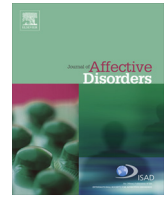




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Research report

Increased energy/activity, not mood changes, is the core feature of mania



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ABSTRACT

Background: In the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition, the occurrence of increased energy/activity and elation of mood or irritability became necessary symptoms for the diagnosis of an episode of mania or hypomania.

Objective: To evaluate whether increases in energy/activity or mood changes represent the core feature of the manic syndrome.

Methods: The symptomatology of 117 hospitalized patients with bipolar mania was evaluated using the Schedule for Affective Disorders and Schizophrenia-Changed version (SADS-C). Based on six items of the SADS-S related to mania, a Confirmatory Factor Analysis (CFA) was performed. An Item Response Theory (IRT) analysis was used to identify how much each symptom informs about the different levels of severity of the syndrome.

Results: According to the CFA, the item “increased energy” was the symptom with the highest factorial loadings, which was confirmed by the IRT analysis. Thus, increased energy was the alteration most correlated with the total severity of manic symptoms. Additionally, the analysis of the Item Information Function revealed that increased energy was correlated with the larger amplitude of severity levels compared with the other symptoms of mania.

Limitations: Only six manic symptoms were considered. The sample might not be representative because the patients were evaluated while presenting peak symptom severity.

Conclusions: Increased energy/activity is a more important symptom for a diagnosis of mania than mood changes and represents the core feature of this syndrome.

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1. Introduction

In the description of manic and depressive states, Kraepelin (1921) referred to changes in mood, thinking, and activity, without emphasizing any of these components specifically. However, modern diagnostic criteria used in psychiatry, such as the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV; APA, 1994), and *International Statistical Classification of Diseases and Related Health Problems*, 10th revision (ICD-10; WHO, 1993), have classified both bipolar disorder and unipolar depression as mood disorders, thus emphasizing the first component to the detriment of the other two.

In the last decades, some studies have investigated the phenomenology of mania by performing a factor analysis of the symptoms. A factor related to hyperactivity was identified in several studies. Based on the results, the authors concluded that increased motor activity not only was more important than changes in mood in characterizing mania but also represents the core feature of the syndrome (Bauer et al., 1991; Akiskal et al., 2001, 2003; Benazzi and Akiskal, 2003; Benazzi, 2007).

As a consequence of this new point of view, the criteria for diagnosing manic and hypomanic episodes were modified in the DSM-V (APA, 2013). In the new classification, euphoria or irritability continues to be necessary, but an increase in energy or activity must also be present for the diagnosis of mania or hypomania.

The objective of the present study was to evaluate whether increased energy and motor activity represent the core feature of the manic syndrome in a sample of hospitalized patients who presented an acute episode of mania.

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2. Methods

The study was conducted in the infirmary of the Institute of Psychiatry, Federal University of Rio de Janeiro, Brazil. The local ethical committee approved the study, and all of the patients gave verbal consent.

Patients who were hospitalized from June 2010 to August 2011 were evaluated using the Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998), a structured interview that allows the formulation of psychiatric diagnoses according with the criteria of the DSM-IV (APA, 1994) and ICD-10 (WHO, 1993), which was validated and translated to Brazilian Portuguese (Amorim, 2000). In cases in which the same patient was hospitalized more than once during the study period, only the first hospitalization was considered.

The patients who met the DSM-IV criteria for an actual manic episode were administered the Schedule for Affective Disorders and Schizophrenia-Changed version (SADS-C; Spitzer and Endicott, 1978). The SADS (Endicott and Spitzer, 1978) is a diagnostic tool based on the Research Diagnostic Criteria (RDC; Spitzer et al., 1978). The SADS-C constitutes a scale of 37 items in which the presence and intensity of manic, depressive, anxiety, and psychotic symptoms are evaluated. The SADS was translated to Portuguese and validated in Brazil (Furlanetto and Bueno, 1999).

Both the MINI and SADS-C were applied in the first 7 days of psychiatric hospitalization for each patient. All of the evaluators were psychiatrists who received training on the use of these tools by the principal investigator (EC). The evaluators were unaware of the goals of the study. The team of evaluators was divided into two groups: some applied the MINI, and others applied the SADS-C.

