Korean Journal of Clinical Psychology
2019. Vol. 38, No. 3, 300-307

Original Article
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https://doi.org/10.15842/kjcp.2019.38.3.003
eISSN 2733-4538

The Beck Depression Inventory-Second Edition: Psychometric Properties in Korean Adult Populations

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The present study evaluated the psychometric characteristics and the factor structure of the Beck Depression Inventory-Second Edition (BDI-II) among the general population in South Korea. The BDI-II was completed by a total of 1,022 adult participants from South Korea with an average age of 35.61 years. Of the 1,022 participants, 53.9% were females. The Korean version of the BDI-II demonstrated strong internal consistency, test-retest reliability, and had a strong correlation with other depression-related self-report measures. Using confirmatory factor analyses, a bifactor model identified a general factor and two specific factors consisting of somatic group factor and cognitive group factor provided the best fit to the data. These findings suggest that the BDI-II is a useful psychological instrument for assessing and understanding depressive symptoms in the Korean general population. Additionally, these findings provide support for a detailed evaluation of depression by numerous healthcare professionals who require a reliable and valid assessment to screen depression.

Keywords: Beck Depression Inventory-II, BDI-II, depression, reliability, validity, bifactor model

Depression is a disabling disorder in which patients suffer from a combination of symptoms that undermine their ability to sleep, study, work, eat, and enjoy activities they used to find pleasurable. Given the many pressures, anxieties, and uncertainties inherent in our present-day world, it is not surprising that people in all societies and walks of life are experiencing the debilitating effects of depression. Indeed, the World Health Organization (WHO) (2001) identified depression as one of the leading causes of disability worldwide. The lifetime prevalence of major depressive disorder is 3–17%, and in Korea, the rate is found to be increasing from 5.6% in 2006 to 6.7% in 2011 (Cho, 2011). In general, diagnosis of depression is made by the conjoined data of mental status examination and clinical interview conducted by the clinicians. The Beck Depression Inventory (BDI), the Center for Epidemiological Studies Depression Scale (CES-D), the Hamilton Rating Scale for Depression (HRSD), and the Zung Self-Rating Depression Scale (SDS) are four of the most widely used depression tests (Shafer, 2006). Among the scales used to examine depression, BDI is one of the widely used instrument to assess the presence and severity of depressive symptoms (Beck, Steer, & Brown, 1996). Since its introduction in 1996, Beck Depression Inventory-Second Edition (BDI-II) has been revised from BDI in order to reflect the Diagnostic Statistical Manual of Mental Disorders-IV (DSM-IV) criteria for major depressive disorder (Beck et al., 1996). More specifically, the revised BDI-II made modifications to 17 responses, including options for both increases and decreases in appetite, weight, and sleep. In addition, four items including body image change, work difficulty, weight loss, and somatic preoccupation were replaced by agitation, worthlessness, loss of energy, and concentration difficulty. The time frame for responses was lengthened from 1 week to 2 weeks. Like its predecessor, the BDI-II contains 21 items which measure the severity of depressive symptoms ranging from 0 to 63.

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Received Apr 3, 2019; Revised May 30, 2019; Accepted Jun 24, 2019

