Published in final edited form as:

Psychiatry Res. 2009 June 30; 168(1): 67–77. doi:10.1016/j.psychres.2008.04.010.

The Mood Disorder Burden Index: A Scale for Assessing the Burden of Caregivers to Adults with Unipolar or Bipolar Disorder

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Abstract

In this paper we present a brief measure of caregiver burden, the Mood Disorder Burden Index (MDBI), for use with family members and close friends of adults with major depressive disorder (MDD) or bipolar disorder (BD). The MDBI assesses burden in three core domains (patients' mood symptoms, caregivers' worry about the future, and caregivers' interpersonal difficulties with the patient) and includes an optional module that assesses caregiver burden associated with patients' pharmacotherapy or psychotherapy. The MDBI was administered to caregivers of older individuals (i.e., 58 years and older) with MDD ($n = 123$) or BD ($n = 38$ who were receiving treatment through a research study). Analyses indicated evidence of convergent and discriminant validity of the new measure well as internal consistency within both caregiver groups. It will be important for future research to administer the MDBI to caregivers of middle-aged and older patients as well as those receiving treatment through inpatient settings or community outpatient clinics.

Keywords

family caregiver; caregiver burden; major depressive disorder; bipolar disorder; measurement

1. Introduction

The consequences of major depressive disorder (MDD) extend far beyond the ill individual and are also borne by close family members and friends (Hinrichsen, 1991; Heru & Ryan, 2004; Langa et al., 2004). Likewise, bipolar disorder (BD) presents many challenges to an individual's social network (e.g., Ogilvie et al., 2005; Perlick et al., 2007). MDD or BD in older adults may have an especially strong impact on family and friends because of the physical and cognitive impairments that often co-exist with mood disorders in late life (Lenze et al., 2001; Butters et al., 2004; Gildengers et al., 2007). In order to more fully understand the

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consequences of adult mood disorders for family members' health, as well as the influence of family on patients' recovery from mood disorders, it is important to quantify the psychological burden of these family caregivers. In this paper we describe a new measure of caregiver burden that is specific to a relative's mood disorder.

The psychological burden of family caregivers commonly refers to the adverse effects of an individual's illness or impairment on their caregivers' own well-being (Poulshock & Deimling, 1984). Better known measures of burden in caregivers of individuals with serious mental illness include the Social Behaviour Assessment Schedule (Platt et al., 1980), the Perceived Burden Scale (Struening et al., 1995), the Involvement Evaluation Questionnaire (Schene & van Wyngaarden, 1992), and the Experience of Caregiving Inventory (Szmukler et al., 1996). Burden measures also have been developed for family members of depressed individuals, specifically (e.g., Coyne et al., 1987; Jacob et al., 1987). To date, measures of caregiver burden in psychiatric illness include features that are less than ideal such as the use of a lengthy semi-structured interview (Platt et al., 1980) or assessment of extraneous constructs (e.g., assistance with activities of daily living; Schene & van Wyngaarden, 1992). Existing measures also do not assess family burden associated with the specific symptoms of patients' depressive and manic episodes, or with patients' treatment (e.g., nonadherence to prescribed medication and difficulty in working with mental health care providers).

The purpose of this report is to present a new measure of burden, the Mood Disorder Burden Index (MDBI), for use with family members and close friends of adults with unipolar or bipolar disorder. We had four specific goals in creating the MDBI. First, we set out to assess burden in three core domains that we believe are applicable to this population of caregivers: patients' mood symptoms, caregivers' worry about the future, and caregivers' interpersonal difficulties with the patient. We also created items to assess burden in a fourth domain—treatment-related burden—applicable to caregivers of patients currently receiving pharmacologic treatment or psychotherapy. Our second goal was to create a measure that also provided clinicians with information regarding the recent frequency of patient symptoms. Third, we set out to develop a measure that could be used with caregivers of older or middle-aged adults by not focusing heavily on caregiver burden associated with patients' difficulties in caring for children or working for pay. Our fourth goal was to create a structured measure that could be completed in 5 to 10 minutes via self-report or interview.

As described above, the MDBI was developed for a broad population of caregivers to individuals with unipolar or bipolar disorder. In this paper we report the psychometric properties of this measure based on its use with caregivers of older patients who were enrolled in one of two university research studies. Thus, it will be important for future research to administer the MDBI to caregivers of middle-aged and older patients as well as those receiving treatment through inpatient settings or community outpatient clinics.

2. Method

2.1. Participants

All patients were 58 years of age or older and met criteria for current MDD or BD as described below. Recruitment strategies included referrals by word of mouth and by clinicians in the primary care and specialty mental health sectors; community agencies; advertisements in the print and on-air media; use of university research registries; and presentations to lay groups of older adults and their families. Patients were eligible for the current study if they had a close family member or friend. The caregiver was identified by the patient as the family member or friend who currently provides the most support or assistance, consistent with previous research in the area of family and mood disorder (e.g., Hinrichsen, 1991; Perlick et al., 2004). All caregivers were required to be 18 years of age or older, living independently in their own homes

(i.e., not in assisted living or a nursing home) and cognitively intact (i.e., no more than 3 errors on the 10-item Short Portable Mental Status Questionnaire; Pfeiffer, 1975). All caregivers had face-to-face or telephone contact with the patient at least twice per week.

