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Validation of the Turkish Version of the Mood Disorder Questionnaire for Screening Bipolar Disorders

Numan KONUK, Sibel KIRAN, Lut TAMAM, Elif KARAAHMET, Hüner AYDIN, Levent ATIK

Abstract

Objectives: *The aims of the study were to validate the Turkish version of the Mood Disorder Questionnaire (MDQ) as a screening tool and to determine its optimum cut-off value for bipolar disorder.*

Methods: *Validation of the Turkish version of the MDQ was conducted on a sample of 309 consecutive patients who attended the psychiatry outpatient unit of 2 different university hospitals. The Structured Diagnostic Interview for DSM-IV Axis I Disorders (SCID) was used as a gold standard test and receiver operating characteristic (ROC) analysis was used to evaluate test performance of the MDQ.*

Results: *In all, 36 (11.7%) patients received a diagnosis of bipolar disorder (type I and II, and bipolar disorder not otherwise specified), 185 (86.1%) were diagnosed as having at least one Axis I psychiatric disorder other than bipolar disorder, and 7 (2.2%) had no psychiatric disorder according to SCID results. Sensitivity and specifity results indicated that the best Turkish MDQ cut-off point was 7 (sensitivity: 0.64; specifity: 0.77), the cut-off point 5 had 0.81 sensitivity and 0.53 specifity, and the cut-off 6 had 0.75 sensitivity and 0.63 specifity.*

Conclusion: *The Turkish MDQ has satisfactory psychometric properties for screening bipolar disorder. The psychometric properties of the Turkish MDQ and its ease of use make it a useful tool for screening bipolar disorders, though further population-based research is required to confirm these results.*

Key Words: *Mood Disorder Questionnaire, Bipolar Disorder, DSM-IV, Validation, Cut of Point, Screening Test*

INTRODUCTION

The repetitive and chronic nature, and difficulties in the diagnosis of mood disorders constitute a major public health problem. Various studies show that diagnosing bipolar disorder is multifaceted and that it often remains undiagnosed or misdiagnosed (Ghaemi et al., 1999). It was reported that 40% of bipolar disorder patients are not diagnosed during the first interview and that the actual diagnosis can be made many years later (Ghaemi et al., 2002).

Patients with bipolar disorder seek treatment for their depressive symptoms more than their manic/hypomanic symptoms (Calabrese et al., 2004). On the other hand, there are studies showing that, to varying degrees (26%-45%), depression patients are in fact bipolar disorder patients (Manning et al., 1997; Benazzi, 2003). Therefore, patients that are followed-up for major depression should also be screened for bipolar disorder in psychiatric outpatient units.

As the majority of bipolar patients are diagnosed with depression or schizophrenia, misdiagnoses might lead to faulty information about the prevalence of bipolar disorder. The lifetime prevalence of bipolar disorder is 1%-2%, although as there are different descriptors of bipolar spectrum disorder (bipolar I, bipolar II, cyclothymia, and bipolar disorder not otherwise specified [BDNOS] this rate increases up to 2.6%-6.5% (Angst, 1998). The difficulties in diagnosing bipolar spectrum disorders constrain the making of wide-spectrum prevalence studies, and the detection of risk groups and possible causative factors.

There are various reasons for the difficulties in the diagnosis of bipolar disorder. First, symptoms of bipolar disorder, such as low impulse control, variable energy

Numan Konuk MD., e-mail: *geronto@yahoo.com*

level, and inclination for legal problems, are also evident in other psychiatric disorders. Secondly, variation in the definition of bipolar spectrum disorders cause confusion (Carta and Angst, 2005). In addition, comorbid diagnoses also contribute to this complexity (Perugi et al., 1999). Whatever the reasons are, misdiagnosis or failure to diagnose bipolar disorder result in negative consequences due to delayed treatment.

The need exists for epidemiological studies in order to reduce the failure of the bipolar disorder diagnosis and to identify the at-risk groups and risk factors. Screening tests are used in wide-spectrum epidemiological studies. Screening studies with short self-report questionnaires help identify individuals who need more detailed assessment for bipolar disorder. Unfortunately, conducting public-based epidemiological studies with psychiatrists is not practical and is costly; therefore, screening instruments are necessary for detecting bipolar disorder risk groups (Leon et al., 1995). Although there are available instruments for screening various psychiatric disorders, there are limited instruments for bipolar disorder (Zimmerman et al., 2004).