Although the primary aim of the BDI-II is to measure the global construct of depression, the question as to whether meaningful groups of items in the questionnaire can be discerned through factor analysis has been of ongoing interest (Beck et al., 1996). Beck et al. (1996) suggested two-dimensional models consisting of 'somatic-affective' (12 items) and 'cognitive' (9 items) from the data collected from a clinical sample of 500 psychiatric outpatients. Similarly, they analyzed data from a sample of 120 primarily White undergraduate students, and suggested a model consisting of 'cognitive-affective' (16 items) and 'somatic' (5 items). Through their naming of the factors, it has been found that cognitive, affective, and somatic elements underlie the factors, but the authors failed to determine fixed sets of items that measure these elements. Such lack of clarity in the factor structure of the BDI-II has led to several other models. In at least two studies, a three-factor solution (affective-cognitive-somatic) has been supported (Buckley, Parker, & Heggie, 2001; Osman et al., 1997). The factor analysis and validity of the BDI-II have been studied in various countries (Al-Musawi, 2001; Ghassemzadeh, Mojtabai, Karamghadiri, & Ebrahimkhani, 2005; Kojima et al., 2002). These studies examined whether the two-factor model proposed by Beck and colleagues are applicable to other population as well. Although all studies demonstrated its factorial validity, only some confirmed a similar two-factor structure to that of the original inventory (Ghassemzadeh et al., 2005; Kojima et al., 2002). The most recent studies have proposed a bi-factor model of the BDI-II (Arnau, Meagher, Norris, & Bramson, 2001; Brouwer, Meijer, & Zevalkink, 2013; Ward, 2006). In this model, a general factor and several group factors, and items can be loaded on more than one factor (Buhler, Keller, & Lage, 2014). Arnau et al. (2001) and Brouwer et al. (2013) have demonstrated a general factor comprised of all items, with the cognitive group and somatic-affective group. Ward (2006) has found a general factor, along with the cognitive group and somatic group. The diverse explanation for the structure of the BDI-II and its applicability in a variety of cultures leads to an exploration of the BDI-II in South Korea as well. In particular, cross-cultural validation for the BDI-II has not been conducted yet and needs further research.

Depression can be manageable, and the use of psychometrically sound and appropriate screening instruments can identify potential cases of depression quickly and inexpensively. The BDI-II should receive more attention because of its capacity to be implemented for clinical and research purposes among many cultures. The relationship between ethnicity and depression is complex and influenced by various factors (Plant & Sachs-Ericsson, 2004). Given the increasing rates of depression, it is evident that early detection and diagnosis of depression in Korean adults is extremely important. The applicability of a widely used valid and reliable instrument for the detection of depression in the general population can help address this problem in Korea. Unfortunately, to our knowledge, there has been very limited research regarding the psychometric properties of the BDI-II in Korea, nor how they compare with those of the original English version. Thus, psychometric information related to an appropriate screening instrument, specifically adapted for use in Korean populations, would have high utility not only for practitioners but also for researchers for whom they would serve a pivotal role in empirical investigations of depressive disorders. An understanding of the dimensions of depressive symptoms could facilitate valid and interpretable comparisons across cultures. However, the instrument should be first psychometrically valid in order to be used as a screening tool. Therefore, the current study aims to provide information on the validity and reliability of the Korean version of the BDI-II in an adult community sample. The present study was designed to ascertain two main objectives: (a) to analyze the psychometric properties (internal consistency) of the BDI-II and (b) to evaluate the factorial structure suggested by previous studies in a Korean non-clinical sample.

Methods

Participants and procedure

The study sample consisted of 1,022 general adults from 5 regional areas (i.e., Seoul, Incheon, Cheongju, Daegu, Jinju) across South Korea. We used data drawn from Korean Beck Anxiety And Depression Inventory (K-BANDI) project, which is designed to address psychometric investigation of the scales developed by Beck and his colleagues (Beck & Steer, 1990; Beck et al., 1996). Participants were recruited from social organizations, religious services, places of employment, psychology classes, and by word-of-mouth. They received approximately $5.00 for their participation. The

Table 1. *Study Sample Demographics*

Variable	*n*	%
Age		
19–29	420	41.1
30–39	224	21.9
40–49	182	17.8
Over 50	196	19.2
Education		
Elementary school	3	0.3
Middle school	19	1.9
High school	399	39.0
Some college	413	40.4
Graduate degree	183	17.9
Unreported	5	0.5
Marital status		
Single	523	51.2
Married	468	45.8
Divorced	13	1.3
Separated	3	0.3
Widowed	10	1.0
Unreported	5	0.5
Personal income (won)		
Under 1,000,000	379	37.1
1,000,000–2,000,000	186	18.2
2,000,000–3,000,000	215	21.0
3,000,000–4,000,000	125	12.2
Over 4,000,000	113	11.1
Unreported	4	0.4
Past Psychiatric/Counseling Service		
Yes	33	3.2
No	984	96.3
Unreported	5	0.5

mean age of the sample was 35.61 years (SD = 12.45, range 19–72), and 53.9% of the participants were female. The mean BDI-II total score was 9.29 (SD = 7.23). Other available sample demographics are summarized in Table 1. This study was approved by the Samsung Medical Center Ethics Review Board.