Based on the SADS-C results obtained in the evaluation of the hospitalized patients who presented actual mania, a Confirmatory Factor Analysis (CFA) was performed to identify the items that best fit the “mania” dimension as proposed by Spitzer and Endicott (1978). The structure of two different models was studied: mania with five items/symptoms (Rogers et al., 2003) and mania with six items/symptoms, including “anger” because of possible presence of this symptom according to theoretical considerations (Johnson et al., 1986). The unidimensionality of the models was tested using LISREL 8.80 software (Jöreskog and Sörbom, 1996) based on the method of full-information maximum likelihood using the polychoric correlation matrix as suggested by Jöreskog and Moustaki (2001), considering that the SADS-C is an ordinal response tool. For data interpretation, we followed the protocol of Hair et al. (2009), who suggested some indices, the error, and goodness of fit. For this analysis, we verified the Goodness of Fit Index (GFI), Normed Goodness of Fit Index (NGFI), Parsimony Goodness of Fit Index (PGFI), χ^2 and significance (coefficients of adjustment to the model), and the Root Mean Square of Error Approximation (RMSEA; an error index).

Subsequent to the confirmation of the unidimensionality of the “mania” dimension of the SADS-C, an Item Response Theory (IRT) analysis was performed to identify how much each of the symptoms revealed the different levels of severity (θ) of the symptoms during the manic episode. This approach allowed the identification of the symptoms that are likely most critical in mania. A two-parameter model was used that included a graduated response model (2P-GRM; Samejima, 1997), which was an adapted version of the ordinal graduated responses from the logistic models of two (2PL) and three (3PL) parameters for the dichotomous items of Birnbaum (1968). The standard parameters of IRTPro 2.1 software (Scientific Software International, 2011) were used to calibrate the items and analysis in IRT.

The Item Information Function (IIF) was used to identify how much each item informed about the different levels of mania severity. The IIFs showed how much information is contained in

a specific symptom across all levels of the latent trait (i.e., the severity of the pathological state). For example, a symptom may reveal a lot about the severity of mania when the manic state is moderate ($\pm\theta=0.1$), but it may reveal little in a more severe state ($\pm\theta=1.5$). This means that when the severity of the clinical state is moderate in manic patients ($\pm\theta=0.1$), a specific symptom may inform more than the other symptoms. In contrast, when the clinical state is more severe ($\pm\theta=1.5$), the symptom is less informative than the other symptoms or may even be absent in the symptomatology. This allows the identification of several degrees of severity of the manic crisis, the symptoms of which are central and reveal more about the state of the patient. To determine whether the same symptom or different symptoms are prevalent along the spectrum associated with severity of mania, 60 points were determined for different levels, ranging from $\theta=-3.0$ to $\theta=+3.0$. Each point comprises a symptom that informs the most. All points were treated as categorical variables from which the total number of points of each symptom was scored. Hence, a percentage was calculated to determine how much the symptom was preponderant in relation to the latent trait. For example, if a symptom had information of 30 out of 60 points, then it preponderated in 50% of the latent trait. A χ^2 with the percentage was calculated to determine whether the symptom was significantly prevalent in relation to the other symptoms.

Finally, the summation of the IIF generates a Test Information Function (TIF). According to Purpura et al. (2010), a TIF can inform how much a group of items contributes to the understanding of the symptoms across the latent trait spectrum. Two different TIFs were calculated from the theoretical model proposed in the present study: a TIF for symptoms associated with increased energy/activity and a TIF for the symptoms associated with mood changes. Based on the TIFs, the same procedure of division of points was performed as described above. The χ^2 test revealed whether the group of symptoms associated with increased energy/activity in manic states was more or less statistically preponderant than symptoms associated with mood changes.

3. Results

During the period of the study, 419 patients were hospitalized, with a total of 481 admissions, considering that some of the patients were hospitalized more than once. A total of 167 patients were diagnosed with an actual manic episode. In 50 patients, the SADS-C was not applied because of several reasons: the patient's refusal to participate in the study, evasion from the hospital, and discharge from the hospital requested by the family. Therefore, the data analysis was based on the results of the SADS-C with 117 patients. Thirteen patients (11.1%) simultaneously met the criteria for an actual major depression episode that consequently led to a mixed-state diagnosis according to DSM-IV criteria.

Among the 117 patients, 49 (41.9%) were male and 68 (58.1%) were female, with no significant sex differences ($\chi^2=3.085$, $p=0.08$). The average age was 42.4 years ($SD=11.7$), and the average education was 8.8 years ($SD=3.2$). The average age at the first crisis was 24.3 years ($SD=8.5$). With regard to the first crisis, mania (57.3%) was significantly more frequent than depression (29.1%; $\chi^2=83.718$, $p<0.001$). Sixteen patients (13.6%) did not know to respond about their first crisis. The average number of hospitalizations per patient was 10.4 ($SD=10.5$).

The CFA with the two models (with five and six items) was performed to determine whether clustering all of the items of the SADS-C associated with mania is possible. The CFA revealed a better adjustment when six items were modeled together, indicating that the factorial structure with six items (i.e., increased energy, increased activity, elation of mood, increased self-esteem,

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