



Indonesian Beck Depression Inventory Adaptation and Validation Among Nursing Students: A Cross-Sectional Study

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ABSTRACT

Background

The Beck Depression Inventory (BDI) is widely used to assess depressive symptoms; however, its validity among Indonesian nursing students has not been established.

Objective

The objective of this study to translate the BDI into Bahasa Indonesia and evaluate its psychometric properties among Indonesian nursing students.

Methods

The study followed the framework of adaptation and validation of instrument scale by Sousa and Rojjanasrirat. A total of 709 nursing students in Indonesia were participated with eligible criteria: actively enrolled; no history of mental health disorder and not currently on routine medication prescribed by a psychiatrist. Validity testing included exploratory and confirmatory factor

Keywords:

Depression, mental health, nursing student, reliability, validity

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analyses (EFA and CFA), concurrent validity, and assessment of ceiling and floor effects. Reliability was assessed using Cronbach's alpha.

Results

Eighteen items were retained. Internal consistency was high (Cronbach's alpha = 0.914). EFA supported a three-factor structure: Negative Attitude, Somatic Symptoms, and Impaired Performance with factor loadings 0.376 to 0.684 (KMO= 0.946; Bartlett's test $p < 0.001$). CFA demonstrated acceptable model fit. Ceiling and floor effects were minimum (7.7% and 0.01%, respectively). Concurrent validity showed a strong correlation with the DASS-21 with depression subscale ($r = 0.72$, $p < 0.001$).

Conclusion

The 18-item Indonesian BDI is a valid and reliable instrument for assessing depression severity among Indonesian nursing students and can be recommended for assessing depression among nursing students.

There is a significant relationship between the quality of nursing services and outpatient satisfaction at the public health center. Consequently, policies and rigorous monitoring-evaluation of the implementation of standard operating procedures (SOPs) for nursing care are essential.



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Background

Mental health disorders are recognised as a significant global health challenge among student populations, with depression emerging as one of the most prevalent of these conditions (Sonmez *et al.*, 2023). The high incidence of depressive symptoms reported across various regions has been shown to negatively impact students' psychological well-being and academic attainment (January *et al.*, 2018). A study indicates that university students experience an elevated vulnerability to mental health issues compared to members of the general population of the same age (John *et al.*, 2024). This heightened vulnerability can be attributed to certain experiential characteristics that typify university students as a population, such as developmental transition into young adulthood, pressure to adapt to a new academic environment, the burden of academic and social expectations, and the intense demands of higher education curricula (Acharya, Jin, & Collins, 2018; Gao *et al.*, 2020; Othman *et al.*, 2019).

Against this backdrop, nursing students represent a population that is particularly susceptible to depression. Globally, the prevalence of depression in this population is as high as 34%, and it is much higher in the Asian region at approximately 43% (Tung *et al.*, 2018). In Indonesia, studies consistently report depression rates of 40–42% among nursing (Fitriawan *et al.*, 2023; Tarigan *et al.*, 2025). The two studies used different instruments to assess depression. Fitriawan *et al.* (2023) used the Patient Health Questionnaire-9 (PHQ-9), while Tarigan *et al.* (2025) used the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R). The aetiology of depression in this population is multifactorial, with factors directly linked to nursing education and clinical practice

suspected to be major contributors (Karaca *et al.*, 2019). Clinical practice-related factors, such as repeated interactions with patients experiencing illness, pain, and helplessness, have been reported to significantly contribute to the onset of mental health problems – including depression (Brown, Anderson-Johnson, & McPherson, 2016; Demir, Ercan, & Erdoğan, 2022).

In Indonesia, validation and adaptation of the Beck Depression Inventory (BDI) has been documented in studies involving patients with coronary heart disease (Ginting *et al.*, 2013a) or Indonesian flood survivors (Ariani *et al.*, 2023). However, the application of the BDI among nursing students in Indonesia has remained explored. Notably, previous studies conducted in Indonesia to investigate depression among nursing students have utilised various instruments, such as CESD-R, PHQ-9, and the Depression, Anxiety, Stress Scales–21 (DASS-21) (Fitriawan *et al.*, 2023; Kurniawan *et al.*, 2024; Tarigan *et al.*, 2025). However, these studies have several methodological limitations regarding instrument validation, including the following: (1) relying solely on Cronbach's alpha, neglecting more robust psychometric indicators (Tarigan *et al.*, 2025); (2) using validation populations other than nursing students (Laksmita *et al.*, 2020); and (3) a validation process that does not adhere fully to the standard guidelines for cross-cultural adaptation (Fitriawan *et al.*, 2023) such as those recommended by Beaton *et al.* (2000) and Sousa & Rojjanasrirat (2011). Previous studies have also overlooked cultural considerations that may affect responses to depression-related assessments among Indonesian nursing students.

Given the significant burden of depressive symptoms among nursing students, accurate assessment is essential for early identification and appropriate intervention. In addition, the cultural background in Indonesia may influence how recognize, understand, and express depressive symptoms (Ginting *et al.*, 2013b). Therefore, instrument that has undergone proper validation and cultural adaptation is needed to ensure its suitability for use among Indonesian nursing students. Without these processes, differences in language, cultural norms, and symptom interpretation may lead to measurement bias and inaccurate assessment of depressive symptoms. Proper validation and cultural adaptation help ensure that the instrument accurately measures the intended construct and produces reliable results within the target population.