Measures

Beck Depression Inventory–II (BDI–II)

The BDI-II is a 21-item inventory that assesses the presence and the severity of depressive symptomatology. Each item is rated on a 4-point scale from 0 to 3 with summation scores ranging from 0 to 63. The BDI-II has been found to display high internal consistency. Adequate content and factorial validity has been reported, and diagnostic discrimination has been well established. With a permission of the publisher, The Psychological Corporation, two independent licensed clinical psychologists (i.e., JHK and STH) translated the original English version of the BDI-II into Korean and confirmed the content of the questionnaire through a debate among three researchers. A proficient bilingual person who mastered in clinical psychology re-translated it to English and researchers reviewed and revised into the final version.

Patient Health Questionnaire–9 (PHQ–9)

The PHQ-9 is a depression module of the PHQ that consists of the nine criteria upon which the diagnosis of DSM-IV depressive disorders is based. It is only half the length of many other depression scales, but it has comparable sensitivity and specificity. Each item is scored on a scale of 0 to 3, after which the circled numbers are added to yield a score ranging between 0 and 27. The Korean version of the PHQ-9 is well validated and widely used for depression screening (Choi et al., 2007).

State–Trait Anxiety Inventory (STAI)

The STAI Form Y assesses two types of anxiety with two scales: State Anxiety and Trait Anxiety. State Anxiety is measured by 20 short descriptive statements, which the individual answers in reference to how he or she feels at the moment, whereas Trait Anxiety is measured by 20 statements that refer to one's general feelings. The Korean version of STAI showed good validity and reliability for adult samples (Hahn, Lee, & Chon, 1996).

Adult ADHD Self–Report Scale (ASRS)

The ASRS is developed by WHO workgroup (Kessler et al., 2005). The ASRS is a checklist of 18 questions about ADHD symptoms that are based on the diagnostic criteria of DSM-IV. The reliability and validity of the Korean version are well established (Kim, Lee, & Joung, 2013).

Data analyses

The internal consistency of the BDI-II was evaluated by calculating Cronbach's α coefficient. Test-retest reliability was estimated by Pearson's correlation coefficient of the BDI-II scores obtained 1-week apart. The concurrent validity of the BDI-II was estimated

https://doi.org/10.15842/kjcp.2019.38.3.003

by Pearson's correlation coefficient with other well-validated clinical depression and anxiety measures. For the discriminant validity, we evaluated Pearson's correlation coefficient with ADHD symptom measures.

The factor structure of the BDI-II was examined using a set of confirmatory factor analysis (CFA). Five previously reported models of the BDI-II factor structure were selected. On selecting, we considered the generalizability of the sample to nonclinical population, methodology (e.g., appropriate sample size, tests of assumptions etc.), overall model fit, and cross-validation of findings in other samples. Given the ordinal nature of items, each model was analyzed using the mean and variance adjusted weighted least squares estimation (WLSMV). Three different fit indices were used to assess the adequacy of a well-fitting model: The comparative fit index (CFI; good fit >.95), the Tucker-Lewis index (TLI; good fit >.95), the root mean square error of approximation (RMSEA; good fit <.05) (Hu & Bentler, 1999). Also, when examining the unidimensionality of a bifactor model, it is highly recommended to consider additional indices, mainly the hierarchical omega (ω_H), the percentage of explained common variance (ECV) and the percentage of uncontaminated correlations (PUC) (Rodriguez, Reise, & Haviland, 2016). General guidelines regarding PUC suggest that instrument can be interpreted as primarily unidimensional if PUC is more than .80. However, if the PUC is lower than .80, then the ECV must be above .60, and the hierarchical omega (ω_H) must be more than .70 (Reise, Scheines, Widaman, & Haviland, 2013).

