Cross-Culture Adaptation and Validation of Indonesian version of CRAFFT substance abuse screening test among adolescents

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Abstract

Background: Substance abuse among adolescent in Indonesia remains public health problem. The CRFFT is the most widely utilized high-risk drug screening tool. Its use in different countries and contexts shows its enormous potential. Although the CRAFFT has been utilized on occasion by professionals and researchers in Indonesia, no psychometric tests have been conducted to ensure that it works reliably in our country.
Purpose: This study aimed to examine the psychometric performance of the CRAFFT screening tool among Indonesian adolescents.
Methods: Eighty adolescents aged 15–18 years, recruited from a drug rehabilitation facility in West Java, Indonesia, participated in the research. The CRAFFT instrument underwent a four-step translation and adaptation process. Content validity was assessed using Aiken's V index. The factorial structure of the instrument was explored through exploratory factor analysis (EFA) and subsequently verified with confirmatory factor analysis (CFA). Internal consistency reliability was evaluated using the Kuder–Richardson 20 (KR-20) coefficient.
Results: CRAFTT CVI was 0.80–1.00 with the factor loadings for each of the three scales in the CRAFTT was 0.65–0.88. The results of the confirmatory factor analysis (CFA) for CRAFFT were as follows: I2 = 64.11, p-value = 0.121, and df = 78. Pearson correlation coefficients for the six different subscales ranged from 0.450 to 0.637. KR-20 coefficient of CRAFFT was 0.767. Corrected Homogeneity Index (CHI) ranged from 0.314 to 0.580.
Conclusion: The results of this study demonstrate that the CRAFFT instrument can serve as a practical and effective tool for identifying substance use issues among adolescents in Indonesia. Further investigations are recommended to examine its sensitivity and specificity in order to establish stronger evidence for the validity of the CRAFFT within this population.

Keywords: adolescents; CRAFFT; Cross-Culture Adaptation; Indonesia; substance abuse; validation

Introduction

Adolescence is a developmental stage that occurs between childhood and adulthood. Adolescents will go through various biological, psychological, and social changes. This stage of adolescent development is vital in the development of character or identity, as well as a critical transition period from child to adult (Yusof et al., 2015). Teenagers, in general, have a high level of curiosity and want to try new things. Aside from being driven by curiosity and the desire to become an adult, it motivates teenagers to want to try to accomplish activities that adults frequently do, such as dealing with sexual issues (Steinberg & Morris, 2001). Teenagers are one of the age groups most at risk for sexual conduct, and they also frequently use injectable drugs (Purnama et al., 2018).

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The National Narcotics Agency has explicitly stated that adolescent substance abuse among adolescents in Indonesia is significant health issues. The National Narcotics Agency reported that the prevalence of drug abuse was increased from 1.80% in 2019 to 1.95 in 2021, with total number 4,827,616 ever used and 3,662,646 used in the last year (National Narcotics Agency, 2022). Based on the age range, the prevalence of drug abuse was 1.93% in aged 15 to 24 years old, and it was increased from 2019 (1.80%). This number of those who currently used has increased by 11.1% compared to the previous year which amounted to 766 cases in year of 2021.

The CRFFT is the most widely utilized high-risk drug screening tool. Its use in different countries and contexts shows its enormous potential (Agley et al., 2015; Bernard et al., 2005; Cote-Menendez et al., 2013; Cummins et al., 2003; Dieppe et al., 2009; Harris et al., 2014, 2016; Karila et al., 2007; van Weelden et al., 2016). Although the CRAFFT has been utilized on occasion by professionals and researchers in Indonesia, no psychometric tests have been conducted to ensure that it works reliably in our country. This study aimed to examine the psychometric characteristics of the CRAFFT screening tool among Indonesian adolescents.

Material and Methods

Participants

A total of 80 adolescents, aged between 15 and 18 years, participated in this study. Participants were recruited from a drug rehabilitation center located in West Java, Indonesia. The sample comprised individuals who voluntarily agreed to join the research, with written informed consent obtained from both the adolescents and their parents.