The Beck Depression Inventory (BDI) is one of the most extensively utilised instruments for measuring the severity of depressive symptoms. This tool has been used in over 7,000 studies, indicating its strong recognition in the field of psychometrics (Wang & Gorenstein, 2013). The BDI is applicable to various populations and a wide age range, spanning adolescents (aged 13–19) to adults (Edelstein, Drozdick, & Ciliberti, 2010). The BDI is widely used because of its strength in providing a comprehensive measurement of depressive symptoms across multiple domains while also allowing for focused and specific examination of specific symptom clusters (Hassan, Said, & Ibrahim, 2021). Although a revised version, the BDI-II, was later developed to align more closely with Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) diagnostic criteria, the original BDI remains widely used in research and clinical settings and has demonstrated satisfactory psychometric properties across diverse populations (Richter *et al.*, 1998). Therefore, the present study focused on evaluating the psychometric properties of the Indonesian version of the original BDI among nursing students. While the psychometric properties of the BDI have been established in several countries and populations, validation studies among Indonesian nursing students are lacking. Moreover, no previous study has comprehensively evaluated the cultural adaptation, factor structure, reliability, and validity of the BDI using a geographically diverse sample of nursing students across Indonesia. Therefore, this study aimed to translate, culturally adapt, and evaluate the psychometric properties of the Indonesian version of the BDI among nursing students.

Methods

This study employed a cross-sectional design with a quantitative approach. The cross-cultural validation and adaptation of the BDI was performed using the six systematic steps introduced by Sousa & Rojjanasrirat (2011) while ensuring that each stage of the process was completed systematically and that the meaning remained consistent across cultural contexts. The six steps included: forward translation, synthesis I, back translation, synthesis II, pilot and psychometric testing (Sousa & Rojjanasrirat, 2011).

Step 1: Forward translation

The translation process began with independent parallel translations of the BDI from English into Indonesian by two qualified translators with distinct cultural competencies: The first translator was an Indonesian registered nurse with expertise in psychiatric nursing and was pursuing doctoral studies in the United Kingdom at the time of the study. The second translator was an Indonesian citizen with international living experience and certification in translating health-related instruments from English into Bahasa Indonesia and vice versa. The two translators independently conducted the forward translation during the second and third week of June 2025.

Step 2: Synthesis 1

Subsequently, in the primary synthesis step, the researcher and two Indonesia psychiatric nursing conducted a comparative analysis of the two translated versions. During this critical examination, linguistic discrepancies, semantic ambiguities, and conceptual inconsistencies were successfully identified and resolved, resulting in a preliminary draft of the Indonesian BDI. The two initial translators were not involved in the subsequent process to minimize potential conflicts of interest. The first synthesis was held in the last of June 2025.

Step 3: Backward Translations

The translated version then underwent back-translation by two different translators: The first translator was an Indonesian psychiatric nursing expert with a doctoral degree who had lived in a country where English is the primary language and the second translator was Indonesian citizen who had experience living in Europe, held a master's degree in linguistics, and worked as an English teacher. The back translation was held in the first of July 2025.

Step 4: Synthesis 2

The secondary synthesis involved a methodical comparison of the back-translated versions with the original instrument and was conducted by two Indonesian psychiatric nursing experts in July 2025.

Step 5: Pilot Testing

According to the guideline proposed by Sousa & Rojjanasrirat (2011) practical implementation of the translated instrument was assessed through a pilot study conducted prior to the content validity assessment. Pilot testing of the pre-final translated version is conducted before the content validity. Practical implementation of the translated instrument was assessed in a pilot study. Ten to forty individuals are needed at this stage (Sousa & Rojjanasrirat, 2011). This step involving 39 nursing students from North Sulawesi, Jambi, Jakarta, Aceh, West Java, West Sumatera, Central Sulawesi, Southeast Sulawesi, South Kalimantan, Papua, West Kalimantan, Maluku, Central Java, Special Region of Yogyakarta, Bali, Central Papua, East Java, North Kalimantan, and West Nusa Tenggara Province. These provinces were purposively selected to represent diverse geographical regions and cultural backgrounds across the major islands of Indonesia, including Sumatera, Java,

Kalimantan, Sulawesi, Bali, Maluku, and Papua. This approach was intended to ensure that the translated instrument was understandable and culturally appropriate for nursing students from different linguistic and sociocultural contexts. Item clarity evaluated using a dichotomous rating (clear/unclear) in several provinces in different Island in Indonesia. This phase was held last July 2025.

To further determine the conceptual and content equivalence of the translated items, a content validity assessment was conducted using an expert panel comprising seven specialists, including psychiatrists, methodologists, clinical practitioners, and psychiatric nursing educators. The expert panel consisted of a psychiatrist employed at a psychiatric hospital in North Sulawesi Province, a methodologist from the Faculty of Nursing, Universitas Indonesia, West Java Province, a clinical practitioner from Marzoeeki Mahdi Hospital, West Java Province, a child psychologist from a psychological service institution in Bukittinggi, West Sumatera Province, and three psychiatric nursing lecturers affiliated with Universitas Brawijaya, East Java Province; Universitas Indonesia, West Java Province, and Universitas Sam Ratulangi, North Sulawesi Province. This was held on the last week of July 2025. Using a four-point relevance scale, the panel evaluated each item, enabling the quantitative calculation of both the Item-Content Validity Index (I-CVI) and the Scale-Content Validity Index (S-CVI).