Recruitment proceeded in two phases. Patients who were interested in participating provided consent to utilize their clinical data and contact their identified caregiver. The caregiver was then contacted for screening and to request his or her participation. Structured, in-person interviews were conducted with caregivers within two weeks of the collection of patient clinical data described in this report.

2.1.1. MDD patient-caregiver dyads (n = 123)—These patients are a subsample of individuals enrolled in an ongoing treatment study for MDD. They enrolled in the ancillary caregiver assessment study prior to initiation of treatment. Patients in the treatment study receive an open trial of antidepressant medication (escitalopram 10 mg./day) without psychotherapy for six weeks as the initial step of a treatment algorithm delivered in a supportive research clinic. Using the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1967), patients are assessed for depression severity at baseline and after 6 weeks of treatment. At that time, partial responders are randomized to receive a higher dose of escitalopram either with or without interpersonal psychotherapy. All patients met criteria for current non-psychotic MDD as established by the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders (SCID for DSM-IV; First et al., 1997); had a baseline score of 15 or higher on the 17-item HRSD; and scored at least 17 on the Mini-Mental Status Examination (MMSE; Folstein et al., 1975). Potential participants were excluded if they had a lifetime diagnosis of bipolar disorder, schizophrenia, schizoaffective or other psychotic disorders; dementia; a history of alcohol/drug abuse within the past 12 months; or a history of non-response or intolerance of escitalopram.

Dyads were recruited from a sample of 194 patients who began treatment between June 1, 2004 and August 31, 2006 (treatment study enrollment is ongoing). A total of 192 of these patients were contacted for participation in this ancillary study, with 3 patients determined to be ineligible because they had no close family member or friend, were in a potentially abusive relationship with their caregiver, or because their caregiver was a participant in the treatment study. A total of 23 patients refused to participate in this ancillary study and 5 patients consented but their caregiver refused to participate. An additional 10 patients agreed to participate but either the caregiver was not currently available for an interview ($n = 4$) or the patient dropped out of the treatment study before the caregiver could be interviewed ($n = 6$).

In order to enhance the likelihood that our new measure captures burden due to the relative's depression rather than medical or cognitive comorbidities, an additional 28 MDD patients were excluded from analysis because they had an MMSE score of less than 24 or a score of 15 or greater on the Cumulative Illness Rating Scale for Geriatrics (CIRS-G; Miller et al., 1992). A CIRS-G score of greater than or equal to 15 was chosen for an exclusion criterion because this was roughly equivalent to 1 standard deviation above the mean. Thus, the final sample size for the MDD group was 123 dyads.

2.1.2. BD patient-caregiver dyads (n = 38)—These patients are a subsample of older adults enrolled in a completed research study (2003–2005), the Bipolar Disorder Center for Pennsylvanians (BDCCP), and who also enrolled in the ancillary caregiver assessment study. The BDCCP was a multi-center randomized controlled study designed to test the efficacy of a psycho-educational intervention, the Enhanced Clinical Intervention (ECI). Patients were not required to be acutely ill to enter the BDCCP and most entered the protocol as euthymic or with mild depressive symptoms. Because previous research has demonstrated that family caregiver burden persists between illness episodes (e.g., Perlick et al., 2001; Reinares et al., 2006), we

felt it was important to include these caregivers in testing of the MDBI. Patients who were not acutely ill when they entered the BDCP continued on the pharmacotherapy on which they entered the study. Those who exhibited acute mood symptoms at study entry or during the course of the study were randomized to receive ECI or usual supportive care. BD diagnosis was confirmed using the SCID for DSM-IV. Potential participants were excluded if they had rapid cycling (>4 episodes in one year); a diagnosis of schizophrenia, schizoaffective disorder, pervasive developmental disorder; a significant neurological condition (e.g., multiple sclerosis, dementia); current alcohol or substance abuse requiring treatment; or alcohol dependence not in full sustained remission.

Dyads were recruited from a sample of 56 older patients enrolled in the BDCP. A total of 53 of these patients were contacted for participation in this ancillary study, with 1 patient determined to be ineligible because he had no close family member or friend. A total of four patients and six caregivers refused to participate, and 1 patient dropped out of the BDCP before the caregiver could be approached. In order to enhance the likelihood that our new measure captures burden due to the relative's bipolar disorder rather than medical or cognitive comorbidities, an additional 3 BD patients were excluded from analysis because they had an MMSE score of less than 24 or a score of 15 or greater on the CIRS-G. Thus, the final sample size for the BD group was 38 dyads.

Table 1 summarizes key patient and caregiver characteristics. Most of the patients were female with an average age of 72 years (range of 58 to 95 years) and a high school education or equivalent. Most of the patients were Caucasian and the remainder were African American. The majority of patients with BD had a diagnosis of BD I (76%) and the remainder were diagnosed with BD II. Approximately half of the patients with MDD had recurrent depression. The majority of patients (71%) had at least one co-morbid Axis I disorder, most commonly generalized anxiety disorder.

