Doi: 10.4274/npa.y5935

Validity and Reliability of the QIDS-SR$_{16}$-Turkish in Comparison with BDI-II-Turkish Among Young Outpatient Sample of Turkish University Students

Hızlı Depresif Belirti Envanteri-Özbildirim Formu'nun (HDBE$_{16}$-ÖF) Beck Depresyon Envanteri-II ile Karşılaştırılarak Ayaktan Başvuran Hastalarda Geçerlilik ve Güvenilirliği

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ABSTRACT

Objective: To evaluate the validity and reliability of 16-item self-report version of the Quick Inventory of Depressive Symptomatology (QIDS-SR16) scale in comparison with BDI-II-Turkish (BDI-II-T) in a young sample of Turkish university students.

Methods: A slightly modified version of the QIDS-SR$_{16}$-Turkish (QIDS-SR$_{16}$-T) available at www.ids-qids.org, along with the BDI-II-T, was administered to 628 young Turkish university students who attended the Family Health Center in Uludağ University Campus between February and April 2010. Descriptive analyses, Student's t-test, receiver operating characteristic (ROC) analysis, and confirmatory factor analyses were used in the study.

Results: The mean age of the participants was 21.1±2.16 (SD) years; 67.8% were female and 32.2% were male. Cronbach's α coefficient for internal consistency of the QIDS-SR$_{16}$-T was found to be 0.769. The mean item-total correlation was 0.45, ranging from 0.29 to 0.71. The correlation between the BDI-II-T and QIDS-SR$_{16}$-T was 0.72. ROC curve analysis suggested 9 as the optimal cut-off for a clinical depression level for the QIDS-SR$_{16}$-T.

Conclusion: We observed that the QIDS-SR$_{16}$-T demonstrated good psychometric properties in a sample of young Turkish students and has convergent validity with the BDI-II-T, a widely used scale for depression. It is essential to diagnose reliably the major depressive disorder and to follow up the patients by valid screening instruments in primary care setting. The internal consistencies of the QIDS determined in studies from the United States were greater than our Cronbach's α coefficient, but there was no statistically significant difference between them (z=0.55, p>0.05). The QIDS-SR$_{16}$-T can be reliably used in primary care settings. *(Archives of Neuropsychiatry 2012;49: 1-5)*

Key words: Major depressive episode, screening scale, validity, reliability

ÖZET

Amaç: Genç Türk üniversite öğrencileri arasında Hızlı Depresif Belirti Envanteri'nin (HDBE) 16 maddelik Özbildirim Formu'nun, Beck Depresyon Envanteri-II (BDE-II) ile karşılaştırılarak geçerlilik ve güvenilirliğinin saptanması.

Yöntemler: www.ids-qids.org'tan ulaşılabilecek Hızlı Depresif Belirti Envanteri-Özbildirim Formu'nun (HDBE$_{16}$-ÖF) hafifçe değiştirilmiş olan versiyonu, BDE-II ile beraber Uludağ Üniversitesi Kampüsü içinde yer alan Aile Sağlığı Merkezine ayaktan başvuran 628 genç Türk üniversite öğrencisine Şubat 2010 ve Nisan 2010 tarihleri arasında uygulandı. Betimleyici istatistik, student t testi, ROC analizi ve doğrulayıcı faktör analizleri çalışmada kullanılmıştır.

Bulgular: Ortalama yaş 21,1±2,16 (SD) olarak saptandı. Örneklemin %67,8'i kadın, %32,2'si erkek idi. İç tutarlılık α-Cronbach katsayısı 0,769 olarak saptandı. Ortalama madde-toplam madde korelasyonu 0,45 (0,29-0,71) olarak bulunmuştur. ROC analizine göre, HDBE16-ÖF için klinik depresyon açısından 9 puan sınır değer olarak saptanmıştır.