All statistical analyses were performed using SPSS 21.0, except for the CFA. Mplus 6.1 was used for the analyses of the factor structure of the BDI-II (Muthen & Muthen, 2010). The *p*-value was set at .01 to justify statistical significance for all analyses.

Results

Internal consistency and test–retest reliability

Cronbach's α coefficient of the BDI-II was .89, which is similar to the previous studies. Examination of the corrected item-total correlation coefficients showed that each item contributed substan-

Table 2. *Means, Standard Deviations, Percentages Symptomatic, and Item-Total Correlations of the Korean BDI-II*

Symptom	*M*	*SD*	Skewness	Kurtosis	%	r_{it}
Sadness	.34	.51	1.18	1.15	33	.57
Pessimism	.35	.56	1.57	2.80	32	.47
Past failure	.31	.57	1.78	2.44	25	.50
Loss of Pleasure	.50	.64	1.08	.87	43	.52
Guilty Feelings	.54	.63	.79	-.02	48	.50
Punishment Feelings	.28	.62	2.68	7.83	22	.50
Self-Dislike	.30	.64	2.04	2.93	20	.56
Self-Criticalness	.41	.69	1.58	1.69	31	.54
Suicidal Thoughts or Wishes	.24	.46	1.78	3.09	23	.43
Crying	.28	.60	2.32	5.35	22	.45
Agitation	.30	.51	1.76	3.80	27	.55
Loss of Interest	.47	.62	1.14	.90	40	.54
Indecisiveness	.52	.62	.99	1.02	46	.52
Worthlessness	.20	.48	2.50	6.15	17	.55
Loss of Energy	.69	.63	.41	-.44	60	.50
Changes in Sleeping Pattern	.77	.74	.83	.62	61	.45
Irritability	.51	.63	.95	.45	44	.54
Changes in Appetite	.62	.67	.80	.15	52	.43
Concentration Difficulty	.54	.60	.71	-.03	49	.55
Tiredness or Fatigue	.69	.61	.39	-.07	61	.56
Loss of Interest in Sex	.43	.69	1.58	2.06	34	.25
BDI-II total	9.30	7.12				

Note. N = 1,008. % = Total percentage endorsing response choices 1, 2, or 3. r_{it} = item-total correlations.

tially to the total BDI-II score (range = .25 to .57). Item 21 (Loss of libido) showed the lowest item-total correlation, but still significant in magnitude. Test-retest reliability was examined for the 48 respondents in the one week's interval. The Pearson correlation coefficient of the two trials was .90 ($p < .001$). Other available means, standard deviations, percentages symptomatic, and item-total correlations are summarized in Table 2.

Concurrent and discriminant validity

Using Pearson correlation analysis, we investigated the relations between scores on the BDI-II and the four other self-report measures. The Pearson correlation coefficient for the Korean BDI-II with the PHQ-9 was .70, indicating a strong correlation between two measures of depression. Correlations between the Korean BDI-II and anxiety-related measures (i.e., STAI-S, STAI-T) were .58 and .61, which is moderate in range. The ASRS also showed significant but relative lower levels of correlation with the Korean BDI-II than depression or anxiety-related measures (Table 3).

Factorial validity

We ran a series of confirmatory factor analysis to test six different previously reported models. Fit statistics for the CFA models are shown in Table 4. Model fit was generally adequate for all of the models tested. All items loaded significantly on their respective factors. Each model is introduced, explained, and assessed as described below.

Table 3. *Means, Standard Deviations, and Scale Intercorrelations*

Scale	*M*	*SD*	1	2	3	4	5
1. BDI-II	9.29	7.13	1				
2. PHQ	3.69	3.67	.70**	1			
3. STAI-S	37.69	11.03	.58**	.59**	1		
4. STAI-T	38.78	11.23	.61**	.60**	.89**	1	
5. ASRS	16.83	10.14	.48**	.49**	.53**	.55**	1

Note. BDI-II = Beck Depression Inventory-II; PHQ-9 = Patient Health Questionnaire-9; STAI-S = State-Trait Anxiety Inventory-State; STAI-T = State-Trait Anxiety-Trait; ASRS = Adult ADHD Screening Scale.
**All tests are significant at the .001-level.

