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Translation and Psychometric Analysis of the Brief Symptom Inventory in Adolescents with Substance Use Disorder

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Abstract

The Brief Symptom Inventory-18 (BSI-18) is an 18-item self-report checklist designed to screen for psychological symptoms in medical patients. This study aimed to assess the psychometric properties of BSI among a diverse group of Indonesian adolescents. This study involved 80 15 to 18-year-old adolescents from a drug rehabilitation center in West Java, Indonesia. The instrument was translated into Bahasa Indonesia, and its content validity index was calculated using Aiken's V formula. The CVI ranged from 0.73 to 1.00 for BSI. The factor loadings of each of the three scales in the BSI ranged from 0.43 and 0.88. The model was acceptable and appropriate when confirmatory factor analyses of the BSI were conducted. The Cronbach alpha coefficient of the BSI was 0.925. The findings of this study give evidence that the BSI is a viable and beneficial screening tool for detecting substance use problems among Indonesian adolescents.

Introduction

Drug consumption may offer a means for temporarily avoiding distressing emotions, thoughts, and trauma-related physiological responses (Suzuki *et al.*, 2014; Li and Seng, 2018), but can potentially increase mental health problems and emotional dysregulation in the long term. For some youth, substance abuse relapse may create a 'vicious cycle' with increasingly negative consequences related to both conditions (Garami *et al.*, 2019; Saladino, Hölzlhammer and Verrastro, 2020), and risk for substance use relapse among the adolescents who are in partial and/or early remission (Dworkin *et al.*, 2018). Excessive substance uses often co-occur with depressive illness (McCauley *et al.*, 2012). Alcohol is the most common substance used among the adolescent population (Avenevoli *et al.*, 2015; Zavaglia and Bergeron, 2017). Studies have found positive associations between alcohol use frequency and recurrent intoxication among depressed adolescents and early-onset depressive disorders with elevated levels of later addictive substance use. It has been reported that 10–25% of depressed subjects have co-occurring substance use disorder (SUD) both in general and clinical populations, with clearly higher figures in clinical populations (Ranjit *et al.*, 2019; Hunt *et al.*, 2020).

Despite the implementation of optimal medical interventions and comprehensive rehabilitation assistance, there persists a notable prevalence of recurrence among individuals diagnosed with substance use disorder (SUD) (Wang *et al.*, 2018)). According to research by the National Narcotics Agency (2020), around 70% of individuals who have received rehabilitation for drug addiction encounter relapse. Relapse is commonly characterized as the reappearance of symptoms associated with SUD following a period of decreased substance

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consumption. This phenomenon is frequently observed among young individuals and adults after treatment, with notable prevalence rates (Kabisa *et al.*, 2021). According to (Zeng, Lu and Chen, 2021), there is a positive correlation between the likelihood of relapse and the occurrence of relapse behavior. Hence, there is a requirement to assess recurrence rates in individuals following the completion of a recovery program (Astuti and Hastono, 2020; Oktriyanto, Amrullah and Titisari, 2020).

The Brief Symptom Inventory-18 (BSI-18; Derogatis, 2001) is a self-report checklist of 18 items. It was a concise tool to assess psychological symptoms in individuals receiving medical care. The BSI-18 has been extensively utilized in both research and clinical settings, encompassing a diverse patient population. Notable examples of its application include studies conducted by (Derogatis and Melisaratos, 1983; Mustanski *et al.*, 2007; Petkus *et al.*, 2010). The BSI-18 has been employed in the examination of oncology samples, as demonstrated by the works of (Bober *et al.*, 2013; Michel and Vetsch, 2015; Bitsko *et al.*, 2016; Vuotto *et al.*, 2017; Calderon *et al.*, 2020). The utilization of the BSI-18 in assessing adolescents who have undergone substance use disorder rehabilitation is substantiated by several factors. Firstly, the instrument's concise nature allows for efficient administration and completion. The BSI-18 comprehensively addresses key aspects of anxiety and depression, which are crucial areas of concern in this population. Furthermore, the inclusion of normative data specific to adolescents with a history of substance use disorder in the published manual further supports the applicability of the BSI-18 in this context. While the BSI has been sporadically employed by professionals and researchers in Indonesia, there is a lack of psychometric testing to establish its reliability within our context. This research evaluates the BSI psychometric properties among a representative sample of adolescents in Indonesia.