Step 6: Psychometric Testing

The final validation step involved administering the adapted instrument to a sample of the target population – Indonesian nursing students. This comprehensive assessment involved an evaluation of various psychometric properties, including internal consistency reliability, construct validity (via factor analysis), criterion-related validity, instrument stability, dimensional structure, and model fit. The complete results of the cultural adaptation and validation processes are systematically presented in Table 1.

A non-probability sampling technique was used, combining convenience and snowball sampling methods. To minimize potential sampling bias, the online survey was disseminated through multiple nursing education networks across Indonesia. The survey link, created using Google Forms, was distributed via WhatsApp. Researchers collaborated with faculty members, program coordinators, and student representatives from various nursing institutions to facilitate survey distribution.

Using a snowball sampling approach, participants were encouraged to share the survey link with eligible peers within their academic and professional networks. Participants were recruited from diploma, undergraduate, nursing professional program, master's nursing and nurse specialist program representing approximately 30 provinces in Indonesia, thereby increasing the diversity and representativeness of the sample.

The eligibility criteria of this study was nursing students who actively enrolled, no history of mental health disorder diagnosed by a psychiatrist, and not currently on routine medication prescribed by a psychiatrist. Those who met the above criteria were invited to participate in the study and able to provide informed consent.

The required sample size for cross-cultural validation of psychometric instruments ranges from 300 to 500 respondents (Sousa & Rojjanasirrat, 2011). Furthermore, Comrey & Lee (2013) categorise a sample size of approximately 300 as 'good' and 500 as 'very good' for factor analysis. By considering those recommendation, this study recruited 709 respondents. These respondents were drawn from nursing education institutions spanning 30 of Indonesia's 38 provinces.

Data collection was conducted in August 2025 via an electronic survey using Google Forms. Eligible students who accessed the survey platform received detailed information about the study

and provided informed consent before completing the questionnaire. Completing the instrument took approximately 15–20 minutes, and the survey process was designed to maintain the anonymity of the respondents. To reduce the risk of duplicate responses, the Google Form was configured to allow only one submission per participant.

Instrument

Structurally, the BDI is a 21-item self-report scale developed by Beck *et al.* (1961) to assess the presence and severity of depressive symptoms. Each scale item consists of four statements describing increasing levels of severity for various depressive symptoms, such as sadness, crying, agitation, fatigue, and loss of energy. Respondents are instructed to select one statement in each item that corresponds best to their condition over the preceding two weeks. Each statement in an item is assigned a score ranging from 0 to 3, reflecting a gradation of symptom severity from absent to severe. The scoring procedure for the entire scale involves summing the scores from all 21 items of the BDI, yielding a total composite score ranging between 0 and 63. This total score is then interpreted based on the following severity categories: 0–9 indicates minimal or no depression, 10–16 indicates mild depression, 17–29 indicates moderate depression, and 30–63 indicates severe depression (Hagiwara *et al.*, 2017). Previous studies have demonstrated that the BDI has good internal consistency, with reliability coefficients ranging from 0.73 to 0.92 and an average coefficient of 0.86 and has shown Cronbach's alpha values of 0.86 in psychiatric populations and 0.81 in non-psychiatric populations (Beck, Steer, & Garbin, 1988). Permission to use, translate, and culturally adapt BDI has been granted to the copyright holder, by Pearson.

The DASS-21 was used as a criterion measure to assess the concurrent validity of the Indonesian version of BDI. The DASS-21 is a self-report instrument developed by Lovibond and Lovibond (1995a) that consists of 21 items divided into three subscales: depression, anxiety, and stress, with seven items in each subscale (Lovibond & Lovibond, 2011). In this study, only the Depression subscale was used. The subscale assesses depressive symptoms experienced during the previous week, including dysphoria, hopelessness, devaluation of life, lack of interest or involvement, anhedonia, and inertia. Each item is rated on a four-point Likert scale ranging from 0 ("Did not apply to me at all") to 3 ("Applied to me very much or most of the time"). The scores for the seven depression items are summed and multiplied by two to obtain the final score, with higher scores indicating greater severity of depressive symptoms (Lovibond & Lovibond, 1995a). The Indonesian version of the DASS-21 has demonstrated satisfactory construct validity and reliability in previous studies. In a sample of Indonesian early adults, the instrument showed acceptable model fit indices (RMSEA = 0.072, SRMR = 0.045, CFI = 0.914, and TLI = 0.901) and good construct reliability for the depression (CR = 0.88) (Hakim & Aristawati, 2023). Therefore, the DASS-21 was considered an appropriate comparator instrument for evaluating the concurrent validity of the Indonesian version of the BDI.

Data Analysis

The data generated in this study were processed using IBM SPSS Statistics 21.0 and AMOS 27. Descriptive analyses were performed to determine frequencies, means, standard deviations (SD), skewness, and kurtosis. The normality assumption was evaluated based on skewness (–3 to +3) and kurtosis (–10 to +10) criteria (Kline, 2023). The reliability of the BDI was measured using Cronbach's alpha, with the standard criterion set at $\alpha > 0.7$ (Koo & Li, 2016). In accordance with Sousa & Rojjanasrirat (2011), the acceptability level of the translated instrument was assessed during the pilot study phase of the adaptation process. In the pilot study, the acceptability level of each item was calculated by comparing the number of items rated as unacceptable with the total number of items in the BDI.

