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Differentiating borderline personality from bipolar disorder with the Mood Disorder Questionnaire (MDQ): A replication and extension of the International Mood Network (IMN) Nosology Project

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ABSTRACT

Introduction: Vöhringer et al. identified a triad of items on the Mood Disorder Questionnaire (MDQ) that best discriminated between borderline personality disorder (BPD) and bipolar disorder (BD) in a tertiary mood clinic setting [23]. The present study aimed to replicate and extend these findings by examining the performance of the triad across a range of cut-off scores and comparing the operating characteristics of the triad to the full MDQ.
Methods: Patients presenting for treatment were assessed with the Structured Clinical Interview for DSM-IV (SCID) and the BPD module of the Structured Interview for DSM-IV Personality (SIDP-IV). The present report is based on 476 depressed patients who had a principal diagnosis of major depressive disorder or BD and who completed the MDQ.
Results: Fifty-seven patients were diagnosed with BD and fifty-four patients were diagnosed with BPD. Both the triad and full MDQ significantly predicted BD diagnosis ($p < .001$), but the triad had optimal operating characteristics, particularly at a cut-off of two.
Conclusion: Within a sample of depressed patients, the MDQ triad is a better screener for BD than the full MDQ, particularly if a positive triad screen is indicated by the presence of any two items. The triad is particularly good for differentiating between BD and BPD, whereas the full MDQ does a poorer job of differential diagnosis. Future studies should administer the triad as a stand-alone scale.

1. Introduction

Bipolar disorder (BD) is often under-recognized and misdiagnosed in clinical practice, in part because most patients with BD seek treatment for depressive symptoms and the past manic or hypomanic component of their psychopathology is missed [1–5]. Indeed, one study found that more than two-thirds of patients with BD were incorrectly diagnosed during their first treatment contact [5]. Other research shows that patients with BD remain misdiagnosed on average from 6 to 10 years [5–7].

The misdiagnosis of BD delays effective treatment and is associated with worsened prognosis and increased healthcare costs [8,9]. Certain psychopharmacological treatments for other disorders can worsen the course of bipolar illness by inducing manic episodes or rapid cycling [5,10–12]. Compared to those with unipolar depression, patients with BD have higher rates of time missed from work, hospitalizations, suicide attempts, and completed suicide [13–17]. BD is amongst the top 20 leading causes of disability worldwide [18].

Because of its public health significance, the detection of BD is crucial, and the use of a BD screener has been proposed as a method of improving recognition. The most commonly used self-report screening scale is the Mood Disorder Questionnaire (MDQ; 19).

There is controversy surrounding the clinical utility of the MDQ as a screener for BD, in part due to the inadequate sensitivity of the measure and therefore high false negative rate [20,21]. Concerns about false positive results have also arisen. Our clinical research group previously questioned the ability of the MDQ to distinguish between BD and borderline personality disorder (BPD) [22]. Indeed, the items on the MDQ seem to reflect not only experiences characteristic of mania but also the affective instability and risky behaviors that are characteristic of BPD, such as suicidality, impulsivity, irritability, and potentially harmful behaviors such as risky sexual activity, reckless spending, and excessive substance use.

In the International Mood Network (IMN) Nosology Project, Vöhringer et al. attempted to improve the ability of the MDQ to differentiate between BPD and BD in a tertiary mood clinic setting [23]. Using logistic regression modeling, they identified a triad of items on the MDQ that best discriminated between the two disorders. These items

Abbreviations: MDQ, Mood Disorder Questionnaire; BPD, borderline personality disorder; BD, bipolar disorder; MDD, major depressive disorder.

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assessed for: elevated mood, increased goal-directed activity, and the co-occurrence of manic symptoms. The authors conducted a receiver operating characteristic (ROC) curve analysis of the full MDQ and the triad and concluded that the triad was a better predictor of BD than the full MDQ. The sensitivity and specificity of the triad were 88.7% and 81.4% respectively, though it was not clear what cut off was used to indicate that someone screened positive. Furthermore, Vöhringer et al. did not compare the operating characteristics of the triad to the full MDQ.

In the present report from the Rhode Island Methods to Improve Diagnostic Assessment and Services (MIDAS) project, we attempted to replicate and extend Vöhringer et al.'s findings within a sample of psychiatric outpatients experiencing a major depressive episode. We limited the sample to depressed patients because although Vöhringer et al. did not specify that all patients were in an episode of major depression at the time of the evaluation, they conducted their study in a tertiary mood clinic. We examined the performance of the triad across a range of cut-off scores and compared the operating characteristics of the triad to the full MDQ.