Sonuç: HDBE$_{16}$-ÖF ile çok sık kullanılan bir depresyon ölçeği olan BDE-II, iyi psikometrik uyum geçerliliği göstermiştir. 1. Basamakta majör depresif epizodu güvenle teşhis etmek ve hastalığı, geçerliliği kanıtlanmış araçlarla takip etmek önemlidir. Amerika Birleşik Devletleri'nde HDBE ile ilgili çalışmalarda elde edilen iç tutarlılık katsayısı α Cronbach bizim çalışmamızdan daha yüksek bulunsa da, aralarında istatiksel olarak bir farklılık yoktur (z=0,55, p>0,05). HDBE$_{16}$-ÖF 1.basamakta güvenle kullanılabilecek bir ölçektir. *(Nöropsikiyatri Arşivi 2012;49: 1-5)*

Anahtar kelimeler: Majör depresif epizod, tarama ölçeği, geçerlilik, güvenilirlik

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Introduction

Major depressive disorder is a mood disorder, which is characterized by one or more major depressive episodes (MDE). To establish the diagnosis of MDE, it must last at least two weeks and must involve five of the nine core symptoms listed below: 1) sleep disturbance; 2) sad mood; 3) change in appetite and/or weight; 4) difficulty in concentration and decision making; 5) negative self view; 6) thoughts of death or suicide; 7) loss of general interest; 8) reduced energy level; and 9) restlessness or agitation. One of the symptoms must be 2) or 7) (1). Estimates of lifetime MDE prevalence in different countries range from 5 to 17%, with an average estimate of 12%. Different rates obtained in Turkey suggest prevalence of 8.4% (2), 26.2% (3), 39.4% (4).

Accurate, time-efficient measurement of depressive symptom severity is of great importance in conducting cost-efficient clinical trials (5). Self-reports are useful to both clinicians and researchers who wish to monitor treatment outcomes. The QIDS-SR_{16} was first described by Rush et al. (6). There are also clinician-rated and interactive voice response formats (6). The QIDS-$SR_{16}$is a brief self-report measure designed to assess depressive symptom severity. Minimum training is required for its administration and it is freely available for use (see www.ids-qids.org), so, it is both time- and resource-efficient (7). The measure consists of 16 items that assess the nine symptom domains used to diagnose a MDE in the Diagnostic and Statistical Manual of Mental Disorders (DSM): sleep disturbance (items 1-4), depressed (sad) mood (item 5), change in appetite or weight (items 6-9), concentration/decision making (item 10), self-view (item 11), suicidal ideation (item12), interest (item13), energy/fatigue (item14), and psychomotor agitation/retardation (items 15 and 16) (8). The ascertainment of remission or partial remission is based on the DSM-IV-TR which logically recommends that all those nine diagnostic criterion symptoms that define the syndrome be assessed (5,8). The responses for each item range from zero to three, with zero indicating the absence of that symptom in the past week. The scoring scheme involves summing the scores for the nine symptom domains to yield a total score, ranging from 0 to 27. Depression severity can be assessed from the QIDS-SR16 scores applying the following guidelines: none (0-5), mild (6-10), moderate (11-15), severe (16-20), and very severe (≥21) (6). However, the QIDS-SR_{16}-T has not yet been evaluated for its reliability and validity. The purpose of this study was to perform this evaluation.

The Beck Depression Inventory-II (BDI-II) is a revised depression screening scale proposed by Beck et al. (9,10) in 1996. The Turkish validity study was performed by Hisli (11).

In this study, we aimed to conduct validity and reliability studies of the QIDS-SR_{16}-T and to compare two different valid depression-screening scales, the QIDS-SR16-T and the BDI-II-Turkish (BDI-II-T), in a young outpatient sample of university students.

Method

The QIDS-SR_{16}-T was obtained from the www.ids-qids.org website. A few minor changes were made to accommodate the Turkish usage, e.g. the reference range for weight in pounds was replaced by weight in kilograms.

The sample calculation formula is.

