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Research report

Development of screening inventories for bipolar disorder at workplace: A diagnostic accuracy study

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ABSTRACT

Background: This study aimed to develop a new instrument for bipolar disorder screening, the Workplace Bipolar Inventory (WBI), and examine its efficiency as compared with Mood Disorder Questionnaire (MDQ) and Bipolar Spectrum Diagnostic Scale (BSDS) among workers on leave of the absence due to their mental health problems.

Methods: Participants were recruited at a psychiatric outpatient clinic for return-to-work in Tokyo, Japan, during September to November 2009. 81 outpatients were recruited, 55 of whom (68%) agreed to participate in this study. Participants answered questionnaires including WBI, MDQ, BSDS, and demographic factors. Their diagnostic information according to the international statistical classification of diseases and related health problems 10th revision (ICD-10) was obtained from their attending psychiatrists. The WBI is a new self-rating 39-item questionnaire which developed with input from occupational mental health specialists and an analysis of WHO Composite International Diagnostic Interview (CIDI) items. The WBI contains 3 subtype scales: WBI-A (5 items), WBI-AB4 (9 items), and WBI-AB (39 items).

Results: Reliability of these scales was moderate. In the AUC of these scales, BSDS was the best of them (0.83). In the optimal cut-off point of these scales, WBI-AB4 showed good efficiency of screening (sensitivity=0.78, specificity=0.75). Both MDQ and BSDS had high specificity, while low in sensitivity.

Limitations: The well validated diagnostic method (i.e., the structured clinical interview for DSM-IV [SCID] or CIDI) was not applied in this study.

Conclusions: The WBI, especially WBI-AB4 would be a useful workplace screening tool for workers with bipolar disorder.

1. Introduction

Bipolar disorder is a serious, commonly disabling, psychiatric condition (Miller et al., 2014). Although bipolar disorder exacts a high personal and societal toll, with high rates of suicide, interpersonal problems, and a substantial economic burden (Dunner, 2003; Glick, 2004), it is frequently misdiagnosed (Dunner, 2003; Ghaemi et al., 2001; Glick, 2004; Mantere et al., 2004). Previous studies reported that inappropriate treatments caused by misdiagnosis or delayed diagnosis may lead to poor prognosis and increased social problems (Berk and Dodd, 2005; Fagiolini et al., 2013; Skeppar and Adolfsson, 2006). For these reasons, early correct diagnosis of bipolar disorder is an important theme (Das et al., 2005; Dunner, 2003).

At the workplace also, bipolar disorder requires attention (Stang et al., 2007). A systematic review of bipolar disorder in the workplace revealed that bipolar disorder imposes a significant financial burden due to lost productivity on employers, costing more than twice as much as depression (Laxman et al., 2008). In addition, it was reported that employees with bipolar disorder annually cost $6836 more than employees without bipolar disorder in terms of health care insurance, prescription drugs, and sick leave, among others (Gardner et al., 2006). A qualitative study using interviews with people with bipolar disorder reported that the impact of bipolar disorder upon work functioning emerged as follows: lack of continuity in work history, loss, illness management strategies in the workplace, stigma and disclosure in the workplace, and interpersonal problems at work (Michalak et al., 2007). The presence of stigma in the workplace would lead to delays in accurate diagnosis and effective management of bipolar disorder (Laxman et al., 2008). A previous study suggested that more attention should be paid to the screening and the treatment of bipolar disorder at the workplace (Kessler et al., 2006). It is important to include a screen for bipolar disorder in workplace depression screening programs.

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Some self-report questionnaires have been developed to screen for bipolar spectrum disorders, but they mainly are intended for use in clinical settings. The Mood Disorder Questionnaire (MDQ) was developed to screen for a lifetime history of a manic or hypomanic syndrome according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) criteria and clinical experience (Hirschfeld et al., 2000) and has been widely investigated (Carvalho et al., 2014). Mood Disorder Questionnaire showed good sensitivity (0.73) and very good specificity (0.90) in clinical settings (Hirschfeld et al., 2000) and higher sensitivity with bipolar I disorder (Gervasoni et al., 2009; Miller et al., 2004; Twiss et al., 2008). The Bipolar Spectrum Diagnostic Scale (BSDS) was developed to target bipolar II and NOS conditions (Ghaemi et al., 2005). Bipolar Spectrum Diagnostic Scale showed good sensitivity, at 0.76, approximately equal in bipolar I and II/NOS subjects (0.75 and 0.79, respectively), with an optimal cut-off point to detect bipolar disorder of 12/13 (sensitivity0.75 and specificity=0.93; (Ghaemi et al., 2005). The Hypomania Check List (HCL-32) self-report questionnaire is a tool designed to screen for hypomanic components in patients with major depressive disorder (MDD) (Angst et al., 2005). The HCL-32 distinguished between BP and MDD with a sensitivity of 0.80 and a specificity of 0.51, but it does not distinguish between BP-I and BP-II disorders (Angst et al., 2005). A comprehensive meta-analysis of accuracy studies among these screening instruments reported that the summary sensitivities were 0.81, 0.66 and 0.69, while summary specificities were 0.67, 0.79 and 0.86 for the HCL-32, MDQ, and BSDS, respectively, in psychiatric services, in reference to the recommended cut-off points (Carvalho et al., 2014). However, most studies were performed in mental health care settings and no study has been conducted targeting the workplace.