Model A: Unidimensional Model

We tested a one-factor model with all 21 items loading onto a single factor. This model produced an acceptable fit to the sample data (CFI = .92, TLI = .91, RMSEA = .07).

Model B: Beck et al. (1996)'s two–factor model

Beck et al. (1996) presented a two-factor solution where somatic-affective (items 4, 10–14, 15–21) and cognitive symptoms (items 1–3, 5–9, 14) were considered as independent dimensions using initial BDI-II validation sample of students. Using our dataset, two-factor model produced a good fit to the sample data across all fit statistics (CFI = .95, TLI = .94, RMSEA = .05).

Model C: Viljoen, Iverson, Griffiths, Woodward (2003)'s two–factor model

The model supported by Vijoen et al. (2003) consisted of two group factors – a somatic-affective factor (items 1, 4, 11–13, 15–21), and cognitive factor (items 2, 3, 5–10, 13, 14, 21). This model showed acceptable fit to the sample data (CFI = .93, TLI = .92, RMSEA = .06).

Model D: Osman et al. (1997)'s three–factor model

The Osman et al. (1997) model consists of three oblique latent factors, with describing as negative attitude (items 1–3, 5–9, 14), performance difficulty (items 4, 10, 12, 13), and somatic elements

Table 4. *Summary of Results From Confirmatory Factor Analyses for Korean Adult Samples*

Study	Model	χ^2	*df*	CFI	TLI	RMSEA	90% CI
Null Model	One Factor	1,024.312	189	.918	.909	.066	.062–.070
Beck et al., 1996	Two Factor	747.289	188	.945	.939	.054	.050–.058
Viljoen et al., 2003	Two Factor	897.461	186	.930	.921	.062	.058–.066
Osman et al., 1997	Three Factor	745.935	186	.945	.938	.055	.051–.059
Buckley et al., 2001	Three Factor	700.210	186	.950	.943	.052	.048–.057
Ward, 2006	Bifactor	568.051	176	.962	.954	.047	.043–.051

Note. CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; CI = confidence interval; Bifactor = model with one general and two group factors.

https://doi.org/10.15842/kjcp.2019.38.3.003

(items 11, 15–21). The CFI and TLI were .95 and .94, respectively. RMSEA was .05.

Model E: Buckley et al. (2001)'s three–factor model

Buckley et al. (2001) reported a three-factor model, with the factors described as cognitive (items 1–3, 5–9, 14), affective (items 4, 10, 12, 13), and somatic symptoms (items 11, 15–21). The CFI and TLI were .95 and .94, respectively. RMSEA was .05, which is in adequate range.

Model F: Ward (2006)'s bifactor model

The bifactor model from the Ward (2006)'s study consists of one general factor and two specific factors - a five-item somatic group factor (items 15, 16, 18–20) and an eight-item cognitive group factor (items 2, 3, 5–9, 14). This model showed a best fit to the dataset among all six tested models (CFI = .96, TLI = .95, RMSEA = .05). We also calculated three bifactor strength indices; ω_H , ECV, PUC. The omega coefficient (ω_H) for the general factor was .89, which suggests it accounted for the majority of reliable variance in the total score among the BDI-II items. The other two BDI-II specific factors demonstrated considerably lower estimates of ω_H (cognitive factor: $\omega_H = .18$, somatic factor: $\omega_H = .30$). The ECV for the BDI-II was .81, indicating a strong general factor. In the BDI-II, PUC was .65. Reise et al. (2013) suggest that even though the PUC is lower than .8, if the values of ECV and ω_H are high (i.e., ECV $>.6$ and $\omega_H > .7$), a scale may be considered unidimensional enough to warrant the use of a total score. Other standardized factor loadings and bifactor indices are summarized in Table 5.