$$n= \frac{N.t^2 .p.q}{(d^2(N-1)+t^2 .p.q)}$$

For the 95% confidence interval, N=73000000 (the entire population of Turkey), p≈0.1 (Turkish population's depression prevalence), t=1.96 and d=0.05 for the sampling error, n was found to be approximately 400. This value is for the minimum number of participants required to conduct the study. Our patients were mostly students of the Faculty of Economics which comprises 8000 students. Out of them, many students wanted to participate in the study, but we limited the number to 670. Therefore, six hundred and seventy outpatients who attended the Family Health Center in the Uludağ University Campus between February and April 2010 voluntarily participated in our study with their own consent. They filled out the QIDS-SR_{16}-T and the BDI-II-T simultaneously in an appropriate time (7-10 minutes). Forty-two out of the 670 patients' questionnaires were eliminated from the study because of such problems as failure to complete the two tests. SPSS 17, Lisrel 8.3 and MedCalc v.9.2.0.1 softwares were used for statistical analyses. Descriptive analyses, Student's t-test, ROC analysis, and confirmatory factor analyses were applied in the study. The acceptable goodness-of-fitness indices must be as follows: GFI >0.90, χ^2/df=2 to 5 and root mean squared error of approximation (RMSEA)<0.05. The ROC curve was used to determine the most appropriate cut-off scores for the QIDS-SR_{16}-T. The 'area under curve' (AUC) is a measure of the performance of the diagnostic test at all possible cut-off points. The greater the area, the best the performance.

Results

The mean age of the participants was 21.1±2.16 (SD); 67.8% were female. Outpatients' demographic data are presented in Table 1. Students had a family history of depression as follows: mother - 29 (4.62%), father - 8 (1.27%), sibling - 14 (2.23%), self - 16 (2.55%), and relative - 5 (0.79%).

The QIDS-SR_{16}-T score was found to be higher in women than in men (t=2.967, p=0.03). Similarly, the BDI-II-T score was higher in women than in men (t=2.608, p=0.009). QIDS-SR_{16}-T score related proportionally with the family history of depression (Student's t-test; t=2.079, p=0.038). Cronbach's α coefficient for internal consistency of the QIDS-SR_{16}-T was found to be 0.769. The total QIDS-SR_{16}-T score could be predicted by the linear regression analysis equation: total QIDS-SR_{16}-T score = 11.755 – 1.21*gender – 0.82*education level + 0.11*monthly income – 0.3*work/or not – 0.01*number of sibling + 1.12*family depression history.

The mean item-total score (Pearson's correlation coefficient) was found to be 0.45 (ranging from 0.29 to 0.71). This is a substantial indicator of the construct validity of the QIDS-SR_{16}-T scale (Table 2).

The internal consistency (Cronbach's α coefficient) was 0.769. Table 3 depicts that all items contributed equally to Cronbach's α.

To measure the convergent validity of the QIDS-SR_{16}-T scale, Pearson's correlation coefficient was calculated for the BDI-II-T and the QIDS-SR_{16}-T.The value of the correlation coefficient indicated a good convergent validity - r=0.721, p=0.000.

We compared the QIDS-SR_{16}-T with BDI-II-T to form the depression severity classification by the ROC analysis. Beck proposed a depression severity classification as follows: 0-9 - no depression, 10-16 - mild, 17-29 - moderate, 30-63 - severe depression.

The point 17 is the cut-off value in the BDI-II-T for a clinical depression among the Turkish people, which is an already proven data. According to ROC analysis, we found that 9 is the cut-off score (equal or higher than 9) for a clinical depression threshold using the QIDS-SR_{16}-T. It corresponds to 17 in the BDI-II-T. The QIDS-SR16-T had 81.4% sensitivity and 79.4% specificity (Table 4, Figure 1). The AUC was measured to be 0.862 (95%CI= 0,833-0,888) (p=0.0001) for the QIDS-SR_{16}-T scale, reflecting a good discrimination.

The mild depression zone is determined between the scores 10 and 16 in the BDI-II-T, and 10 in the BDI-II-T is corresponding to 7 in the QIDS-SR_{16}-T by the ROC analysis. Furthermore, the severe depression zone is starting by 30 to 63, therefore, the point 30 is corresponding to 11 in the QIDS-SR_{16}-T.

Thus, we determined 0-6 as no depression, and 7-8 as mild, 9-10 moderate and 11-27 as severe depressive symptomatology in the scoring of the QIDS-SR_{16}-T for the Turkish population.

Although the specificity of the QIDS-SR_{16}-T was found lower and the number of sick patients seemed to be more than in the BDI-II-T classification, there was a statistically significant difference between the two tests (z test; z=3.73, p<0.000); the QIDS-SR_{16}-T is superior to the BDI-II-T.