According to Sousa & Rojjanasrirat (2011), the Content Validity Index (CVI) was calculated based on assessments by a panel of mental health experts and methodologists using the following criteria: I-CVI ≥ 0.78 and S-CVI > 0.90 . They recommended involving approximately 6 to 10 experts in the expert panel to ensure sufficient breadth and depth of professional judgement. Each expert independently evaluated the relevance of the instructions, response format, and each translated item using a four-point scale: 1 = not relevant, 2 = unable to assess relevance, 3 = relevant but needs minor alteration, and 4 = very relevant and succinct. Ratings of 3 and 4 were considered relevant, whereas ratings of 1 and 2 were considered not relevant. The I-CVI was calculated by dividing the number of experts who rated an item as relevant by the total number of experts. The S-CVI using the averaging method (S-CVI/Ave) was calculated by averaging the I-CVI values across all items. An I-CVI value of ≥ 0.78 and an S-CVI/Ave value of ≥ 0.90 indicate acceptable content validity. Items that did not meet these criteria were revised and re-evaluated (Sousa & Rojjanasrirat, 2011). The internal consistency of each BDI item was analysed using corrected item-total correlation (CITC), with values greater than 0.3 indicating adequate internal consistency (Embretson & Reise, 2000). In the psychometric testing as the last step, the instrument was evaluated through analyses of construct validity and reliability.

Construct validity was examined using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA was performed using maximum likelihood extraction with varimax rotation, applying the following criteria: a Kaiser–Meyer–Olkin (KMO) value of >0.6 , a Bartlett’s test of sphericity value of <0.05 (Coakes & Steed, 2009), an eigenvalue of >1 (Kaiser, 1960), and a factor loading of ≥ 0.4 . CFA was used to test model fit, with the following criteria: χ^2/df ratio (CMIN/DF) of <3 (good) or <5 (acceptable), CFI of >0.80 , TLI of ≥ 0.95 , RMSEA of <0.08 , and SRMR of <0.08 – with lower AIC and BIC values indicating better model fit (Hu & Bentler, 1999). Convergent and discriminant validity analyses were conducted using the following criteria: a factor loading of ≥ 0.5 for convergent validity, and an AVE of >0.5 and a CR of >0.7 for discriminant validity (Cheung *et al.*, 2024).

To achieve robust internal validation, the study sample was split into two subsamples: one for EFA and one for CFA. Participants who completed the survey earlier (cases 1–349) were assigned to the EFA subsample, while subsequent participants (cases 350–709) were assigned to the CFA subsample, resulting in an approximate split ratio of 49:51. EFA was conducted using IBM SPSS Statistics version 21 with maximum likelihood extraction and varimax rotation, whereas CFA was performed using IBM SPSS AMOS version 27. Criterion validity was assessed using two methodological approaches. First, concurrent validity was examined by correlating scores on the Indonesian version of the BDI with scores on the DASS-21; the latter served as the gold standard, and the two instruments were administered concurrently. A strong positive correlation between these two instruments was considered indicative of robust concurrent validity (Alavi *et al.*, 2023).

Ethical Considerations

This study was conducted in accordance with ethical principles for research involving human respondents. The research protocol received approval from the Health Research Ethics Committee of the Faculty of Health and Pharmacy, Bani Saleh University, West Java Province, Indonesia (No. Ec.178/KEPK/FKF-UBS/VIII/2025).

Results

The following findings were obtained during psychometric validation.

Characteristics of Respondents

This study involved 709 nursing students from 30 provinces across Indonesia. The demographic profiles of the respondents are presented in Table 2. The median age of the respondents

Table 1. Cultural Adaptation and Validation Process of the BDI in an Indonesian Nursing Student Population

No	Description	Item	Method and standard	Results
Phase 1: Translation, adaptation and content validation				
1	Forward and back translation dan synthesis I-II	Beck Depression Instrument	Bilingual bicultural translation (n=4), comparison of the two forward and back translation	38.10 % item need minor revision in first round of pilot study 0% item need revision in second round of pilot study
2	Content validity		Pilot test: 39 nursing students 7 experts: 3 lecturers in psychiatric nursing; 1 psychiatrist; 1 clinical nurse; 1 psychologist; 1 methodologist,	I-CVI: 98.9% acceptable Level agreement 94.87-100% I-CVI > 78%, S-CVI > 90%
Phase 2: Psychometric validation				
1	Item analysis	BDI Ina 21 items	Total item correlations > 0.3	Total item correlations > 0.3 except item 21= 0.234 (was deleted)
2	Construct validity	BDI Ina 21 items	EFA (n= 349): KMO Test > 0.6 Bartlett's test of Sphericity < 0.05 Eigen value > 1 Factor loading ≥0.4	Best model using extraction method used maximum likelihood and Varimax with Kaiser for rotation method Eigenvalue and scree plot test was found 3 factors. The KMO value 0.946 dan Bartlett's Test of Sphericity (p< 0.0001) confirming adequacy for EFA Factor loading in 20 items ranged from (0.376-0.684)
			CFA (n= 360) CMIN/DF <3, GFI, AGFI: 0.80-0.90 RMSEA < 0.08, SRMR < 0.8 CFI, TLI dan IFI > 0.9 AIC & BIC the lower the better	Perform 3 factors in 18 items (10 and 18 was deleted: high covariance) $\chi^2=346.944$; df=132; CMIN/DF=2.628; GFI=0.901; AGFI=0.871; RMSEA=0.067; CFI=0.914; TLI=0.9; IFI=0.915; AIC=424.944; BIC=576.502.
			Celling and floor effects < 15%	Floor effect: n= 54 (7.7%) Celling effect: n= 1 (0.01%)
5	Discriminant validity	BDI-, 18 items, 3 factors	AVE > 0.5 CR> 0.7	Negative Attitude (AVE=0.423; CR=0.868), Somatic Symptoms (AVE=0.362; CR=0.730), and Impaired Performance (AVE=0.417; CR=0.740).
6	Concurrent-criterion-related validity	BDI-, 18 items	Correlation coefficient 0.10 = small effect 0.30= medium effect 0.50= large effect	r = 0.72, p < .001 (strong correlation)
8	Reliability	BDI Ina 18 items, 3 factors	Internal consistency: - Cronbach alpha >0.7	Cronbach S alpha= 0.910