The purpose of this study was to develop new instruments for bipolar disorder screening in the workplace, and to examine the reliability and efficiency (i.e., sensitivity, specificity, AUC, and the stratum-specific likelihood ratios) to be compared with Mood Disorder Questionnaire (MDQ) and Bipolar Spectrum Diagnostic Scale (BSDS) in workers who have a mood or anxiety disorder.

2. Methods

2.1. Participants' recruitment

The present survey was conducted in one psychiatric outpatient clinic for supporting return-to-work of employees with mental health problems in Japan. The inclusion criteria were 1) taking a leave of the absence due to their mental health problems, 2) participated in the daily return-to-work program, and 3) permitted to participate in this study by their attending psychiatrists.

2.2. Procedure

The procedures of the present study were as follows: 1) participants were asked to complete the self-reported questionnaire including the Workplace Bipolar Inventory (WBI), Mood Disorder Questionnaire (MDQ) and Bipolar Spectrum Diagnostic Scale (BSDS), 2) after the questionnaire survey, the diagnostic information of each participant according to the ICD-10 was collected from their attending psychiatrist, and 3) the researcher combined this information to create the dataset for statistical analyses. The attending psychiatrists were blinded to the results of the questionnaire of their patients.

2.3. Screening instruments

2.3.1. Workplace Bipolar Inventory (WBI)

Workplace Bipolar Inventory is a newly developed self-rating 39-item questionnaire for use at the workplace. It was developed with input from two sources, a panel of specialists and items from an already-established inventory. Eight practitioners of occupational mental health were asked to report the observed specific symptoms or behaviors of cases with bipolar disorder type I and II in workplace settings. From their reports, 128 items of specific symptoms or behaviors were collected as an item pool and four large categories (including 17 small categories) were created by two occupational mental health specialists and five graduate school students majoring in occupational mental health using the KJ Method (Scupin, 1997). One to three items were selected among each category for WBI, and provisionally 35 items were included.

The other source was an analysis of World Health Organization Composite International Diagnostic Interview version 3.0 (WHO-CIDI 3.0) items using the data of the world mental health survey Japan (WMH-J) (Kawakami et al., 2008). 69 items met the criteria for a screening question (elevated, expansive or irritable mood) of bipolar disorder, two met the criteria for bipolar disorder type I (manic episode), five met the criteria for bipolar disorder type II, and 14 met the criteria for hypomanic episode according to Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) (American Psychiatric Association., 2000). The odds ratios (OR) of predicting bipolar disorder type I, II, mania and hypomania were calculated using each of the 15 questions about manic and hypomanic episodes according to WHO-CIDI 3.0. The respondents diagnosed with bipolar disorder were compared with those who were diagnosed with major depressive disorder or anxiety disorders. The ORs of each question ranged from 0.75 to 4.80. Four questions which had significant ORs were chosen for the items of WBI. These questions were related to the signs and symptoms of "psychomotor agitation" (OR=4.05 [95% CI: 1.13–14.57]), "increase in goal-directed activity" (OR=3.70 [95% CI: 1.08–12.66]), "excessive involvement in pleasurable activities that have a high potential for painful consequences" (OR=4.38 [95% CI: 1.21–15.78]), and "more talkative than usual or pressure to keep talking" (OR=4.80 [95% CI: 1.38–16.65]).

From the two approaches described above, a provisional set of 39 items for the WBI was developed. To screen for bipolar disorder using fewer items, WBI was developed as a two-step inventory according to the diagnostic criteria of manic and hypomanic episodes in DSM-IV. The first step (question A) consisted of five items from the KJ method according to criterion A of DSM-IV (i.e., abnormally and persistently elevated, expansive or irritable mood) and one item asking about the duration of symptoms. The second step (question B) consisted of 34 items including 30 items from the KJ method and four items from WHO-CIDI 3.0. In addition, the severity of impairment of daily living due to symptoms was asked in one item (question C). Questions A and B ask the respondents to answer with "yes" or "no" except the question about the duration of symptoms (3-point scale as follows; less than 3 days, 3–6 days, or more than 7 days). Question C evaluates the level of impairment resulting from the symptoms on a 4-point scale (no, minor, moderate, or serious problems). The respondents who answered "yes" to any item of question A were required to answer question B. In the present study, the respondents who answered "no" to all items of the question A were treated as having answered "no" to all items of question B.

The WBI contains three subtype scales; WBI-A (5 items), WBI-AB (39 items), and WBI-AB4 (9 items). The present study tested the screening performances of each of the three subtype scales. WBI-A included only question A. The scoring algorithm calculated the number of symptom items scored "yes" (ranging from 0 to 5). The WBI-AB scale included all the questions. The scoring algorithm calculated the number of symptom items scored "yes" (ranging from 0 to 39). The WBI-AB4 scale included question A and four items quoted from WHO-CIDI 3.0. The scoring algorithm calculated the number of symptom items scored "yes" (ranging from 0 to 9). The diagnostic criteria for bipolar type I or II according to the ICD-10 do not include the duration of symptoms and severity