The inventors of the QIDS (13) noted that this scale is unidimensional (i.e. it has one factor). Kaiser-Meyer-Olkin measure was 0.878 and the Bartlett's test of sphericity was significant (p=0.000). These values allowed us to perform the exploratory factor analysis by principal component analysis and varimax rotation. In the explanatory factor analysis, 3.391 was found as single eigenvalue over 1. We determined one factor explaining the 37.68% of the total variance.

Based on depression severity categories, 375 students (60.1%) had no depression, 74 (11.9%) had mild, 57 (9.1%) moderate and 118

Table 1. Socio-demographic and medical data of the subjects

	n	%
Age		
<20 years old	253	40.3
20-24 years old	354	56.4
>24 years old	21	3.3
Education		
Illiterate	6	1
Primary school	3	0.5
High school	18	2.9
University	601	95.7
Income		
<500TL	243	38.7
501-1000TL	218	34.7
1001-2000TL	138	22.0
>2000TL	29	4.6
Work		
Does not work	523	83.3
Does work	105	16.7
Dwelling		
Village	86	13.7
Town	88	14
City	454	72.3
Number of sibling		
No sibling	66	10.5
1 sibling	194	30.9
2 siblings	135	21.5
3 siblings	122	19.4
>3 siblings	111	17.7
Family History of Depression		
Yes	57	9.1
No	224	35.7
N/A	347	55.3

Table 2. Descriptive analysis of the nine domains and item-total score correlation coefficient (r_{it})

Domains	Mean	SD	r_{it}
1- Sleep	1.65	0.93	0.295*
2- Sad mood	0.76	0.88	0.678*
3- Appetite	0.85	0.92	0.308*
4- Concentration/decision making	0.92	0.86	0.709*
5- Self-view	0.75	1.22	0.639*
6- Thoughts of death or suicide	0.13	0.40	0.383*
7- General interest	0.43	0.73	0.551*
8- Energy level	0.51	0.72	0.618*
9- Restlessness/agitation	0.89	1.12	0.578*
Sum	6.89	7.78	

*: p<0.01

Table 3. Internal consistency α-Cronbach value changes if item is deleted

	Cronbach's α if Item Deleted
1- Sleep	0.771
2- Sad Mood	0.735
3- Appetite/weight	0.768
4- Concentration or decision making	0.736
5- Self view	0.758
6- Thoughts of death or suicide	0.776
7- General interest	0.761
8- Energy level	0.752
9- Restlessness/Agitation	0.748

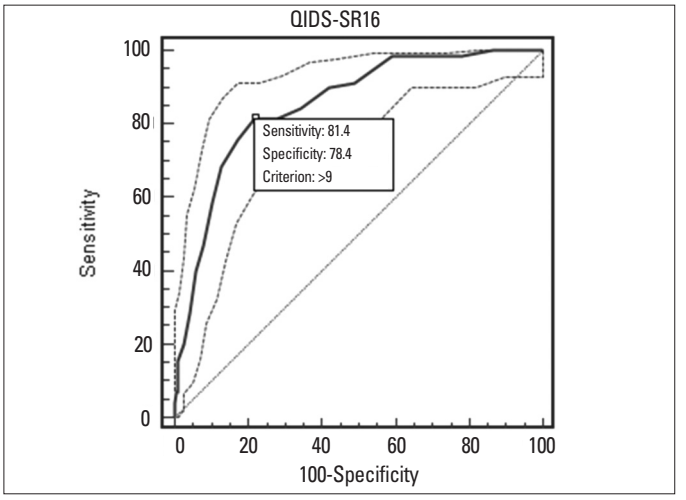

Figure 1. Receiver operating characteristic (ROC) curve for QIDS-SR_{16}-T scale

students (18.9%) had severe depression. These numbers may seem higher, probably originating from the depression severity category of the BDI-II-T.

Discussion

The results of our validity study performed in primary care were similar to those of the study by Lamoureux et al. (7) among 155 heterogeneous outpatients, which was also conducted in primary care. The authors used both the clinician-rated and self-report QIDS scales and compared the results with those of the Structured Clinical Interview for DSM Disorders (SCID). They reported an AUC of 0.82. The value of Cronbach's α was 0.86, which is somewhat greater than our value, perhaps reflecting the differences in sample variability. The authors suggested a total score cut-off of 13-14 for moderate depression, which gives rise to a sensitivity of 76.5% and a specificity of 81.8%. They emphasized the need for screening of MDE in primary care, which could substantially improve patient outcomes, particularly when combined with efforts to promote adequate treatment and follow-up.