Instrument

The CRAFFT is a test used to identify adolescents who have had substance abuse problems within the last 12 months. It consists of two distinct components. The first section includes three questions designed to determine whether or not the adolescent has used alcohol, cannabis, or other drugs in the past 12 months. Substance use is assessed in the second section of the CRAFFT, which consists of six questions (Knight et al., 2002). The CRAFFT instrument defines substance abuse as riding in a “car” driven by someone (including self) while high on alcohol or other substances; using alcohol or other substances to “relax” or feel better about herself/himself; using them while “alone”; and “forgetting” to complete a task while using them. The CRAFFT also asks if “family or friends” advised the youngster to cut back on alcohol or other drug usage and if they ever got into “trouble” with the law. All items were “Yes” (1 point) or “No” (0 point). CRAFFT scores, the sum of second-part questions, range from 0 to 6. Higher values may suggest problematic use (Knight et al., 2002). The CRAFFT demonstrated acceptable internal consistency in this sample (Cronbach’s alpha was 0.68) (Knight et al., 2002).

Translation process

The process of translating this instrument into Bahasa Indonesia was carried out in four structured phases. The first step involved forward translation, followed by a reverse translation conducted by a panel of experts, then pre-testing, and finally cognitive interviewing. The purpose of these stages was to ensure that the adapted version not only matched the English source but also reflected the cultural and conceptual context of the target population (WHO, 2019).

For the initial forward translation, two bilingual translators were engaged. The first (T1) held a doctoral degree from an overseas university, while the second (T2) had no clinical background, which allowed a balance between technical accuracy and lay interpretation. Their translations were then synthesized into a single version, referred to as “T-12,” after reviewing and reconciling differences. In the third stage, an independent translator who had no prior exposure to the original English version were then back-translated the T-12 document into English. This process was repeated by two native speakers to verify consistency and accuracy. The final stage brought together a multidisciplinary review committee consisting of psychometricians, medical professionals, linguists, and translators. This expert panel critically assessed the draft to ensure that the Indonesian version achieved equivalence with the original in terms of semantics, linguistic clarity, experiential meaning, and conceptual alignment. A five-point Liker scale for cultural equivalence and linguistic clarity (5-perfectly readable and understood to 1-completely unreadable and unintelligible). This classification method was applied to assess how clearly each item was understood and whether it was appropriate within the cultural context of all participants. The evaluation produced scores of 88% for linguistic clarity and 90.8% for cultural suitability.

Content validity

Content validity was determined by looking at the instrument’s significance, relevance, and vocabulary. Each question on the survey is evaluated by a specialist. If an item is improper and should be removed from the questionnaire, it will receive a score of 1 point; if it is possibly not acceptable or relevant, it will receive a score of 2 points; and if the questionnaire items are reasonable, they will receive a score of 3 points. The Content Validity Index (CVI) was determined by the panel of experts through summing the assigned scores for each item and dividing the total by the number of evaluators. Any revisions to the instrument were made in accordance with the CVI outcomes and the professional judgment of the experts (Bolarinwa, 2015). To assess the content validity of the instrument items, we applied Aiken’s V formula, which is widely used

to quantify the degree of agreement among experts regarding the relevance of each item. Aiken's V is particularly suitable when using ordinal rating scales. The formula for Aiken's V is as follows:

$$V=\sum s/\ n(c-1)$$

Where: s=r−ls; r is the score given by each expert; l is the lowest possible score on the scale; n is the number of experts; and c is the number of possible categories or response points on the rating scale. Each expert rates the item on a Likert scale (e.g., 1 to 4), indicating the degree of relevance or appropriateness. The resulting Aiken's V coefficient ranges from 0 to 1, where a value closer to 1 indicates strong agreement among experts that the item is relevant A value below 0.70 typically indicates that the item may require revision or removal (Lynn, 1986). In this study, we engaged a panel of expert validators to rate each item for clarity, relevance, and representativeness.