was 20 years old, and the study respondents were predominantly female (85.33%). Most of the respondents were enrolled in a Bachelor of Nursing program, identified as Muslim, and resided in boarding houses during their studies. Most of the respondents were from educational institutions on the island of Sumatera and reported no permanent employment due to their student status. Detailed participant distribution across each province is presented in the Table 2. Based on their BDI scores, a significant proportion of the respondents (59.76%) exhibited minimal or no depressive symptoms. The univariate skewness of the 21 items ranged from 0.036 to 2.536, and the univariate kurtosis ranged from -0.168 to 8.051. The skewness and kurtosis of the 21 BDI items are presented in Table 3.

Table 2. Demographic Characteristics of the Study Sample (n = 709)

Demographic		Median (Min-Max)	n (%)
Age		20 (16-47)	
Gender:	a. Male		104 (14.67)
	b. Female		605 (85.33)
Education in Nursing:	a. D3 program		158 (22.28)
	b. Bachelor's program		458 (64.60)
	c. Nursing professional program		85 (11.99)
	d. Master program		8 (1.13)
	e. Nurse specialist program		0 (0.00)
Marital Status:	a. Single		674 (95.06)
	b. Married		34 (4.80)
	c. Divorced/widowed		1 (0.14)
Religion:	a. Islam		593 (83.64)
	b. Catholicism		27 (3.81)
	c. Protestantism		78 (11.00)
	d. Hinduism		10 (1.41)
	e. Other		1 (0.14)
Living during education:	a. Dormitory		14 (1.98)
	b. Rented room		339 (47.81)
	c. Living with nuclear family		315 (44.43)
	d. Living with extended family		39 (5.50)
	e. Other		2 (0.28)
Campus Location (by provinces):	a. West Sumatera		124 (17.49)
	b. East Jawa		86 (12.13)
	c. Central java		84 (11.85)
	d. Riau		63 (8.89)
	e. North Sulawesi		41 (5.78)
	f. West Jawa		33 (4.65)
	g. Southeast Sulawesi		31 (4.37)
	h. Bengkulu		26 (3.67)
	i. South Kalimantan		24 (3.39)
	j. West Nusa Tenggara		23 (3.24)
	k. Banten		23 (3.24)
	l. Bangka Belitung Islands		20 (2.82)
	m. North Kalimantan		19 (2.68)
	n. North Sumatera		14 (1.97)

	o. Special Region of Yogyakarta	13 (1.83)
	p. Central Papua	13 (1.83)
	q. Lampung	12 (1.69)
	r. Jakarta	10 (1.41)
	s. East Nusa Tenggara	7 (0.99)
	t. Central Sulawesi	6 (0.85)
	u. Aceh	6 (0.85)
	v. Papua	6 (0.85)
	w. Bali	6 (0.85)
	x. Maluku	5 (0.71)
	y. West Papua	3 (0.42)
	z. Southwest Papua	3 (0.42)
	aa. Southeast Maluku	3 (0.42)
	ab. Jambi	2 (0.28)
	ac. Gorontalo	2 (0.28)
	ad. South Sulawesi	1 (0.14)
Employment Status:	a. Unemployment (student)	665 (93.79)
	b. Practitioner	40 (5.64)
	c. Other	4 (0.56)
Total scale of BDI		8.00 (0-47)
	a. No Depression/Minimal (0-9)	423 (59.76)
	b. Mildly (10-16)	172 (24.26)
	c. Moderately (17-29)	99 (13.96)
	d. Severely (30-63)	15 (2.12)

