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How do you feel? Detection of recurrent Major Depressive Disorder using a single-item screening tool

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ABSTRACT

Mood is a key element of Major Depressive Disorder (MDD), and is perceived as a highly dynamic construct. The aim of the current study was to examine whether a single-item mood scale can be used for mood monitoring. One hundred thirty remitted out-patients were assessed using the Structured Clinical Interview for DSM-IV Axis-I Disorders (SCID-I), Visual Analogue Mood Scale (VAMS), 17-item Hamilton Depression Rating Scale (HAM-D_{17}), and Inventory of Depressive Symptomatology-Self Report (IDS-SR). Of all patients, 13.8% relapsed during follow-up assessments. Area under the curves (AUCs) for the VAMS, HAM-D_{17} and IDS-SR were 0.94, 0.91, and, 0.86, respectively. The VAMS had the highest positive predictive value (PPV) without any false negatives at score 55 (PPV=0.53; NPV=1.0) and was the best predictor of current relapse status (variance explained for VAMS: 60%; for HAM-D_{17}: 49%; for IDS-SR: 34%). Only the HAM-D_{17} added significant variance to the model (7%). Assessing sad mood with a single-item mood scale seems to be a straightforward and patient-friendly avenue for life-long mood monitoring. Using a diagnostic interview (e.g., the SCID) in case of a positive screen is warranted. Repeated assessment of the VAMS using Ecological Momentary Assessment (EMA) might reduce false positives.

1. Introduction

Considering the high burden of disease and high risk of relapse in depression (Mueller and Leon, 1999; Mathers and Loncar, 2006), early detection and monitoring of relapse in depression are pivotal. To increase the probability of early detection, the American Psychiatric Association (APA) advises regular and systematic monitoring of patients during both the continuation and the maintenance phase (APA, 2010). Likewise, the National Institute for Health and Clinical Excellence (2009) and the Agency for Healthcare Research and Quality (2012) recommend screening for depression, especially in high risk patients including patients with a (family) history of Major Depressive Disorder (MDD). Agency for Healthcare Research and Quality (2012) recommends that the screening clinician should be aided by depression care staff, and a full diagnostic interview should be conducted in case of a positive test.

Depressed mood, one of the core symptoms of MDD besides anhedonia (APA, 2000), seems to play an important role in both the onset as well as recurrence of MDD. Higher levels of daily negative affect (self-reported frequency of negative emotions) were found to predict general affective distress and symptoms of depression and anxiety 10 years later, even when controlling for affective reactivity to daily hassles (Charles et al., 2013). This is surprising, since it has been proposed that affect can be characterised as a fluctuating construct around a core level (Kuppens et al., 2007, 2010). After remission, sad mood is among the most prevalent residual symptoms (Iacoviello et al., 2010; Romera et al., 2013), and is predictive of poor psychosocial functioning (Romera et al., 2013), as well as an earlier return of a depressive episode (Rucci et al., 2011; Van Rijsbergen et al., 2012). Of all DSM-IV MDD symptoms, depressed mood had both the highest rule-in as well as rule-out accuracy for diagnosing a

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current depressive episode in an out-patient psychiatric setting ($N=1523$), after correcting for symptom prevalence (Mitchell et al., 2009).

Assessing sad mood on a Visual Analogue Mood Scale (VAMS) could offer possibilities for straightforward and efficient depression monitoring, including potential for online as well as smartphone application. As no training is required and administration is brief, the VAMS could be a more patient friendly alternative to other well-known instruments including the Hamilton Depression Rating Scale (HAM-D) and the Inventory of Depressive Symptomatology-Self Report (IDS-SR). Attesting to its clinical relevance, it has recently been shown that the VAMS has predictive validity for time to relapse in remitted patients (Van Rijsbergen et al., 2012). A 1 cm increase on the baseline VAMS increased the risk of relapse by a factor of 1.15 over a period of 5.5 years. In further support of its validity it has been shown that the VAMS shows meaningful relationships with various self-report measures of depression, including the Beck Depression Inventory (BDI), HAM-D, and the Hospital Anxiety and Depression Scale (HADS) (Cella and Perry, 1986; McKenzie and Marks, 1999). However, it is also important to examine the ability of the VAMS to discriminate between patients with and without a current relapse (i.e., discriminative validity), which remains to be established.

Thus far few studies have focused on the discriminative ability of the VAMS. Yet, none of these studies focused specifically on recurrent depression. Killgore (1999) tested the discriminative validity of a VAMS among college-students, and found a sensitivity (SE) of 0.55 and specificity (SP) of 0.89 in detecting depressed mood states (BDI ≤ 9 versus BDI > 9). Two studies focused on individuals who were inflicted with cancer or cardiovascular disease, and showed a SE of 0.80 and SP of 0.79 (indexed by the Patient Health Questionnaire-9) (Mitchell et al., 2010) and of 0.73 and 0.90 (index not specified) (Mitchell et al., 2012) in detecting MDD using a VAMS. Finally, in two studies using a DSM-based structured interview for the assessment of MDD, it was shown that a VAMS had acceptable diagnostic accuracy in patients with dementia (SE=0.72 and SP=1.0) or mild cognitive impairment (SE=0.85 and SP=0.94; Kertzman et al., 2004), but not in post-stroke patients before 18 months post-stroke (Berg et al., 2009).