Construct validity

To describe the characteristics of the participants, descriptive statistical methods were applied. The dimensional structure of the CRAFFT instrument was examined through both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Model fit was evaluated using established indices, including the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), and the comparative fit index (CFI) (Hu & Bentler, 1999). A good fit has a root mean square error less than 0.06 and a standard deviation less than 0.08. According to literature, CFI values more than 0 suggest a good fit, whereas values less than 0.8 imply an adequate fit. (Browne & Cudeck, 1992). The item correlation of CRAFFT was analyzed by means of a Pearson correlation test. When the subscales are combined and certain items are deleted, correlation coefficients above 0.7 suggest that the dimensions have captured the same notion (Calvache et al., 2020).

Reliability

The term "reliability" describes the degree to which a measurement is free of errors (Mokkink et al., 2016). This study used KR-20 coefficient to determine its reliability.

Procedure

All study protocols followed the ethical standards outlined in the Declaration of Helsinki. Ethics committee of the STIKes Abdi Nusantara approved

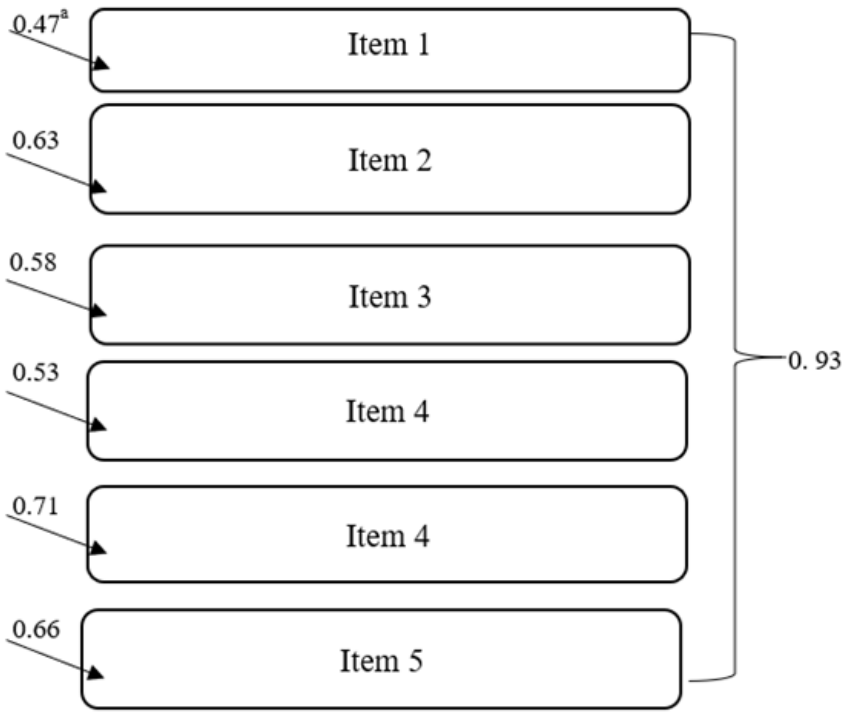

Figure 1. The CRAFFT-Indonesian Measurement Model for the unidimensional. a: Measurement Error. b: Squared Multiple Correlation (SMC) value. c: Standardized Factor Loadings

Table 1. Demographic of respondent (n=80)

Variables	Intervention group (n=80 (%))
Age, Mean ± SD	16.7±2.55
Gender	
Male	43 (53.7)
Female	37 (46.2)
Current education	
Elementary school	23 (28.8)
Junior high school	50 (57.5)
Drop out/uneducated	11 (13.8)
Age at first diagnose	13.32±3.57
Parent age	40.7±8.64
Working status	
Yes	52 (65)
No	28 (35)
Rehabilitation	
Yes	67 (83.3)
No	13 (16.3)

Table 2. Validity content based on Aiken's Value formula of CRAFFT (n=5)