Table 3. Skewness and Kurtosis BDI 21 items in Indonesian Version

No item	Item	Std. Deviation	Skewness		Kurtosis		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach alfa's domain
		Statistic	Statistic	Std. Error	Statistic	Std. Error			
2	Pessimism	.481	.036	.093	3.107	.185	.491	.908	0.864
3	Past failure	.694	.905	.093	-.123	.185	.592	.905	
5	Feeling of guilt	.803	.505	.093	-.168	.185	.542	.907	
6	Feeling of punishment	.662	2.050	.093	4.116	.185	.570	.906	
7	Self-dislike	.603	1.482	.093	3.142	.185	.675	.903	
8	Self-criticism	.781	1.126	.093	1.115	.185	.640	.904	
13	Indecisiveness	.601	1.297	.093	1.418	.185	.678	.903	
14	Change in appearance	.701	2.067	.093	3.988	.185	.602	.905	0.749
15	Loss of energy	.686	1.128	.093	.286	.185	.609	.905	
11	Agitation	.678	.997	.093	.116	.185	.524	.907	
16	Changes in sleeping pattern	.692	1.455	.093	1.920	.185	.542	.906	
17	Tiredness	.712	1.010	.093	.460	.185	.696	.902	
19	Weight Loss	.549	2.397	.093	6.148	.185	.428	.909	
20	Hypochondriasis	.737	1.608	.093	1.837	.185	.534	.907	

1	Sadness	.599	.567	.093	1.499	.185	.522	.907	0.714
4	Losing pleasure	.543	2.116	.093	4.900	.185	.572	.906	
9	Suicidal thoughts	.399	2.536	.093	8.051	.185	.552	.907	
12	Loss of interest	.545	2.362	.093	6.093	.185	.610	.905	
10	Crying	.862	1.727	.093	2.054	.185	.525	.907	
18	Losing appetited	.507	1.919	.093	3.651	.185	.539	.907	
21	Losing interest in sex	.829	2.619	.093	5.371	.185	.234	.915	

Step 1. Forward Translation: Two independent Bahasa Indonesia versions of the Beck Depression Inventory (BDI) were produced through the forward translation process.

Step 2. Synthesis I: The synthesis process resulted in one Bahasa Indonesia version of the BDI agreed upon by both translators.

Step 3. Back Translation: Two independent English versions of the BDI were generated through the back translation of the synthesized Bahasa Indonesia version.

Step 4. Synthesis II of the Back Translations: The second synthesis process resulted in one finalized English version of the BDI.

Step 5. Pilot Testing: During the first round of pilot testing, 38.10% of the BDI items were identified as requiring revision. Following item revision, a second round of pilot testing was conducted, resulting in no items requiring further revision (0%). The content validity of the BDI was assessed by calculating the I-CVI and the S-CVI in step pilot testing. This evaluation was performed by a panel of seven mental health experts. The assessment revealed perfect I-CVI scores (1.00) for all 21 items of the BDI, exceeding the minimum threshold of 0.78. On the S-CVI, the BDI also achieved a perfect score of 1.00, surpassing the >0.90 criterion

Step 6. Psychometric Testing

Construct Validity

Item analysis using CITC correlation yielded values greater than 0.3 for all items except Item 21 (Loss of Interest in Sex), with a CITC of 0.234. Based on this statistical consideration, Item 21 was excluded from the Indonesian version of the instrument, leaving 20 items retained for further analysis. EFA was then conducted on 349 respondents using this 20-item Indonesian BDI. The data suitability tests conducted returned a KMO value of 0.946 and a statistically significant Bartlett's test of sphericity value (chi-square = 346.944; $p < 0.0001$). Principal component analysis with maximum likelihood extraction and varimax rotation yielded a three-factor structure, with factor loadings ranging from 0.376 to 0.684. Item 10 was retained, notwithstanding a factor loading of 0.376, because it conceptually represents a core depressive symptom that is not replaceable by other items. The EFA revealed three factors: (1) Negative Attitude (Items 2, 3, 5, 6, 7, 8, 13, 14, and 15); (2) Somatic Symptoms (Items 11, 16, 17, 19, and 20); and (3) Impaired Performance (Items 1, 4, 9, and 12). CFA was performed on the responses of 360 respondents across three iterations. The best-fitting model was obtained after removing Items 10 (crying) and 18 (Loss of Appetite) due to high covariance, yielding optimal goodness-of-fit indices: $\chi^2 = 346.944$, $df = 132$, CMIN/DF = 2.628, GFI = 0.901, AGFI = 0.871, RMSEA = 0.067, CFI = 0.914, TLI = 0.9, IFI = 0.915, AIC = 424.944, BIC = 576.502 (See Table 4, Figure1).

Convergent Validity

Based on the CFA results, the factor loadings of all items ranged from 0.4 to 0.70, with the majority exceeding 0.5. Although Item 19 (Weight Loss) had a factor loading of <0.5 , the instrument demonstrated adequate convergent validity for measuring depression among nursing students.

Discriminant Validity

Discriminant validity analysis yielded AVE values for each factor: Negative Attitude (AVE = 0.423, CR = 0.868), Somatic Symptoms (AVE = 0.362, CR = 0.730), and Impaired Performance (AVE = 0.417, CR = 0.740). Although the AVE values were below 0.5, the CR values exceeding 0.7 across all factors remain acceptable criteria when $CR > 0.6$ (Lam, 2012). These findings support high internal consistency and strong inter-item relationships in measuring depression.