The Mood Disorder Questionnaire (MDQ), which is a frequently used instrument, is a reliable and valid tool for screening and detecting bipolar disorder (Hirschfeld et al., 2000). In a study with psychiatric patient diagnoses made with MDQ and telephone-based Structured Diagnostic Interview for DSM-IV Axis I Disorders (SCID) administration, MDQ displayed 0.73 sensitivity and 0.90 specifity. In another population-based study, the sensitivity of MDQ was 0.81 and its specifity was 0.65 (Hirschfeld et al., 2003a, 2003b). The reliability and validity studies of the Finnish (Isometsa et al., 2003), Italian (Hardoy et al., 2005), and French scales (Rouget et al., 2005) were conducted with different populations and results revealed good psychometric properties.

There is a need for a convenient and practical questionnaire for the diagnosis of bipolar disorder in Turkey. The present study evaluated the validity of a Turkish version of MDQ in screening bipolar disorder so that the questionnaire could be used in population-based and prevalence studies. The aims of this study were to validate a Turkish version of MDQ as a screening tool and to determine the optimum cut-off value for bipolar disorder.

METHODS

Sample

The study included 309 consecutive patients who attended the psychiatry outpatient units of Zonguldak Karaelmas University, Medical Faculty, (n= 234), and Çukurova University, Medical Faculty (n= 75), and who agreed to participate and signed an informed consent form. Three patients form Zonguldak Karaelmas University and 2 from Çukurova University declined to participate or provided insufficient answers to the MDQ questions and were excluded from the study. The study was approved by the Institutional Review Board. Immediately after completing the Turkish MDQ, the patients were evaluated with SCID by a psychiatrist with at least with 2 years of experience or a research assistant who was trained in the use of SCID and was unaware of the patients' MDQ results.

Instruments

The Mood Disorder Questionnaire (MDQ): MDQ is a self-report questionnaire with yes and no questions based on the The Diagnostic and Statistical Manual of Mental Disorders–IV (DSM-IV) (American Psychiatric Association, 1994). The scale consists of 3 questions. The first question includes 13 items: symptoms or behaviors related to manic or hippomanic syndromes, elevated mood, irritability, gumption, sleep, libido, thought, energy, attention, and behavior. Symptoms are evaluated with questions that start with, "has there ever been a period of time when you were not your usual self and continue with, "you were so irritable that you shouted at people or started fights or arguments?", "you felt much more self-confident than usual?", "…you got much less sleep than usual and found you didn't really miss it?" The second question asks whether several of the symptoms have been experienced during the same period of time (synchronicity), and the third question is about the effect of these symptoms of the individual's functionality. There are 2 other questions; one about family history of bipolar disorder and one about previous bipolar disorder diagnosis, which were shown to be unrelated to obtaining positive results (Hirschfield et al., 2000). These questions were not included in the present study as in other validity studies (Hardoy et al. 2005, Rouget et al. 2005, Hirschfeld et al. 2000).

After obtaining permission from the researchers that conducted the original reliability and validity study of the scale, MDQ was translated in to Turkish by 2 fluent English-speaking psychiatrists. The translation that was administered to individuals from 2 different geographic locations, and 4 different educational and socioeconomic backgrounds was adapted into Turkish by agreement on the most adequate Turkish correspondences. Two back

Table I. Diagnostic validity of MDQ replies according to SCID-CV diagnosis.

	Sensitivity	Specifity	1-specifity	Probability ratio
1	1	0.11	0.89	1.13
2	0.97	0.21	0.79	1.22
3	0.92	0.29	0.71	1.3
4	0.89	0.4	0.6	1.49
5	0.81	0.53	0.47	1.7
6	0.75	0.63	0.37	2.05
7	0.64	0.77	0.23	2.77
8	0.47	0.83	0.17	2.8
9	0.36	0.9	0.1	3.79
10	0.22	0.95	0.05	4.04
11	0.19	0.96	0.04	5.31
12	0.08	0.99	0.01	7.58
13	0	1	0	1

translations by professional translators were combined and approved by Dr. Hirschfeld.

Structured Clinical Interview for DSM IV Axis I Disorders, Clinical Version (SCID-CV) SCID-CV is a semi-structured interview developed by First et al. (1996) that includes DSM-IV diagnoses. The Turkish translation, and reliability and validity study was conducted by Çorapçıoğlu et al. (1999).