Methods

The study included a cohort of 80 teenagers from 15 to 18 years old. The participants for this study were selected from a drug rehabilitation facility in West Java, Indonesia. The study sample comprised individuals who voluntarily decided to participate in the research, and informed consent was obtained from both the participants' parents and the participants themselves. The Brief Symptom Inventory-18 (BSI-18; (Derogatis, 2001)) is a self-report checklist of 18 items. It was a concise tool to assess psychological symptoms in individuals receiving medical care. The BSI comprises three dimensions, namely somatization, depression, and anxiety. The BSI categorizes individuals with a GSI t-score of 63 or higher as clinically significant. The criteria for identifying cases using the BSI-18 questionnaire include two options: a t-score of 63 or higher on the Global Severity Index (GSI), or meeting the criteria on any two symptom scales. Additionally, the usual case-rule for the GSI involves a t-score of 63 or higher.

The process of translating a questionnaire encompasses four stages. Commencing with the initial forward translation, engaging an expert panel, employing the back-translation technique, and doing cognitive interviewing. According to the World Health Organization (2016), the concluding phase of the translation process involves the fulfillment of the questionnaire through the implementation of a pre-test and the creation of accompanying documentation. This endeavor generates bilingual versions in Bahasa Indonesia that accurately reflect the original notions in English. Moreover, the device possessed considerable value, exhibited rationality, and conformed to predetermined expectations. The tool was translated into Bahasa, a language spoken by the indigenous population of Indonesia, by two multilingual translators. The individuals received support from English language experts who were naturally fluent in Bahasa. Each translator is operating autonomously, and three reviewers have undertaken the validation process using the two translated versions. Consequently, the ultimate version of the Bahasa edition underwent evaluation by three nursing professionals, all of whom own a doctoral degree from an international institution and are proficient in Bahasa and English. In the meantime, another translator proficient in both languages altered their

course and performed a translation task from Bahasa to English, reversing the direction of the translation process. Subsequently, a researcher conducted a comparative analysis between the revised English rendition and the first English version, with another bilingual nursing expert engaged in the validation process for both languages.

The researchers utilized the Content Validity Index (CVI) to assess the content validity of the translated questionnaire, particularly focusing on the prioritization, relevance, and appropriateness of the phrasing (Campbell, 2014). Five individuals with expertise in the field were selected to evaluate the Bahasa questionnaire following forward and backward translation. Among these experts, three had a Doctor of Philosophy degree in nursing, while the remaining two were clinicians, consisting of one nurse and one physician. The questionnaire was subjected to expert evaluation, wherein reviewers assessed each item on the questionnaire and assigned a numerical value to it. Additionally, an alternative scale is available assessing factors encompassing multiple levels of content suitability and significance. System implemented wherein a single point is assigned to instances of inappropriate content. The question item ought to be removed. The two-point method evaluates information or items of a dubious nature. It requires a substantial level of exertion. A three-point system is proposed to provide an acceptable range with minimal effort. The 4-point scale encompasses suitable elements without modification, and no questions can be omitted. Upon the conclusion of the expert committee's review, the Content Validity Index (CVI) score was computed utilizing Aiken's V formula as described by Azwar (2015). The V value varies between 0 and 1.00. If the CVI has a value of 0.80 out of 1.00, it suggests it is significantly elevated. The higher the value of V, the greater the accuracy of the item and the validity of the exam. Once the items have undergone the content validity assessment, they are considered comprehensive.

Descriptive statistics were employed to elucidate the profile of the sample. The study applied exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to ascertain the factor structure of the BSI instrument. The evaluation of measurement fit indices is commonly proposed through the use of the root-mean-square approximation error (RMSEA), standardized root-mean-residual (SRMR), and comparison of fits (CFI) (Hu and Bentler, 1999). An optimal match is characterized by a root mean square error below 0.06 and a standard deviation below 0.08. Existing scholarly research has shown that Comparative Fit Index (CFI) values exceeding 0 indicate a favorable level of fit, while values below 0.8 indicates an acceptable level of fit. According to (Browne and Cudeck, 1992), The item correlation of the CRAFFT was examined using a Pearson correlation test. According to Calvache *et al*. (2020), when the subscales are aggregated and specific items are excluded, correlation coefficients exceeding 0.7 indicate that the dimensions have effectively represented the same concept.

The concept of "reliability" pertains to the extent to which a measurement is devoid of errors (Mokkink *et al.*, 2016). The present study employed the Cronbach Alpha coefficient to assess the reliability of the measurements. All study protocols adhered to the ethical principles stated in the Declaration of Helsinki. The study conducted at STIKes Abdi Nusantara has been approved by the ethics committee. The committee has granted a waiver for written informed parental consent and written assent. In June 2012 to February 2013, research assistants engaged with teenagers identified by clinic staff in the waiting areas of three distinct primary care clinics. Participants falling within the designated age bracket were invited to participate in the research study involving an anonymous survey. The patients who provided verbal agreement, were subsequently relocated to a designated area, where they were administered a comprehensive set of questions for completion.

