0.271$ ,  $p<0.05$ ) and family/social relationship and psychiatric domains ( $r=0.385$ ,  $p<0.01$ ). Our analysis also showed that the ASI-

5-BM medical domain has significant correlation with SF-12, BDI and the psychiatric domain. This means that ‘concurrent’ validity for ASI-5-BM has been acquired.

The reliability of our study was found to be consistent with a good Cronbach’s alpha estimates for the ASI-5-BM, in keeping with data from the US,<sup>14</sup> Netherlands,<sup>9</sup> China,<sup>5,15</sup> Switzerland<sup>8</sup> and Japan.<sup>6</sup> Alpha values for the medical and occupation domain are lesser than 0.7. For the medical domain (0.581), this is probably due to the reporting of how many times there were hospitalized as opposed to how many days that they were in the hospital. For the occupation domain (0.634), there may be some variation on the full-time employment as opposed to non-full time. The inter-rater analysis showed good consensus between two raters to an independent evaluation of the severity of each domain in the ASI-5-BM. Demirbas et al.<sup>7</sup> and Luo et al.<sup>5</sup> also found similar good inter-rater correlations in their studies, namely between 0.71-0.99 and between 0.74-0.98 respectively. This data gives us confidence that the evaluation of a same situation is consistent among multiple raters. The test-retest correlation was also found to be good in this study, which is in keeping with similar results from the Demirbas et al.<sup>7</sup> and Luo et al.<sup>5</sup> studies. The test-retest reliability examines the variation in measurement over time, where the instrument gave similar values when re-utilized by the same interviewer on the same client, even between assessments of 14 days apart. These findings substantiates that the ASI-5-BM has good and stable psychometric properties as stated by Stoffelmayer et al.<sup>22,23</sup> Based on our findings, we conclude that the ASI-5-BM can be used in Malaysia.

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## Conflict of interest

The author declares no conflict of interest.

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