Evaluation

Descriptive findings are presented as frequencies and percentages Bipolar disorder types I and II, and bipolar disorder not otherwise specified diagnoses detected with SCID-CV were used as a gold standard, and receiver operating characteristic (ROC) analysis was used to evaluate the optimum cut-off points, sensitivity, and specifity of the Turkish MDQ using SPSS for Windows version 11.

RESULTS

Mean age of the sample, which included 114 men (36.9%) and 195 women (63.1%) was 36.2 ± 13.4 years, 32% of the patients graduated primary school, 46% were high school graduates, and 22% were university graduates.

According to the DSM-IV diagnoses detected with SCID-CV, 36 (11.7%) of the 309 patients received a diagnosis of bipolar disorders (type I and II, bipolar disorder not otherwise specified) and 7 (2.2%) had no psychiatric disorder according SCID-CV results. The remaining patients (n = 278, 86.1%) were diagnosed with at least one Axis I psychiatric disorder other than bipolar disorder; 103 (33.3%) were diagnosed with mood disorders, 29 with (9.4%) schizophrenia and other psychotic disorders, 6 (1.9%) with substance induced disorders, 131 with (42.4%) anxiety disorders, 13 with (4.2%) somatoform disorders, and 1 (0.3) with an eating disorder. The number of patients with adjustment disorder and without any diagnosis was 12 (3.9%). The number of patients who had other DSM-IV Axis-I disorders was 14 (4.5%) and 29 patients had a comorbid diagnosis (6.7%).

The percentage of positive answers to MDQ questions that contributed to SCID-CV diagnoses ranged from 15.2%-61.8% (61.8%: distractibility; 59.5%: irritability: 53.4% flight of ideas). Presence of the bipolar disorder diagnoses of the patients who gave positive answers to each items in the first question of the MDQ were analyzed using chi-square analysis (Table II).

As applied in the validity study of original version of MDQ, when the response to the second question is positive and moderate to severe to the third question, theoretical cut-off points for the first question which includes 13 subitems were determined by ROC analysis. The ROC curve and related values are presented in

Table II. The effect of positive MDQ items on SCID-I bipolar disorder diagnosis.

MDQ Questions	Positive MDQ diagnoses in all bipolar cases diagnosed with SCID-CV		P values obtained with chi-square analysis
	Number	%	P
Elevated mood	18	20.9	0.003
Irritability	27	14.7	0.048
Increased self-esteem	22	16.4	0.031
Insomnia	19	14.8	0.153
Talkative	21	19.8	0.002
Racing thoughts	23	13.9	0.215
Distractibility	27	14.1	0.101
Energy	21	18.1	0.070
Activity	20	20.4	0.002
Social Activity	18	24.7	0.000
Libido	14	29.8	0.000
Risky Behavior	18	22.5	0.001
Spending money	15	23.8	0.002
Co-occurrence of the symptoms	23	18.7	0.003
Symptom Severity	31	15.3	0.000

Figure I (Area under the curve: 0.753; 95% confidence interval: 0.671-0.875). Sensitivity, 1-specifity, specifity, and probability rates of the ROC analysis are provided in Table I. When the rate of validation of diagnoses that were supported by clinical assessment to invalidated diagnoses (probability rates) are calculated, the cut-off points of 5,6,7,8 were 1.7, 2.1, 2.8, 2.8 respectively. For the Turkish MDQ, with a cut-off point of 5, sensitivity was 81% and specifity was 53%, with a cut-off point of 6 the sensitivity was 75% and specifity was 63%, and with a cut-off point of 7 the sensitivity was 64% and was specifity 77% (Table I).

Based on these findings, the data were regrouped for the possible cut-off points of 5, 6, and 7, and sensitivity and specifity values were calculated (Figure II). As the cut-off point increased, the sensitivity decreased and selectivity increased.

When the predictive values were considered, the positive predictive value for the cut-off point of 5 was 18.4 and the negative predictive value was 95.4. The positive predictive value for the cut-off point of 6 was 21.3 and the negative predictive value was 95.1, the positive predictive value for the cut-off point of 7 was 26.7 and the

Table III. Sensitivity, specifity, and predictive value of Turkish MDQ for the SCID I diagnosis of Bipolar I and II disorder.