Results and Discussion

The recommendations provided by the expert panel about minor revisions were incorporated into the scale before commencing the psychometric testing phase. The BSI content validity index (CVI) ranged from 0.73 to 1.00. These results suggest that the BSI properly valid in assessing food content.

Table 1. Reliability of BSI Scale

Scale	Cronbach's Item-total correlation (n = 144)	Item-total correlation (Range) (n = 144)	Intraclass correlation coefficient (n = 72)
BSI	0.925	0.533—0.728	0.765

The present study examined the favorable psychometric features of the Brief Symptom Inventory (BSI) in a sample of 80 Indonesian teenagers. Initially, a good level of internal consistency was achieved about the instrument. The analyses have shown support for the three-dimensional structure of the BSI scale, hence establishing the construct validity of the instrument. Nevertheless, the study failed to establish a specific threshold score determining whether patients with recurrent disorders should undergo further comprehensive assessment. The majority of the research examined the efficacy of the BSI in identifying instances of problematic alcohol or drug, as defined by meeting one or more criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM). Additionally, the research explored the BSI's ability to identify substance use disorders, as defined by meeting two or more criteria outlined in the DSM.

The existing scholarly literature has examined various factor structure models of the Brief Symptom Inventory (BSI). These models include five-factor structures observed in bereaved patients (Johnson, 1996), six-factor structures observed in different ethnic groups, both clinical and nonclinical, as well as college and university counseling center clients (Daoud *et al.*, 2010), eight-factor structures observed in individuals experiencing distress (Ruipérez *et al.*, 2001), and a single-factor structure of general distress observed in patients with epilepsy or psychiatric disorders (Kellett *et al.*, 2003; Endermann *et al.*, 2005). Researchers and practitioners in the field of addictive behavior now have the opportunity to utilize a scientifically validated version of the BSI Abuse Screening Test, which has undergone modifications. The results suggest that the BSI exhibits robust psychometric properties and holds potential utility within the context of Indonesia. Furthermore, research has demonstrated that the advantages of this intervention remain intact even when administered by individuals lacking medical training, hence broadening its potential range of utilization. Additionally, our research results provide a foundation for the possible utilization of the Brief Symptom Inventory (BSI) as a screening instrument within the framework of early detection and intervention initiatives.

Nevertheless, this study possesses certain limitations. The sample size of 80 adolescents is smaller than the sample sizes reported in previous validation studies conducted by (Bernard *et al.*, 2005; Bertini *et al.*, 2015). The current approach is inadequate for evaluating tools within socio-demographic subfields. The potential for self-reports to inaccurately portray survey respondents' substance usage and introduce bias is a result of respondents' apprehension of potential consequences or negative judgement. To mitigate potential questioning or intimidation responses were gathered in securely sealed envelopes that were opaque, ensuring anonymity. Additionally, under CIOMS protocols, the requirement for parental consent was removed. Numerous studies conducted in both clinical and educational settings have provided empirical evidence supporting the reliability of self-reported alcohol and psychotropic substance usage. However, it is imperative for researchers to thoroughly investigate the psychometric features of the scale in several independent societies. The inclusion of clinical data, such as comorbidities and family history, would have provided valuable insights. Ultimately, due to the data collection taking place in educational institutions rather than via clinical interviews, the attributes assessed were self-reported, rendering it challenging to ascertain with objectivity whether adolescents minimized or exaggerated their substance consumption. Self-

report measures have been found to possess more accuracy and reliability compared to alternative approaches when evaluating alcohol and drug usage. In Indonesia, a significant number of preventive efforts are implemented within educational institutions, hence establishing the BSI as a potent tool.

Conclusion

The results of this study provide empirical support for the effectiveness and utility of the BSI as a screening instrument for identifying substance use issues among Indonesian adolescents. Screening tools such as the BSI do not serve as diagnostic tools for substance use disorder. However, when these tools are precise and dependable, they assist service providers in directing their attention towards patients who are at a heightened risk in medical settings that are often bustling, where the majority of adolescent patients may not be engaging in alcohol or drug misuse. Further research is required to evaluate the sensitivity and specificity of the BSI to establish a more comprehensive and validated tool.

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