Item	Examiner 1		Examiner 2		Examiner 3		Examiner 4		Examiner 5		∑s	V	
	Value (R)	S=R-Lo	Value (R)	S=R-Lo	Value (R)	S=R-Lo	Value (R)	S=R-Lo	Value (R)	S=R-Lo			
1	4	3	4	3	4	3	4	3	4	3	15	1.00	Valid
2	4	3	4	3	4	3	4	3	4	3	15	1.00	Valid
3	4	3	4	3	3	2	3	2	3	2	12	0.80	Valid
4	4	3	4	3	4	3	4	3	4	3	15	1.03	Valid
5	4	3	4	3	4	3	4	3	4	3	15	1.04	Valid
6	3	2	4	3	4	3	3	2	3	2	12	0.80	Valid

s=R-Lo; r is the score given by each expert; Lo is the lowest possible score on the scale; n is the number of experts.

Table 3. Factor loading of individual items in CRAFTT

	Factor loading	Eigen Value	Variance explained (%)
Have you ever ridden in a car driven by someone (including yourself) who was high or had been using alcohol or drugs?	0.76	4.54	40.76
Do you ever use alcohol or drugs to Relax, feel better about yourself, or fit in?	0.88		
Do you ever use alcohol or drugs while you are b yourself or alone?	0.65		
Do you ever Forget things you did while using alcohol or drugs?	0.66		
Do your Family or Friends ever tell you that you should cut down on your drinking or drug use?	0.58		
Have you ever gotten into Trouble while you were using alcohol or drugs?	0.76		

Table 4. Empirical Data Correlation Matrix of CRAFFT (n=80)

Items	1	2	3	4	5	6
1	0.543**					
2	0.484**	0.537**				
3	0.637*	0.463**	0.561**			
4	0.501**	0.458*	0.415*	0.450*		
5	0.637**	0.532**	0.313*	0.565**	0.552**	
6	0.611**	0.456**	0.619*	0.594**	0.594*	0.474**

Note: Correlation between raw survey scale score values using the Pearson correlation coefficient. * p<0.05; **p<0.00.

Table 5. Reliability of CRAFFT

Item no.	KR-20 if item eliminated	Corrected Homogeneity Index
1	0.653	0.513
2	0.663	0.442
3	0.701	0.325
4	0.632	0.417
5	0.672	0.314
6	0.620	0.580

the study with a waiver of written informed parental consent and written assent. Research assistants in the waiting areas of three different primary care clinics between June 2012 and February 2013 addressed adolescents who had been identified by clinic staff. Patients within the specified age range were asked to take part in an anonymous survey research study. Patients who consented verbally were moved into a separate room where they were given a battery of questionnaires to fill out.

Result

Demographic characteristics

The participants' demographic information is presented in Table 1. The average age was 16.7 (SD=2.55), there were 53.7% males, and 57.5% had completed the eighth grade. Most of them (61.7%), on average (SD=3.57), started abusing drugs at the age of 13.32. In addition, 61.2% of their parents had jobs (Table 1) and their average age was 40.7 (SD=8.64).

Content validity

Before psychometric testing, we incorporated expert panel advice for minor modifications. The CRAFTT CVI was 0.80–1.00 (Table 2).

Construct validity

Exploratory factor analysis (EFA) is applied to the instrument's item structure in order to determine whether or not the measuring tool can be trusted to produce accurate results. The eigen value of only one of the factors was greater than one. The Kaiser–Meyer–Olkin (KMO) score was 0.942, which indicates that the study could have been conducted with the representative sample. The fact that the Bartlett test produced a significant result (X2 = 1476.42; P= 0.001) indicates that factor analysis is very necessary. Table 3 shows the factor loadings for each of the three scales in the CRAFTT was 0.65–0.88; this indicates that the construct validity is satisfactory, with 40.765% of the variation has been explained.

The confirmatory factor analysis (CFA) of the CRAFFT instrument produced the following fit indices: I^2 = 64.11 with a p-value of 0.121 and 78 degrees of freedom. The chi-square test did not yield significant results, suggesting that the proposed model adequately represents the observed data. In addition, the Root Mean Square Error of Approximation (RMSEA) was 0.058, with a confidence interval ranging from 0.05 to 0.089, further supporting that the model provided a reasonable fit (Figure 1).

