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Validation of the Polish version of the Beck Depression Inventory in patients with epilepsy

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ABSTRACT

Background: Despite the fact that depressive disorders are the most common comorbidities among patients with epilepsy (PWE), such disorders often go unrecognized and untreated. In addition, the availability of validated screening instruments to detect depression in PWE is limited. The aim of the present study was thus to validate the Polish version of the Beck Depression Inventory (BDI) in adult PWE.
Methods: A group of 118 outpatient PWE were invited to participate in the study. Ninety-six patients meeting the inclusion criteria completed the Polish Version of Beck Depression Inventory-I (BDI-I) and were examined by a trained psychiatrist using the Structured Clinical Interview (SICD-I) for Diagnostic and statistical manual of mental disorders - fourth edition (Text revision) (DSM-IV-TR). Receiver operating characteristic (ROC) curves were used to determine the optimal threshold scores for BDI.
Results: Receiver operating characteristic analysis showed the area under the curve to be approximately 84%. For major depressive disorder (MDD) diagnosis, the BDI demonstrated the best psychometric properties for a cut-off score to be 18, with a sensitivity of 90.5%, specificity of 70.7%, positive predictive value (PPV) of 46.3%, and negative predictive value (NPV) of 96.4%. For the 'any depressive disorder' group, the BDI optimum cut-off score was 11, with a sensitivity of 82.5%, specificity of 73.2%, PPV of 68.8%, and NPV of 85.4%.
Conclusions: The BDI score is a valid psychometric indicator for depressive disorders in PWE maintaining adequate sensitivity and specificity, high NPV, and acceptable PPV with an optimum cut-off score of 18 for MDD diagnosis.

1. Introduction

Depressive disorders are common psychiatric comorbidities in patients with epilepsy (PWE), occurring with a prevalence ranging from 11% to 62% [1] and complicating the course and prognosis of the disease. As depression in PWE may exhibit atypical symptoms, it is often underdiagnosed and undertreated. Consequently, the development of validated, self-report, screening psychometric instruments for effective implementation in professional medical settings is of prime clinical importance. Screening psychometric tools for depression in PWE include the Beck Depression Inventory (BDI) [2–5], the Hospital Anxiety and Depression Scale (HADS) [3–6], and the newly developed Neurological Disorders Depression Inventory for Epilepsy (NDDI-E) [7–26]. However, with limited data and some conflicting results [5,6], there is still a need for validation studies against the gold standard, in order to produce conclusive cut-off points for specific psychometric screening instruments that are optimized for PWE.

The aim of this study was to validate the psychometric properties of the Polish version of the BDI in PWE in order to determine its optimal specificity, sensitivity, and cut-off scores for identifying depressive disorders.

2. Methods

2.1. Study sample

The demographic and clinical variables for the study population are presented in Table 1 with detailed descriptions presented elsewhere [27]. Briefly, 118 PWE from a tertiary epilepsy unit were screened of which 96 were enrolled. The chosen subjects had been diagnosed with an active epilepsy according to the International League Against Epilepsy criteria [28] and had been receiving stable antiepileptic treatment for the previous 2 months. They ranged in age from 18 to 65 years. Subjects having any of the following criteria were excluded from the study: last seizure within 24 h prior to examination; more than 10 seizures in the last month; major brain damage with mass effect; neurosurgery; unstable somatic/neurological disease pseudoepilepsy; mental retardation; alcohol and/or drugs dependence or abuse in the past 6 months; and borderline, antisocial personality disorder.

The reasons for the exclusion of the study subjects at screening included the following: neurosurgical treatment of epilepsy; unstable somatic disease; inability to comprehend and/or follow tasks due to

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Table 1
Demographic and clinical characteristics of study population.

	N = 96 (%)
Male sex (%)	31 (32.3)
Age, in years (SD)	36.6 (12.0)
Age of seizure onset (SD)	19.5 (11.6)
Duration of epilepsy (SD)	17.0 (11.8)
Number of seizures/last month — median (IQR)	3 (2.5)
Seizure type (%)	
Generalized	15 (15.6)
Simple partial	7 (7.3)
Complex partial	27 (28.1)
Partial evolving to general	47 (49.0)
Tonic–clonic	10 (10.4)
Absence	2 (1.0)
Myoclonic	1(1.0)
Atonic	2 (2.1)
Number of AEDs (IQR)	2 (1.2)
Drug-resistant (%)	70 (72.9)
Polytherapy (%)	46 (47.9)

mental retardation or head trauma in the past; and substance use disorder.

The study was performed in agreement with the Declaration of Helsinki following the approval of the Ethic Research Committee of the Institution. For each study participant, written informed consent was obtained.