Table 5. *Standardized Factor Loadings and Bifactor Indices for Best Fitting Model of the BDI-II*

Symptom	General Depression	Cognitive	Somatic
Sadness	.77		
Pessimism	.62	.14	
Past failure	.58	.38	
Loss of Pleasure	.67		
Guilty Feelings	.56	.33	
Punishment Feelings	.63	.36	
Self-Dislike	.67	.55	
Self-Criticalness	.65	.36	
Suicidal Thoughts or Wishes	.55	.18	
Crying	.61		
Agitation	.73		
Loss of Interest	.68		
Indecisiveness	.66		
Worthlessness	.73	.22	
Loss of Energy	.59		.36
Changes in Sleeping Pattern	.47		.52
Irritability	.68		
Changes in Appetite	.46		.52
Concentration Difficulty	.67		.19
Tiredness or Fatigue	.63		.50
Loss of Interest in Sex	.34		
Omega hierarchical (ω_H)	.89	.18	.30
Explained common variance (ECV)	.81	.09	.10
Percentage of uncontaminated correlations (PUC)	.65		

Note. All standardized factor loadings are significant at the .001-level $p < .01$.

Discussion

The present study evaluated the reliability, validity, and factor structure of the BDI-II in the general population of Korea. Cronbach's α coefficient of the BDI-II found in this study has been proven to be a reliable measure of depression. Such finding is consistent with Beck et al. (1996), Whisman, Perez, & Ramel (2000) as well as other non-clinical sample studies (Kapci, Uslu, Turkcapar, & Karaoglan, 2008; Kojima et al., 2002). The BDI-II also showed high internal validity and concurrent validity. Also, the BDI-II showed a strong correlation with the PHQ-9 and also had a modest correlation with the STAI. While the correlation between the BDI-II and the ASRS had the lowest correlation amongst the scales and was lower than previous studies (Storch, Roberti, & Roth, 2004), it was still significantly correlated.

The present study found that the bifactor model fitted to our data most accurately, which suggests that along with cognitive and somatic factor, general factor underlying the BDI-II best describes depression. Such finding is in line with the previous finding made by Ward (2006). In previous researches, there have been different recommendations for determining the factor structure of the BDI-II (Arnau et al., 2001; Beck et al., 1996; Buckley et al., 2001; Dozois, Dobson, & Ahnberg, 1998; Osman, Barrios, Gutierrez, Williams, & Bailey, 2008; Osman et al., 1997; Vanheule, Desmet, Groenvynck, Rosseel, & Fontaine, 2008; Ward, 2006). The previous two- or three-factor models, including two-factor model originally sug-

gested by Beck et al. (1996), raised two main controversies over the years. First of all, partitioning the BDI-II into subscales would present limited clinical value due to the substantial overlap between the latent factors (Subica et al., 2014). More specifically, previous tests showed that depending on the nature of the sample, items could load on different factors (Storch et al., 2004). The bifactor model examined in this study can overcome such ambiguity. Secondly, BDI-II common item variance appears to be independently accounted for by both a general depression factor and multiple specific factors (Brouwer et al., 2013; Ward, 2006). While cognitive and somatic factors each contribute as a specific factor, given the nature influence of general factor in the bifactor model, it is best to assess the BDI-II as a unidimensional construct. However, it is important to note that in clinical settings, specific factors might help describe varying diagnostic properties. Therefore, in order to determine the appropriate factor structure and clinical interpretability of an instrument that appears to be comprised of items that simultaneously assess a general depression construct and narrower subdomains of depressive symptomology, bifactor model proposed by Ward (2006) can help identify the severity of depression among a set of different items.

It was reported that ethnicity was not significantly correlated with the BDI-II total score (Beck et al., 1996). Similarly, the total score of the BDI-II was similar to previous findings (Beck et al., 1996; Dozois et al., 1998; Ghassemzadel et al., 2005; Kojima et al., 2002; Whisman et al., 2000). It should be noted, however, that means of somatic items such as 'changes in sleeping pattern', 'loss of energy', and 'tiredness or fatigue' were the highest. Such characteristic could be explained by cultural factors, as Korean patients who are depressed "tend to reveal culture-specific somatic complaints because they feel shame or fear stigma if they are seen as mentally ill" (Lee, Kim, Choi, & Lee, 2014).