Bernstein, Rush, Carmody et al. (12) used a low-income and relatively low-education public sector sample applying both classical test theory and item response theory. Overall, the self-report and clinical versions of the QIDS were similar in their psychometric properties. It was observed that the QIDS-SR_{16} was slightly superior in discriminating patients with average and above average depression. In the study by Rush et al. in 2006, where the QIDS self-report and clinician rating were performed to non-psychotic major depressive patients, the self-report was found to be generally as sensitive as the clinician ratings in identifying symptom change, as well as both treatment response and remission in depression. 1500 STAR*D (Sequenced Treatment Alternatives to Relieve Depression Trial) major depressive patients were recruited from 18 primary and 23 specialty care settings across the United States (5). Generally, lower self-report item means were observed to be limited to three domains: appetite/weight, concentration/decision making and energy level, and the six item-scale correlation coefficients were greater than 0.60. In our study, we found four items. While only sleep and appetite/weight domains showed a Pearson's correlation coefficient ≤0.50 in that study, sleep, appetite/weight and thoughts of death/suicide domains had a coefficient lower than 0.50. The Cronbach's α coefficient for internal consistency was 0.87, which is a value greater than that of our study (5). QIDS scales are as reliable as other instruments for survey of prognosis, like other valid instruments in primary care, according to the US Preventive Services Task Force (6,13-5).

In another study published in 2003, Rush et al. (6) compared the QIDS-SR_{16} and QIDS-C scales with HAM-D_{17} among chronic major depression patients. In that study, seven out of the nine items were found greater than ≥0.60, while in our study, this number was four items. Two items, i.e. appetite/weight and suicidal ideation, were observed to be <0.50; we obtained similar result. By the score equation procedure, the QIDS-SR_{16} total score was predicted by the formula: QIDS-SR_{16} total score = 0.8*HAMD-$_{17}$.

In a study where the Mini-International Neuropsychiatric Interview (M.I.N.I.), Montgomery-Åsberg Depression Rating Scale (MADRS), Quick Inventory of Depressive Symptomatology-Clinician-Rated (QIDS-C_{16}) and the QIDS-SR_{16} were used in different locations (Duke University, Texas University, Arlington and Texas Southwestern University), all tests were found to be unidimensional and the internal consistency reliability levels were high, ranging from 0.85 to 0.89. In this study, it was concluded that the QIDS-$C_{16}$is more discriminative than other tests. Moreover, the cut-off points were 5, 7, 9, and 11 for the QIDS-SR_{16}. The same cut-off points were found in our study (16).

The study by Bernstein et al. is important regarding the use of the QIDS scales among full bipolar, bipolar disease-depressive period and major depressive disorder patients. The results were similar in all patient groups. Our sample constituted only of primary care outpatients and was not a clinical example (17).

Brown et al. (18) administered the QIDS-SR_{16}, IDS-$SR3_{30}$, $HRSD_{17}$ and the Mini Asthma Quality of Life Questionnaire to asthmatic patients at treatment exit due to high rates of co-occurrence of asthma with depression. The internal consistency coefficient (Cronbach's α) was highest (0.95) in the IDS-SR_{30}; 0.87 for the QIDS-SR_{16} and 0.87 for the $HRSD_{17}$. High correlation has been found between the total scores of the QIDS-SR_{16} and the $HRSD_{17}$ (r=0.85), being highest between the total scores of the QIDS-SR_{16} and the IDS-SR_{30} (r=0.97). These item-scale correlation coefficients are significantly higher than ours used to compare the QIDS-SR_{16}-T