Table 4. Results of Confirmatory Factor Analysis for the Relationships Among Three Trial Models

Trial	Fit Indices										
	X ²	df	CMIN/DF	GFI	AGFI	RMSEA	CFI	TLI	IFI	AIC	BIC
Model 1	466.582	167	2.794	0.884	0.855	0.071	0.893	0.879	0.894	552.582	719.685
Model 2	437.614	149	2.937	0.886	0.855	0.073	0.893	0.877	0.893	519.614	678.944
Model 3	346.944	132	2.628	0.901	0.871	0.067	0.914	0.9	0.915	424.944	576.502

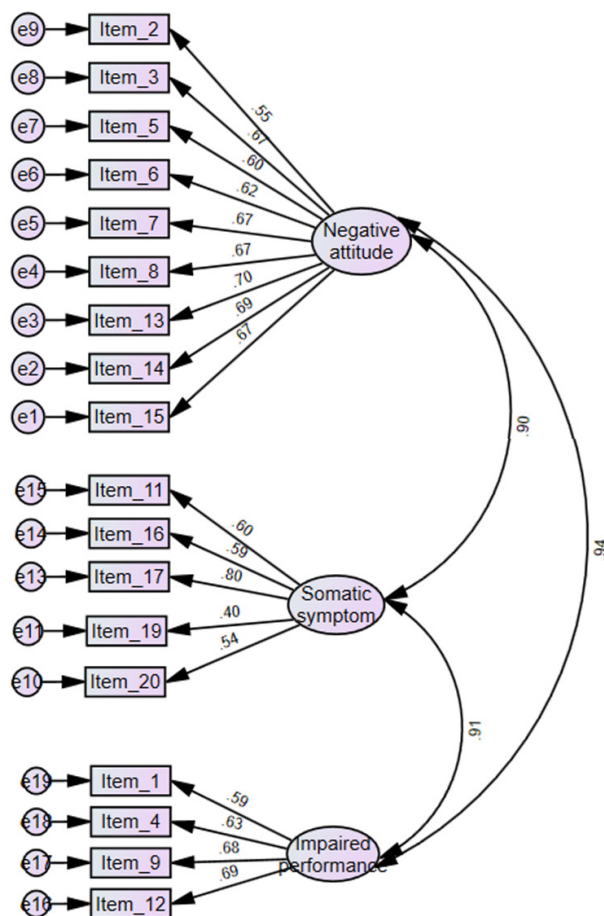


Figure 1. Confirmatory Factor Analysis of 18-item BDI, Indonesia Version

Concurrent-Criterion-Related Validity

The concurrent validity of the BDI was evaluated against the depression subscale of the DASS-21, which served as the criterion measure. Given that the data were not normally distributed, a non-parametric Spearman's correlation analysis was performed. A strong, statistically significant positive correlation was observed ($r = 0.72$, $p < .001$), confirming that the BDI possesses good concurrent validity in measuring depressive symptoms.

Reliability

Instrument reliability was tested using Cronbach's alpha for the 18-item Indonesian version of the BDI. The analysis yielded a Cronbach's alpha value of 0.910, indicating excellent internal consistency in measuring the depression construct within the study population.

Discussion

The Indonesian version of the BDI demonstrated satisfactory psychometric properties. This was confirmed using EFA, which yielded a three-factor structure comprising 18 items. Indonesian nursing students possess distinct cultural characteristics that differentiate them from their counterparts in other countries. One cultural factor that may influence depression in Indonesia is religiosity (Tanaka *et al.*, 2025). Indonesia is characterized by substantial religious diversity, and religious practices play an important role in the daily lives of its people (Wardana, 2026). Religious values may influence how individuals respond to various stressors and life challenges, including using religious coping strategies. Previous studies have shown that positive religious coping is associated with lower levels of depression, as it can provide meaning, hope, and psychological support when dealing with stress (Siagian & Abia, 2022). Indonesia's cultural diversity encompasses a wide range of languages, traditions, arts, and belief systems, which collectively shape the identities and characteristics of local communities. Within the context of mental health, these cultural values play an important role in influencing how individuals and communities perceive, interpret, and respond to psychological problems (Zafila & Purnairawan, 2024).

The specific dynamics of healthcare education, the structure of nursing curricula, and the service culture within both clinical and community practicum settings can significantly influence psychological well-being and vulnerability to depression among Indonesian nursing students (Hwang & Kim, 2022). Therefore, conducting a rigorous psychometric evaluation of depression instruments is critical to ensuring the availability of validated assessment tools for the accurate detection of depression among the nursing student population in Indonesia. The findings of this study provide robust evidence of the reliability and validity of this adapted instrument in the specific cultural and demographic contexts of Indonesian nursing education.

The analyses revealed excellent internal consistency of the adapted scale, with a Cronbach's alpha of 0.910. This indicates that the 18-item Indonesian BDI measures the construct of depression in a highly consistent and reliable manner. This finding aligns with the strong reliability reported in the validation study for the original English BDI (Beck, Steer, & Brown, 2011) and is consistent with other international adaptations, such as the Bangla version administered to university students ($\alpha = 0.90$) (Hasan & Khan, 2025) and the Persian version (Toosi, Rahimi, & Sajjadi, 2017) thus supporting the transcultural utility of the BDI.

Previous studies shared similarities with the present study in terms of large sample sizes and comparable participant age ranges. These similarities may have contributed to the consistent findings, particularly regarding the high reliability of the instrument. Methodological differences may also have contributed to variations in psychometric findings. In the present study, the Depression subscale of the DASS-21 was used as a criterion measure to assess the concurrent

validity of the Indonesian version of the BDI. Previous studies, however, have employed different comparator instruments, including structured diagnostic interviews and alternative depression scales. These methodological differences should be considered when interpreting variations in validity coefficients, factor structures, and item retention across studies (Lovibond & Lovibond, 1995b).