As shown in Table 4, the Pearson correlation coefficients for the six different subscales ranged from 0.450 to 0.637 (p-value less than 0.05), indicating that there was significant independence among the subscales.

Reliability

The coefficient of reliability known as KR-20 determined that the CRAFFT has a reliability of 0.767. The Corrected Homogeneity Index (CHI) was used to conduct independent tests on each component to determine whether or not they were consistent. The results of these tests ranged from 0.314 to 0.580. It was determined that Items 3 and 5 were the ones that had the least amount of consistency in relation to the overall scale (Table 5).

Discussion

In an Indonesian sample consisting of 80 adolescents, positive psychometric properties of the CRAFFT were shown to be present. In the first place, a satisfactory value of.767 was obtained in terms of the instrument's internal consistency. This value is higher than the one that was obtained in the initial validation research conducted by (Knight et al., 2002) (=.68), as well as in other investigations (Bertini et al., 2015; Kelly et al., 2004; Subramaniam et al., 2010; Wartberg et al., 2016). The analyses that were carried out have corroborated the one-dimensional structure of the CRAFFT scale, which demonstrates the construct validity of the instrument. This was previously noted by (Subramaniam et al., 2010; Wartberg et al., 2016). However, the study did not provide a cutoff score for determining which patients with cannabis and alcohol use disorders warrant more in-depth evaluation. Most of the research looked at how well the CRAFFT could detect problematic alcohol or drug use (defined as meeting one or more DSM criteria) and substance use disorders (defined as meeting two or more DSM criteria).

Finally, researchers and practitioners in the field of addictive behavior have access to a version of the CRAFFT Abuse Screening Test that has been modified and scientifically validated. The findings indicate that the CRAFFT has reliable psychometric features and can be useful in a classroom setting. It has also been shown that none of its benefits are lost when provided by people who are not trained in medicine, expanding its scope of application. Our findings also pave the way for the CRAFFT to be used as a screening tool in the context of potential early detection and intervention programs.

However, this study has some drawbacks. The sample size of 80 teenagers is less than prior validation studies (Bernard et al., 2005; Bertini et al., 2015; Cummins et al., 2003; Kelly et al., 2004). This is insufficient for tool evaluation in socio-demographic subfields. Self-reports may misrepresent survey respondents' substance use and skew information due to fear of punishment or criticism. To avoid questioning or intimidation, replies were collected in sealed, opaque envelopes with no identifying information, and parental consent was waived in accordance with CIOMS protocols. Clinical and educational research has established that self-reported alcohol and psychotropic substance usage is reliable. However, researchers must examine the scale's psychometric properties in other independent societies. Clinical information, such as comorbidities and family history, would have been beneficial. Finally, since the data were obtained in schools rather than through a clinical interview, the characteristics evaluated were self-reported, making it hard to objectively determine whether teenagers understated or exaggerated their substance use. According to addiction experts (Babor et al., 2001; Winters et al., 1990), self-report measures are more accurate and reliable than other methods for assessing alcohol and drug use. In Indonesia, much preventive work is done in schools, making the CRAFFT a powerful instrument.

Conclusion

The results of this study demonstrate that the CRAFFT questionnaire serves as a practical and effective tool for identifying substance use among Indonesian adolescents. While such screening instruments are not intended to provide a clinical diagnosis of substance use disorders, their accuracy and reliability make them valuable in directing healthcare providers' attention to adolescents who may be at higher risk. This is particularly important in busy clinical settings, where the majority of young patients are not engaged in alcohol or drug misuse. Further research examining the sensitivity and specificity of the CRAFFT is recommended to ensure stronger validation and to support its use as a comprehensive screening instrument.

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Declaration of interest
The authors of this article declare that they have no conflict of interest

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Data Availability
None

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