	All bipolar cases				Bipolar II			
Cut-off points	Sensitivity	Specifity	(+) Predictive value	(-) Predictive value	Sensitivity	Specifity	(+) Predictive value	(-) Predictive value
5	80.6	58.6	18.4	95.4	100	50	4.4	100.0
6	75.0	61.9	21.3	95.1	100	60.3	5.5	100.0
7	63.9	76.9	26.7	94.2				
8			27.0	92.3				

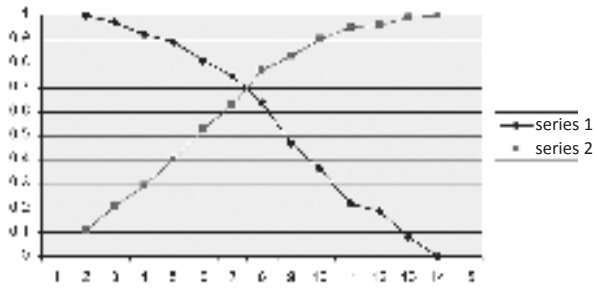

Figure I. ROC Curve and Values.

	Area under the curve	Standard error	P value	95% Confidence Interval	
Total score from the first question	0.753	0.0042	0.000	0.671	0.835

negative predictive value was 94.2, and the positive predictive value for the cut-off point of 8 was 27.0 and the negative predictive value was 92.3 (Table III).

DISCUSSION

According to the findings of this study, the sensitivity of the Turkish MDQ was similar to previous findings in the literature, although the specifity level was lower than in the original study of the scale (Hirschfeld et al., 2000). The specifity and sensitivity rates were nearly the same as in Hirschfeld et al.'s study of specified mood disorder outpatients and very similar to the same author's population-based study (Hirschfeld et al., 2000, 2003a, 2003b). One possible cause for the slight differences studying results is that Hirschfeld et al. (2003a) studied only bipolar disorder patients, whereas the present study included psychiatric outpatients that weren't prescreened and had several different diagnoses, which resulted in low specifity.

The usefulness of a screening tool increases as false negative and false positive results decrease. The most important characteristics of a screening tool are that it identifies actual cases and doesn't stigmatize. Important factors in determining the usefulness of a screening test are the nature of the studied illness, and clinical and technical efficacy of the test, in addition to the aim of pre-diagnosis and early diagnosis (Hugod and Fog, 1992). From this point of view, our results showed that the Turkish MDQ can be used as a pre-diagnosis and screening test by detecting the risk groups for referring detailed psychiatric examination

Table IV. Sensitivity and specifity values of previous validity studies of the MDQ.

	Presented study		Hirschfeld[1]		Hirschfeld[2]		Hirschfeld[3]		Hardoy[a]		Rouget[b]		İsometsa[c]	
Cut-off point	Sensitivity	1 – Specifity	Sensitivity	1- Specifity	Sensitivity	1- Specifity	Sensitivity	1- Specifity	Sensitivity	1- Specifity	Sensitivity	1- Specifity	Sensitivity	1- Specifity
1.0	1.00	0.88							1	0.65			1	0
2.0	0.97	0.79							1	0.57			0.90	0.82
3.0	0.91	0.70							0.96	0.5			0.90	0.82
4.0	0.88	0.59							0.90	0.42			0.90	0.82
5.0	0.80	0.47							0.84	0.30			0.85	0.82
6.0	0.75	0.36							0.76	0.18			0.85	0.71
7.0	0.63	0.23	0.73	0.10	0.28	0.03	0.58	0.07	0.67	0.14	0.74	0.10	0.85	0.53
8.0	0.47	0.16							0.61	0.1			0.85	0.41
9.0	0.36	0.09							0.55	0.06			0.75	0.41
10.0	0.22	0.05							0.43	0.04			0.50	0.33
11.0	0.19	0.03							0.31	0.01			0.35	0.18
12.0	0.08	0.01							0.22	0			0.15	0.12
13.0	0.00	0.00							0.10	0			0.15	0.06

[1]Hirschfeld et al., 2000, [2]Hirschfeld et al., 2003a, [3]Hirschfeld et al., 2005, [a]Hardoy et al., 2005, [b]Rouget et al., 2005, [c]İsometsa et al., 2003

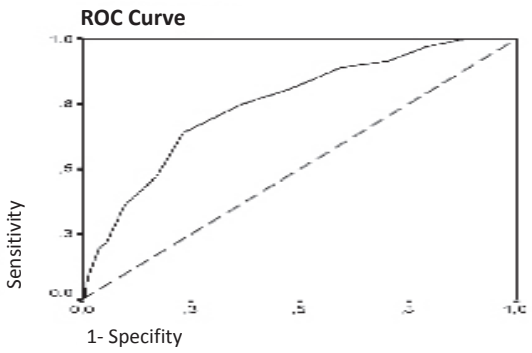

Figure II. Sensitivity and 1-specifity values between regrouped MDQ scores according to the cut-off point of 7 and SCID-I diagnosis.