2.2. Instruments

All the subjects were assessed at a single study visit by the same investigator Mariusz S. Wiglusz (MSW) during which they were diagnosed with the Structured Clinical Interview for DSM-IV Axis I Disorders (SICD-I) [29] and subsequently completed the Polish Version of Beck Depression Inventory-I (BDI-I) [30,31].

The BDI-I contains 21 items on a 4-point scale from 0 (symptom absent) to 3 (severe symptoms) and is a 21-item self-report inventory for evaluating the severity of depression in normal and psychiatric populations. It assesses depressive symptoms within the preceding week with high scores reflecting a greater severity of depressed mood (range = 0–63). Higher scores indicate greater symptom severity [30,31]. The Polish Version of BDI-I is free to the public, while BDI-IA, BDI-II, and BDI-FS (Fast Screen) are copyrighted.

The BDI-IA was a revision of the original instrument developed by Beck during the 1970s aimed to improve the ease of use by limiting the range of questions. Both BDI-I and BDI-II have 21 questions. The BDI-II revised the BDI-I items pertaining to loss of energy, worthlessness, agitation, and change in appetite, as well as adding an item on concentration difficulty. Items relating to changes in hypochondria, body image, and difficulty working were replaced in BDI-II, but items dealing with interest in sex, thoughts of suicide, and feelings of being punished remained the same as in BDI-I. Finally, participants were asked to rate how they had been feeling for the previous 2 weeks, as opposed to a single week in the original BDI-I. A shorter seven-item fast screen assessment version of the questionnaire, the BDI-FS, is available for primary care use and contains seven self-reported items each corresponding to a major depressive symptom in the preceding 2 weeks [30,32].

For the study, the patients were assigned to two diagnostic groups: 'major depressive disorder' (MDD) and 'any depressive disorder'. The second group comprised MDD and mood disorders with depressive features that do not meet the criteria for MDD (depressive disorder not otherwise specified [DD-NOS] such as minor depression, recurrent brief depressive disorder, dysthymic disorder, mood disorder due to a general medical condition, substance-induced mood disorder).

2.3. Statistics

The optimal cut-off points with the greatest sum of sensitivity and specificity with BDI for diagnosis of depressive disorders were calculated using the receiver operating characteristic (ROC) curve. Comparisons between MDD patients and nondepressed subjects were performed using Student's *t*-tests for normally distributed continuous data, Mann–Whitney's *U*-test for nonnormally distributed data, and Fisher's exact test for categorical data. A value of $p < 0.05$ was considered to be statistically significant. Statistical procedures were performed using Statistica 10.0.1011.

3. Results

The study group characteristics are presented in Table 1 with a detailed analysis of the demographic and clinical variables described elsewhere [27]. A diagnosis of major depression disorder was established in 21 (22%) patients, and 'any depressive disorder' was found in 40 (41.6%) subjects through a systematic evaluation with SCID-I. The mean BDI total score for the MDD group was 26 (20; 30 IQR) and 20.5 (15; 28 IQR) for the 'any depressive disorder' group.

Receiver operating characteristics for the BDI-I are shown in Fig. 1, Tables 2 and 3. The BDI demonstrated the best psychometric properties with regard to the MDD diagnosis detection for a cut-off score of 18 with a sensitivity of 85.7%, specificity of 90.7%, Area Under the Curve (AUC) of 94.3%, positive predictive value (PPV) of 72%, and negative predictive value (NPV) of 95.8%. In the case of the 'any depressive disorder' group, the BDI showed the optimum cut-off score to be 11, with a sensitivity of 92.5%, specificity of 85.7%, AUC of 96.3%, PPV of 82.2%, and NPV of 94.1% (see Fig. 2).

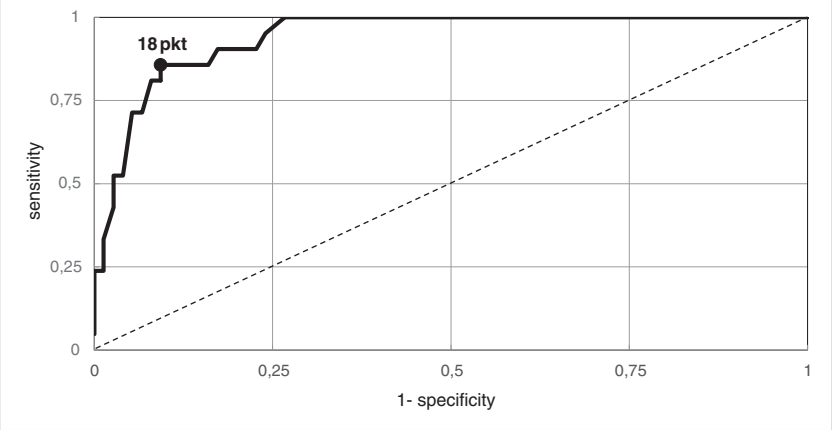

Fig. 1. ROC for BDI: MDD vs. non-MDD patients.