Based on the item-total correlation analysis, Item 21 (Loss of Interest in Sex”) was removed from the final adapted instrument. This decision was primarily driven by the socio-cultural context of Indonesia, where discussing matters of sexuality is widely considered a highly sensitive and taboo subject, particularly among adolescents (Muarifah, Soesilo, Tagela, 2019). In Indonesian society, open discussions about sexuality are often considered taboo due to prevailing cultural and religious norms, which may discourage individuals from openly expressing or discussing sexual issues (Situmorang, 2024). Given these prevailing cultural values, discussing topics of a sexual nature in a public setting – including a research context – is considered a sensitive issue that respondents would likely find uncomfortable.

Concerning the factor structure, EFA performed on data from a subsample of 349 respondents revealed three factors for the Indonesian BDI: Negative Attitude, Somatic Symptom, and Impaired Performance. The EFA confirmed a three-domain structure, with most items demonstrating robust factor loadings and the domains showing significant intercorrelations. This finding aligns with research by Abubakar *et al.* (2016) on adapting and evaluating the latent structure of the Swahili version of the BDI, thus providing further support for the construct validity of this three-factor model across cultures. CFA was subsequently conducted on a separate subsample ($n = 360$) to verify this model. The final model, comprising 18 items, demonstrated an acceptable model fit after the removal of two items: Item 10 (Self-Criticism) and Item 18 (Changes in Appetite). The removal of these two items can be theoretically justified. Item 10 (Self-Criticism) may carry cultural connotations; in collectivist societies such as Indonesia, self-criticism may not manifest as a core symptom of depression in the same way it does in individualistic Western cultures, or it might be expressed differently (Kirmayer, 2001). Similarly, Item 18 (Changes in Appetite) can be influenced by factors unrelated to depression in a student population, such as taste preferences, environmental control, media, and advertising (Deliens *et al.*, 2014). Furthermore, the conceptual territory of Item 18 may overlap with that of a retained item that addresses weight loss. The removal of these two items improved the model fit without substantially compromising the comprehensiveness of the scale, as the remaining items adequately capture the core cognitive-affective and somatic dimensions of depression. The convergent and discriminant validity of the final model were also found to be satisfactory, further strengthening the construct validity of the Indonesian BDI.

The concurrent validity analysis, which examined the correlation between the BDI Indonesian version and the depression subscale of the DASS-21, demonstrated a strong Spearman’s correlation coefficient of $r = 0.72$ ($p < .001$). The findings of this study are consistent with previous research demonstrating strong correlations between the BDI and other established measures of depression across diverse populations. For example, Arnarson *et al.* (2008) report high correlations between the BDI and the Mini-International Neuropsychiatric Interview (MINI) among both student and patient samples. Similarly, other studies have shown that the BDI is strongly associated with instruments such as the Center for Epidemiologic Studies Depression Scale (Campos & Gonçalves, 2011) and the Difficulties in Emotion Regulation Scale – Short Form (DERS-SF; (Danasasmita *et al.*, 2024). The consistency of these findings indicates that the Indonesian version of the BDI is a reliable and valid instrument for assessing depressive symptoms among nursing students.

Nevertheless, the present study offers several advantages over earlier research. First, participants were recruited from approximately 30 provinces across Indonesia, providing broader geographical and cultural representation. Second, a more comprehensive psychometric evaluation

was conducted, including EFA, CFA, concurrent validity, assessment of ceiling and floor effects, and reliability testing. Furthermore, the inclusion of participants from diverse regions enhances the cultural relevance and supports the generalizability of the instrument within the Indonesian nursing education context.

Several limitations should be considered when interpreting the findings of this study. First, the translation process is that the back translators were not native English speakers, as recommended by Sousa and Rojjanasrirat (2011). Nevertheless, both translators were bilingual professionals with experience in translating health-related instruments and were blinded to the original version, which may have helped minimize potential translation bias. Second, although participants were recruited from approximately 30 provinces across Indonesia, the distribution of respondents was uneven, with some provinces represented by fewer than 30 participants. This imbalance may have limited the representativeness of certain regions and reduced the ability to capture potential regional variations in the expression and interpretation of depressive symptoms.

Given Indonesia's substantial cultural, linguistic, and religious diversity, differences in local norms and contextual factors may influence how nursing students understand and respond to specific BDI items. Therefore, the relatively small number of respondents from some provinces may have affected the generalizability of the findings to the broader population of Indonesian nursing students. Future studies should consider employing stratified or probability-based sampling approaches to achieve more balanced provincial representation and to examine measurement invariance across different geographic and cultural groups.

Conclusion

The 18-item Indonesian version of the BDI demonstrates good cultural congruence and adequate psychometric properties (validity and reliability) for measuring depressive symptoms among nursing students in Indonesia. Although some AVE values were below 0.50, the corresponding CR values exceeded 0.70, supporting adequate convergent validity. Therefore, the Indonesian BDI can be recommended for assessing depression severity among nursing students in Indonesia. Future research would benefit from incorporating clinical interviews to validate the accuracy of the Indonesian BDI and employing a longitudinal design to observe the progression of depressive symptoms over a specific period, such as a single semester.

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