2. Method

The Rhode Island MIDAS project integrates research assessment into an outpatient community-based care setting [24]. All research is IRB-approved and subjects participated after signing a written voluntary informed consent form. The psychiatric outpatients are comprehensively evaluated upon presentation for treatment with semi-structured diagnostic interviews and a battery of self-report questionnaires. Patients were most frequently referred from primary care physicians (30.3%), family members or friends (18.8%), and psychotherapists (17.2%).

Patients presenting for treatment were assessed with the Structured Clinical Interview for DSM-IV (SCID) and the BPD module of the Structured Interview for DSM-IV Personality (SIDP-IV). As described in previous publications, the diagnostic interviewers were highly trained and diagnostic reliability was high [22]. Diagnostic reliability was assessed in 65 patients with one rater observing as another rater interviewed the patients, and the raters independently made diagnoses. The reliability for diagnosing BD was good and for BPD was excellent ($k = 0.75$ and $k = 1.0$ respectively) [22]. The present report is based on the 476 depressed patients who completed the MDQ, had a principal diagnosis of major depressive disorder (MDD) or BD, and did not have comorbid BD and BPD diagnoses, an exclusion that ensured that a positive MDQ screen was not accounted for by symptoms of the comorbid diagnosis.

The MDQ screens for a lifetime history of hypomania or mania with 13 yes or no questions that reflect *DSM-IV* inclusion criteria [19]. The 14th question asks if the endorsed symptoms occurred during the same period of time, and the final question asks the individual to rate the resulting level of impairment from the symptoms on a 4-point scale (no problem, minor problem, moderate problems, or serious problem). A positive case on the MDQ is defined as a cumulative score of 7 or more symptoms that co-occurred and caused moderate or severe impairment, as outlined by the developers of the scale [19].

The MDQ triad identified by Vöhringer and colleagues [23] included item 1 ("Has there ever been a period of time that you felt so good or so hyper that other people thought you were not your normal self or you were so hyper that you got into trouble?"), item 9 ("Has there ever been a period of time that you were much more active or did many more things than usual?"), and item 14, the co-occurrence question ("Have several of these ever happened during the same period of time?").

The sensitivity of a scale is computed as the percentage of people with a disorder who screened positive for that disorder and specificity as the percentage of people without the disorder who screened negative for that disorder. The positive predictive value is computed as the percentage of people that screened positive for a disorder who have the disorder, and negative predictive value is computed as the percentage of people that screened negative for a disorder who do not have the disorder.

Table A.1
Demographic characteristics of 476 psychiatric outpatients.

Characteristic	n	%
Gender		
Female	293	61.6
Male	183	38.4
Education		
<12 years	27	5.7
High school or GED	309	65.0
4-Year College	140	28.9
Marital Status		
Married	196	41.2
Living with someone	27	5.7
Widowed	7	1.5
Separated	28	5.9
Divorced	86	18.1
Never married	132	29.4
Race		
White	415	88.4
Black	27	5.7
Hispanic	19	4.0
Asian	2	0.4
Other	7	1.5
Age (years)	MEAN = 40.58	SD = 12.5

3. Results

The majority of the 476 subjects were white, female, married, and high school graduates (Table A.1). The mean age of the sample was 40.6 years (SD = 12.5). The majority of patients were diagnosed with unipolar depression (n = 419, 88.0%), and approximately one tenth of patients were diagnosed with BD (n = 57, 12.0%). Most patients with BD were diagnosed with Bipolar I (n = 18, 3.8%) or Bipolar II Disorder (n = 28, 5.9%), and the remainder were diagnosed with BD not otherwise specified (n = 11, 2.3%). Fifty-four patients were diagnosed with BPD (11.3%).

The maximum sum of sensitivity and specificity for the triad was at a cutoff of 2 (Table A.2). At this cutoff, the sensitivity of the triad was much higher than the sensitivity of the full MDQ (94.7% vs 68.4%), though the specificity was lower (57.5% vs 81.6%). McNemar's test revealed a significant difference between the sensitivities of these tests ($\chi^2 = 13.07$, $p < .001$). The negative predictive power of the cutoff of 2 was slightly higher than that of the full MDQ (98.8% vs 95.0%), though the positive predictive value was lower (23.3% vs 33.6%). When only 1 item of the triad was required, the sensitivity was nearly 100%; however, the specificity dropped below 15%. The AUC values for the triad and full MDQ were 0.83 (95% CI: 0.78–0.88) and 0.85 (95% CI: 0.80–0.90) respectively, a nonsignificant difference ($p = .409$).