There were some limitations to this study. First of all, the participants in the study solely relied on a nonclinical sample. Further evaluation is needed, especially for clinical sample, in order to enhance the generalizability of the BDI-II in Korea. Secondly, only self-report measures were used, so relationships between study variables may have been inflated by a questionnaire-specific method variance. Continuous investigations should be conducted to examine the reliability and clinical utility of the BDI-II using clinician-rated scales, such as the Hamilton depression rating scale.

Nevertheless, the present study is the first published work in addressing the reliability, validity, and factor structure of the BDI-II in the Korean adult populations. The results suggest that the BDI-II is a useful psychological instrument for assessing and understanding depressive symptoms. Such findings provide support for a detailed evaluation of depression by numerous healthcare professionals who require a reliable and valid assessment to screen depression.

References

Al-Musawi, N. M. (2001). Psychometric properties of the Beck depression inventory-II with university students in Bahrain. *Journal of Personality Assessment, 77*, 568-579.

Arnau, R. C., Meagher, M. W., Norris, M. P., & Bramson, R. (2001). Psychometric evaluation of the Beck Depression Inventory-II with primary care medical patients. *Health Psychology, 20*, 112-119.

Beck, A. T., & Steer, R. A. (1990). *Manual for the Beck Anxiety Inventory*. San Antonio, TX: Psychological Corporation.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *BDI-II: Beck Depression Inventory Manual* (2nd ed.). San Antonio, TX: Psychological Corporation.

Brouwer, D., Meijer, R. R., & Zevalkink, J. (2013). On the factor structure of the Beck Depression Inventory-II: G is the key. *Psychological Assessment, 25*, 136-145.

Buckley, T. C., Parker, J. D., & Heggie, J. (2001). A psychometric evaluation of the BDI-II in treatment-seeking substance abusers. *Journal of Substance Abuse Treatment, 20*, 197-204.

Bühler, J., Keller, F., & Läge, D. (2014). Activation as an overlooked factor in the BDI-II: A factor model based on core symptoms and qualitative aspects of depression. *Psychological Assessment, 26*, 970-979.

Cho, M. J. (2011). *The Epidemiological survey of mental disorders in Korea*. Seoul, Korea: Ministry of Health and Welfare.

Choi, H. S., Choi, J. H., Park, K. H., Joo, K. J., Ga, H., Ko, H. J., & Kim, S. R. (2007). Standardization of the Korean version of Patient Health Questionnaire-9 as a screening instrument for major depressive disorder. *Journal of the Korean Academy and Family Medicine, 28*, 114-119.

Dozois, D. J., Dobson, K. S., & Ahnberg, J. L. (1998). A psychometric evaluation of the Beck Depression Inventory–II. *Psychological Assessment, 10*, 83-89.

Ghassemzadeh, H., Mojtabai, R., Karamghadiri, N., & Ebrahimkhani, N. (2005). Psychometric properties of a Persian-language

https://doi.org/10.15842/kjcp.2019.38.3.003

version of the Beck Depression Inventory-Second Edition: BDI-II-PERSIAN. *Depression and Anxiety, 21*, 185-192.

Hahn, D. W., Lee, C. H., & Chon, K. K. (1996). Korean adaptation of Spielberger's STAI (K-STAI). *Korean Journal of Health Psychology, 1*, 1-14.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

Kapci, E. G., Uslu, R., Turkcapar, H., & Karaoglan, A. (2008). Beck Depression Inventory II: Evaluation of the psychometric properties and cut-off points in a Turkish adult population. *Depression and Anxiety, 25*, E104-110.