The current study was designed to rigorously examine the discriminative validity of the VAMS as a screen for current depressive relapse in recurrent depression, using a DSM-based interview (i.e., SCID-I) as the gold standard for establishing a MDD diagnosis. Instead of using a paper-and-pencil version, we used a numeric version of the VAMS that can be administered verbally and could facilitate quick assessment. The present study not only examined the VAMS's sensitivity (i.e., correctly identified positive cases) and specificity (i.e., correctly identified negative cases), but also tested its positive and negative predictive value (i.e., probability of truly having, or not having a disease given the outcome of the test). Finally, to get a more comprehensive insight in its relative performance as a screen for depressive relapse, we compared the discriminative ability of the verbally administered VAMS with the most frequently used interview and self-report instruments for the assessment of depressive symptomatology, the Hamilton Depression Rating Scale ($HAM\text{-}D_{17}$) interview and the IDS-SR.

2. Methods

This study uses data from a research portal where patients with a remitted recurrent depression can participate in studies that specifically focus on the course and treatment of recurrent depression. The data from two randomized controlled trials, for readability referred to as Study A and Study B, were analysed. Study A focused on Preventive Cognitive Therapy (PCT) in groups as an addition or alternative to antidepressant medication (ADM) versus ADM alone in the prevention of relapse in recurrent depression (for a detailed description see Bockting et al. (2011a)). Study B examined the effectiveness of an internet adaptation of PCT added to Treatment-As-Usual (TAU) versus TAU alone in the prevention of relapse in recurrent depression (for a detailed description see Bockting et al. (2011b)). The Medical Ethical Committee for Mental Health Institutions (METiGG) approved both protocols and all patients provided written informed consent prior to participation.

2.1. Participants

In both studies, patients were included who had a) experienced at least two lifetime Major Depressive Episodes (MDEs), of which the last MDE was no longer than 2 years ago; b) current remission of the last MDE for at least 2 months, both defined according to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) and assessed with the Structured Clinical Interview for DSM-IV disorders (SCID-I; First et al., 1995) administered by trained interviewers; and c) a current score of ≤ 10 on the 17-item Hamilton Depression Rating Scale ($HAM\text{-}D_{17}$). Exclusion criteria were: current mania, hypomania, a history of bipolar illness, any psychotic disorder (current and previous), organic brain damage, current alcohol or drug abuse, predominant anxiety disorder, and recent electroconvulsive therapy. Both studies included remitted patients, but differed to the extent that Study A only included patients who a) were currently on ADM for at least 6 months, and b) did not receive psychotherapy more frequent than twice per month. In Study B, there were no restrictions with respect to both type and frequency of current care (i.e., psychotherapy, ADM, specialty care, and no care).

2.2. Measures

2.2.1. Relapse in MDD

Depression status during follow-up was assessed using the SCID-I, administered by trained interviewers. Interviewers attended regular consensus meetings to enhance inter-rater agreement. The occurrence of MDEs between assessment points was retrospectively assessed for all patients at four assessment points in Study A (after 3, 9, 15 and 24 months), and three assessment points in Study B (after 3, 12 and 24 months). The VAMS, $HAM\text{-}D_{17}$, and IDS-SR were also completed during these assessments.

2.2.2. Visual Analogue Mood Scale (VAMS)

Patients were asked to rate their current mood on a telephone-assisted version of a Visual Analogue Mood Scale (VAMS)[1] previously used in mood induction procedures (Segal et al., 1999; Van Rijsbergen et al., 2013). By telephone, patients received the following instruction: 'Please rate your current mood on a scale of 0 to 100', on which 0 indicates 'happy', and 100 indicates 'sad' and their answer was noted by the interviewer.

2.2.3. Hamilton Depression Rating Scale ($HAM\text{-}D_{17}$)

The 17-item Hamilton Depression rating scale ($HAM\text{-}D_{17}$; Hamilton, 1960) interview was assessed by telephone (Simon et al., 1993) to measure levels of depressive symptomatology. This widely used semi-structured interview covers affective, behavioural and biological symptoms with scores that range between 0 and 52. Trained research assistants administered the $HAM\text{-}D_{17}$.

2.2.4. Inventory of Depressive Symptomatology-Self Report (IDS-SR)

The Dutch translation of the 30-item IDS-SR (Rush et al., 1996) was included as another widely used index of depressive symptomatology. The IDS-SR is a self-report measure on which patients rate their symptoms on a series of four-point scales (ranging from zero to three). The IDS-SR asks for all DSM-IV core symptom domains including mood, cognitive and psychomotor symptoms, but also covers commonly associated symptoms including anxiety. The IDS-SR has excellent internal consistency ($\alpha=0.92$, Rush et al., 2003).

2.3. Procedure

The procedure for both studies was similar. Upon entry in the studies, patients were followed for 2 years. Although all patients were remitted upon entry, we have a mixed population of remitted and depressed patients at follow-up. During all follow-up telephone interviews, the VAMS was administered first, followed by the SCID-I (coded as yes/no current relapse), and then the $HAM\text{-}D_{17}$ interview. The IDS-SR was administered online in the same week, which patients could access through a personalised hyperlink. Patient recruitment for the respective studies started in 2009 (Study A) and 2010 (Study B), with the VAMS being administered since March

[1] Visual Analogue (Mood) Scales have been presented in many ways (McCormack et al., 1988; Ahearn, 1997; Paul-Dauphin et al., 1999); with variations in length, orientation, anchor points, and the presence or absence of both numbers and a line. The VAMS used in the current study could therefore also be referred to as a Numerical Rating Scale (NRS). However, as a NRS reflects one of the many possible presentations of a VAMS (Paul-Dauphin et al., 1999), we used the term VAMS throughout for reasons of clarity and coherence.