Table 4. Cut-off points and coordinates of ROC curve

Criterion	Sensitivity	95% CI	Specificity	95% CI	+LR	-LR
>0	100.00	94.8 - 100.0	6.83	4.9 - 9.3	1.07	0.00
>1	100.00	94.8 - 100.0	13.67	10.9 - 16.8	1.16	0.00
>2	98.57	92.3 - 99.8	22.30	18.9 - 26.0	1.27	0.06
>3	98.57	92.3 - 99.8	32.01	28.2 - 36.1	1.45	0.04
>4	98.57	92.3 - 99.8	40.83	36.7 - 45.0	1.67	0.03
>5	91.43	82.3 - 96.8	51.08	46.8 - 55.3	1.87	0.17
>6	90.00	80.5 - 95.9	57.91	53.7 - 62.1	2.14	0.17
>7	84.29	73.6 - 91.9	65.47	61.4 - 69.4	2.44	0.24
>8	81.43	70.3 - 89.7	72.30	68.4 - 76.0	2.94	0.26
>9 *	81.43	70.3 - 89.7	78.42	74.8 - 81.8	3.77	0.24
>10	75.71	64.0 - 85.2	82.91	79.5 - 86.0	4.43	0.29
>11	68.57	56.4 - 79.1	87.05	84.0 - 89.7	5.30	0.36
>12	58.57	46.2 - 70.2	89.57	86.7 - 92.0	5.61	0.46
>13	47.14	35.1 - 59.4	91.91	89.3 - 94.0	5.82	0.58
>14	40.00	28.5 - 52.4	94.24	92.0 - 96.0	6.95	0.64
>15	28.57	18.4 - 40.6	95.68	93.6 - 97.2	6.62	0.75
>16	20.00	11.4 - 31.3	97.30	95.6 - 98.5	7.41	0.82
>17	15.71	8.1 - 26.4	99.10	97.9 - 99.7	17.47	0.85
>18	7.14	2.4 - 15.9	99.10	97.9 - 99.7	7.94	0.94
>19	7.14	2.4 - 15.9	99.28	98.2 - 99.8	9.93	0.94
>20	4.29	0.9 - 12.0	99.64	98.7 - 99.9	11.91	0.96
>21	1.43	0.2 - 7.7	99.82	99.0 - 100.0	7.94	0.99
>31	0.00	0.0 - 5.2	100.00	99.3 - 100.0		1.00

+LR: positive likelihood ratio

-LR: negatice likelihood ratio

Table 5. Fit indices for confirmatory factor analysis models of QIDS-SR^{16}

	GFI	χ^2	df	χ^2/df	RMSEA*
Model 1	0.93	220.55	27	8.17	0.11
Model 2	0.93	24.12	11	2.19	0.04

*: Root Mean Square Error of Approximation

with the BDI-II-T (t=15.5, p<0.01). All three scales used in the study by Brown et al. showed comparable sensitivity to symptom change, indicating high concurrent validity for all three scales. Nevertheless, the total QIDS-SR_{16} baseline to exit change score demonstrated a significant negative correlation (r=-0.49, p<.001) with the Mini Asthma Quality of Life Questionnaire.

The internal consistencies of the QIDS obtained in studies from the United States were greater than our Cronbach's α coefficient, but there was no statistically significant difference between them (z=0.55, p>0.05) (5,7,16,18).

Another QIDS study (19) was performed among adolescents, where the total score of ≤5 indicated no depression, 6-10: mild depression, 11-15: moderate, 16-20: severe and ≥21: very severe. Studies regarding the use of the QIDS-SR16 and QIDS-C_{16} must be conducted in our country too. There is a lack in that issue.

Another QIDS study (20) was performed among 330 psychiatric outpatients, 9.7% of whom had sleep apnea. The outpatients with sleep apnea had higher scores in three items: late insomnia, reduced energy level and decreased general interest (p<0.01, p<0.02 and p<0.04, respectively).

In a study by Carmody et al. (21) where the psychotropic medication was supported by vagus nerve stimulation among patients having treatment-resistant non-psychotic major depressive episode, the QIDS-SR_{16} was compared with the MADRS. The mean QIDS-SR_{16} score was found to be 17.6±3.6, which is higher than the total QIDS-SR_{16} score obtained in our non-clinical study.

In conclusion, the QIDS-SR_{16}-T can be used reliably in primary care settings as well as in the clinical settings for the diagnosis of MDE and its follow-up.

Limitations

Because the study sample was mainly composed of university students, i.e. a homogeneous group, our results cannot be generalized to the whole Turkish population.

Acknowledgement

I would thank to Prof. Dr. Ira H. Bernstein for the revision and contribution to this study.

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