Kessler, R. C., Adler, L., Ames, M., Demler, O., Faraone, S., Hiripi, E., . . . Walters, E. E. (2005). The World Health Organization Adult ADHD Self-Report Scale (ASRS): A short screening scale for use in the general population. *Psychological Medicine, 35*, 245-256.

Kim, J. H., Lee, E. H., & Joung, Y. S. (2013). The WHO adult ADHD Self-Report Scale: Reliability and validity of the Korean version. *Psychiatry Investigation, 10*, 41-46.

Kojima, M., Furukawa, T. A., Takahashi, H., Kawai, M., Nagaya, T., & Tokudome, S. (2002). Cross-cultural validation of the Beck Depression Inventory-II in Japan. *Psychiatry Research, 110*, 291-299.

Lee, S. H., Kim, B., Choi, T. K., & Lee, M. H. (2014). Long-standing depression and anxiety in a Korean woman. *The American Journal of Psychiatry, 171*, 622-624.

Muthén, L. K., & Muthén, B. O. (2010). *Mplus 6.1. Statistical analysis with latent variables: User's guide* (Version 6.1). Los Angeles, CA: Muthén & Muthén.

Osman, A., Barrios, F. X., Gutierrez, P. M., Williams, J. E., & Bailey, J. (2008). Psychometric properties of the Beck Depression Inventory-II in nonclinical adolescent samples. *Journal of Clinical Psychology, 64*, 83-102.

Osman, A., Downs, W. R., Barrios, F. X., Kopper, B. A., Gutierrez, P. M., & Chiros, C. E. (1997). Factor structure and psychometric characteristics of the Beck Depression Inventory-II. *Journal of Psychopathology and Behavioral Assessment, 19*, 359-376.

Plant, E. A., & Sachs-Ericsson, N. (2004). Racial and ethnic differences in depression: The roles of social support and meeting basic needs. *Journal of Consulting and Clinical Psychology, 72*, 41-52.

Reise, S. P., Scheines, R., Widaman, K. F., & Haviland, M. G. (2013). Multidimensionality and structural coefficient bias in structural equation modeling: A bifactor perspective. *Educational and Psychological Measurement, 73*, 5-26.

Rodriguez, A., Reise, S. P., & Haviland, M. G. (2016). Evaluating bifactor models: Calculating and interpreting statistical indices. *Psychological Methods, 21*, 137-150.

Shafer, A. B. (2006). Meta-analysis of the factor structures of four depression questionnaires: Beck, CES-D, Hamilton, and Zung. *Journal of Clinical Psychology, 62*, 123-146.

Storch, E. A., Roberti, J. W., & Roth, D. A. (2004). Factor structure, concurrent validity, and internal consistency of the Beck Depression Inventory-Second Edition in a sample of college students. *Depression and Anxiety, 19*, 187-189.

Subica, A. M., Fowler, J. C., Elhai, J. D., Frueh, B. C., Sharp, C., Kelly, E. L., & Allen, J. G. (2014). Factor structure and diagnostic validity of the Beck Depression Inventory-II with adult clinical inpatients: Comparison to a gold-standard diagnostic interview. *Psychological Assessment, 26*, 1106-1115.

Vanheule, S., Desmet, M., Groenvynck, H., Rosseel, Y., & Fontaine, J. (2008). The factor structure of the Beck Depression Inventory-II: An evaluation. *Assessment, 15*, 177-187.

Viljoen, J. L., Iverson, G. L., Griffiths, S., & Woodward, T. S. (2003). Factor Structure of the Beck Depression Inventory-II in a medical outpatient sample. *Journal of Clinical Psychology in Medical Settings, 10*, 289-291.

Ward, L. C. (2006). Comparison of factor structure models for the Beck Depression Inventory-II. *Psychological Assessment, 18*, 81-88.

Whisman, M. A., Perez, J. E., & Ramel, W. (2000). Factor structure of the Beck Depression Inventory-Second Edition (BDI-II) in a student sample. *Journal of Clinical Psychology, 56*, 545-551.

World Health Organization. (2001). *The World Health Report 2001: Mental health: new understanding, new hope.*