Value	1	2	3	4	5	6	7	8	9	10	11	12	13
Sensitivity	1.00	0.97	0.92	0.89	0.81	0.75	0.64	0.48	0.37	0.23	0.20	0.08	0.00
Specifity	0.89	0.80	0.71	0.60	0.48	0.37	0.24	0.17	0.10	0.06	0.04	0.11	0.01

It is clear that the contribution of a screening test to diagnosis of bipolar disorder cannot be compared to the contribution of a well-trained psychiatrists' examination based on information provided by the patient and the family (Simpson et al., 2002). The purpose of screening a population for bipolar disorder is to detect at-risk individuals and to guide them towards treatment, as well as to detect possible risk factors and prevalence rates.

One of the limitations of screening bipolar disorder based on self-report tests is the limited insight of the patients (Ghaemi et al., 1995; Miller et al., 2004). In addition, it can be difficult to detect bipolar types due to differences in their definitions. Nevertheless, screening tests could be useful in detecting bipolar disorder. Although there is controversy concerning whether self-reports or other information sources (i.e. close relatives, spouses, friends in workplace) are more valuable, Truman et al. (2002) showed that manic symptoms could be reliably detected with self-report tests.

Although the characteristics of the sample were similar to those in this study, the percentage of patients that were undiagnosed by SCID-CV (25.9%) was quite high in the validity study of the Italian version of MDQ (Isometsa et al., 2003). This might be the reason their sensitivity value (0.76) was similar to our study and their specifity value (0.86) was higher than in our study. Differences between the specifity values might be related to false negative results. Nearly half of the false negative answers in our study (13/23) were based on the answer to the third question. The third question is about the disorder's negative effects on functionality. Miller et al. (2004) reported that false negative results could be related to a patient's lower insight. On the other hand, the effect of bipolar II on functionality is different from that of bipolar I (Benazzi, 2004). At least more patients can be detected as positive (having bipolar disorder) with MDQ in screening of bipolar disorder II, and BP-NOS when the third question is ignored or when the mildly affected patients are also included. In this regard, when the effects of the second (the effect on functionality) and third (synchronicity) questions of MDQ on the bipolar disorder diagnosis with SCID-CV were assessed, the effect on functionality seems to be much more noticeable than the synchronicity (Table 2). Miller et al. (2004) proposed that excluding or changing the third question would lead to an increase in the specifity value of the questionnaire. On the other hand, similar to the power of SCID-CV in detecting bipolar II disorder, MDQ also showed a low sensitivity. The inconsistency between the specifity and sensitivity values of MDQ for bipolar II disorder in or study and previous studies can be explained by the fewer number of patients diagnosed with the disorder by SCID-CV (n= 7). On the other hand, other studies also found low sensitivity with MDQ for bipolar II disorder and bipolar disorder otherwise not specified (Table IV).

Hirschfeld et al. (2003a) reported that the lower sensitivity values in their general population sample in comparison to their clinical sample was related to the low sensitivity for bipolar II of SCID-CV (in line with the low prevalence rate of bipolar II). Regardless of the sample, the effect of comorbidity on specifity and sensitivity values should also be considered.

As the prevalence of bipolar disorder in the Turkish population remains unknown, commenting on the sensitivity of the MDQ should be avoided. Population-based studies would lead to a better conclusion. By considering the variability of sensitivity according to prevalence rates, possibility rates were calculated. Based on cutoff point of 7-8 the probability ratio of Turkish MDQ was 2.8. in detecting the individuals wheter diagnosed with SCID-CV or not. When probability rates were evaluated, it could be proposed that the Turkish MDQ will display higher specifity values in other samples. This leads us to the assumption that MDQ can be used as a pre-diagnosis and risk-group detecting instrument; however, the study's results should be supported with population-based studies with large samples. The results of other validity studies in the literature that followed the original study of MDQ are presented in Table IV.

Our findings suggest that the Turkish MDQ is a reliable tool for screening bipolar disorder when using cut-off points ≥ 7. Although positive MDQ results in the target samples do not provide a definite diagnosis, it highlights a risk for bipolar disorder. In addition, with its ease of administration MDQ is a good tool for detecting misdiagnosed schizophrenia or depression in clinical environments. Further population-based research is required in order to support these results.

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