The sensitivity and specificity of the triad was lower in screening for BPD compared to BD, particularly at a cut-off of two (sensitivity: 48.1% vs 94.7%; specificity: 51.2% vs 57.5%) (Table A.2). The sensitivity and specificity of the full MDQ was also lower in screening for BPD than BD (sensitivity: 44.4% vs 68.4%; specificity: 78.2% vs 81.6%), though

Table A.2
Sensitivity and Specificity of the Mood Disorder Questionnaire (MDQ) for Bipolar Disorder (BD) and Borderline Personality Disorder (BPD) in 476 psychiatric patients with major depression.

	BD		BPD	
	Sensitivity	Specificity	Sensitivity	Specificity
MDQ Triad-Cutoff of 1	98.2%	13.6%	94.4%	13.0%
MDQ Triad-Cutoff of 2	94.7%	57.5%	48.1%	51.2%
MDQ Triad-Cutoff of 3	66.7%	84.2%	31.5%	79.4%
Full MDQ	68.4%	81.6%	44.4%	78.2%

Sample only includes patients with principal MDD or BD (depressed type). Patients with comorbid BPD and BD were excluded from the sample.

these differences were smaller. None of the triad cut-offs significantly predicted BPD diagnosis, but the full MDQ significantly predicted BPD diagnosis ($p = .001$). McNemar's test did not reveal a significant difference between the sensitivities of these tests in predicting BPD ($p = .683$), however, the AUC statistics for the triad and full MDQ were 0.54 (95% CI: 0.47–0.62) and 0.62 (95% CI: 0.54–0.70) respectively, and this difference was statistically significant ($p = .008$).

4. Discussion

Screening is the first stage of a 2-stage diagnostic process. The second stage, the more definitive and expensive diagnostic evaluation, is only conducted when the screener is positive. Accordingly, a screening scale functions well if almost all patients with the disorder screen positive (i.e. high sensitivity), and almost all patients who screen negative do not have the disorder (i.e. high negative predictive value). These characteristics allow the clinician to rule out a disorder if the screener is negative and avoid the time-consuming process of assessing for a disorder. Having high specificity (i.e., high likelihood of having the disorder if the screener is positive) or high positive predictive value (i.e. likelihood that a patient who screens positive is diagnosed with the disorder) is less critical because the quick screen is expected to be followed by a thorough diagnostic evaluation. Therefore, we are not suggesting that the diagnosis of BD can be limited to a positive screen; instead, an effective screener allows the clinician to be confident that almost all patients with BD will be detected for further evaluation.

The results of the present study indicate that the triad identified by Vöhringer and colleagues [23] is a superior screener for BD compared to the full MDQ. Both the triad and full MDQ significantly predicted BD diagnosis, but the triad had optimal operating characteristics, particularly at a cut-off of two. Furthermore, the triad better distinguished BD from BPD compared to the full MDQ.

Most of the MDQ items not included in the triad (i.e. irritability, talkativeness, racing thoughts, distractibility, increased social activity, hypersexuality, risky behaviors, and overspending) are less specific to bipolar disorder, and this likely reduces the full MDQ's performance as a screening scale. Two of the three triad items (euphoric mood and hyperproductivity) are more specific to bipolar disorder. The third triad item (co-occurrence) assesses the temporal component of BD diagnosis, which distinguishes BD from the transient mood fluctuations of BPD.

While the present results suggest the superiority of the MDQ triad in screening for BD, it should be noted that the triad was not administered as a stand-alone scale but was a subset of items from the entire scale. How well it performs as an independent measure is uncertain, particularly because the third item asks about symptoms of co-occurrence. In both the present study and the Vöhringer study, this item was completed after all 13 symptom items of the MDQ were answered. Furthermore, the value of Cronbach's alpha can be reduced if a test is too short, so future studies should also measure the alpha value of the triad as an independent measure [25].

The present report only included patients in a major depressive episode in order to reflect Vöhringer et al.'s tertiary mood clinic sample, and therefore these results might not apply to a general clinical population. It is less relevant to include non-depressed patients because BD is most often missed in patients experiencing a major depressive episode [1–5].

A limitation of this report was that the sample was comprised of majority white, female, and insured outpatients who presented for treatment at a single clinical practice. The generalizability of any single site study is limited. However, a strength of the report was that the patients were unselected with regards to meeting any inclusion or exclusion criteria. The MIDAS project includes patients with a variety of diagnoses and does not select cases that are prototypic, and thus more severe variants, of the diagnostic construct.

5. Conclusions

The present report aims to contribute to a more complete literature of the MDQ's utility. These results suggest that the triad is a good screener for BD, especially if a positive screen is indicated by the presence of any two triad items. Furthermore, the triad is particularly good for differentiating between BD and BPD, whereas the full MDQ does a poor job of differentiating between the two disorders. Future extensions and replications should continue to examine the clinical utility of Vöhringer et al.'s triad, particularly when it is administered as an independent screener or to a more demographically diverse population.

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