Patients' average score of 9 on the CIRS-G indicates a moderate level of chronic medical illness and patients had six conditions on average (see Table 1). Patients were cognitively intact as determined by the MMSE. Patients with MDD presented with a current depressive episode that was mild to moderate with HRSD scores ranging from 15 to 27. There was much variability in the duration of patients' current depressive episode, with a range of 3 weeks to 26 years. Reflecting the fact that BDCP participants were not required to be acutely ill to enter the study, they were rated by clinicians as minimally ill on average ($M = 2.3$, $SD = 1.5$; actual range = 1 to 6; possible range = 1 to 7) on the modified Clinical Global Impressions scale for bipolar illness (CGI-BP; Spearing et al., 1997). At the time of the caregiver assessment 36% of the patients with MDD ($n = 44$) and all of patients with BD had received some type of pharmacotherapy in the past month (i.e., anti-depressants, anti-psychotics, or anxiolytics), prior to initiation of protocolized treatment.

The majority of caregivers were female and their average age was 58 with a range from 23 to 88 years. Most of the caregivers were Caucasian (87%) and the remainder were African American (11%) or belonged to another ethnic minority group (2%). Most of the caregivers were either spouses or adult children and the remainder included individuals such as siblings and daughters-in-law. The majority of family members and friends were also caregivers in the narrower definition of providing assistance to the patient with daily activities; a total of 85% of caregivers helped with at least one out of seven instrumental or personal activities of daily living ($M = 2.5$; $SD = 1.76$; range = 0 to 7). Approximately 27% of the caregivers reported that the patient also received assistance from another family member or friend. The average amount of contact between patients and non-spousal caregivers was four to five times per week with a range of twice per week to every day. In terms of physical health, caregivers' average rating was 3.4 (i.e., good to very good) on a scale from 1 (poor) to 5 (excellent). Approximately 19%

($n = 30$) of the caregivers reported that they currently have a psychological disorder; depression and/or anxiety were cited in almost all of these cases.

2.2. Scale Development, Content, Format, and Scoring

MDBI items were taken from qualitative data collected in a study of family caregivers to depressed inpatients (Hinrichsen et al., 1992); DSM-IV criteria for depressive and manic episodes; and years of clinical experience working with older patients and their family members. In the qualitative study, spouses and adult children of older patients recently admitted for psychiatric inpatient care were asked what they had found most difficult about caring for their relative during the recent episode of depression. The most common areas of difficulty identified in that study were of an interpersonal nature (e.g., loss of intimacy or companionship with the patient), practical (e.g., explaining the patient's condition to others), emotional (e.g., anxiety about past or future issues) and stemming from the patient's behaviors (e.g., reduced activity or interest).

Table 2 displays each of the 32 items of the MDBI. We set out to assess family burden in three core domains. In regard to the first domain, patient mood symptoms (20 items), items #1 through 11 represent the 9 symptoms associated with a DSM-IV diagnosis of a major depressive episode. The symptoms of too much or too little sleep, and suicidal ideation or attempt, were each split into separate items. Items #5 and 13 through 18 represent the 7 symptoms associated with diagnosis of a manic episode. An additional three items assess symptoms or behaviors relevant to either disorder (#12, lack of attention to physical appearance or personal hygiene; #19, abuse of alcohol or other substances; and #20, difficulty in working, caring for the home, or other activities). The second core domain pertains to caregivers' worry about the future mental health of the patient, self, and other family members, and the responsibility of explaining the patient's depression to others (3 items, #26–28). The third domain pertains to interpersonal difficulties with the patient stemming from his or her mood disorder (4 items; #29–32).

A fourth, optional module assesses burden associated with the patient's mood disorder treatment (5 items). In this module, three items address pharmacotherapy (i.e., patients' nonadherence to medications and medical appointments, and side effects from medication; #21–23). An additional two items address issues relevant to either pharmacotherapy or psychotherapy (i.e., caregivers' difficulties in working with mental health care providers or dealing with logistical issues related to treatment (#24–25).

A total of 32 items assess the frequency of each event during the past month (i.e., In the past month, how often has [name of patient]...?) and 32 reaction items assess how bothered or upset the caregiver was by each of the event that had occurred (i.e., how bothered or upset were you by this?), a procedure used with other caregiver burden measures (e.g., Platt et al., 1980; Teri et al., 1992). This format avoids making the assumption that all events were burdensome to caregivers and also provides information regarding the recent frequency of specific patient symptoms. Frequency is rated on a 4-point scale (0 = never, 1 = sometimes, 2 = quite frequently, 3 = nearly always) and reaction is rated on a 5-point scale regarding bother/upset (0 = not at all, 1 = a little, 2 = moderately, 3 = very much, 4 = extremely). Frequency scores are calculated by summing across all frequency items. Reaction scores are calculated by summing scores across all reaction items and assigning 0 (not at all bothersome/upsetting) to events that did not occur. The MDBI was administered during a structured, in-home interview that included other caregiver measures

2.3. Other Caregiver Measures

2.3.1. Zarit Burden Interview—The 22-item Burden Interview assesses general caregiver burden (Zarit & Zarit, 1987). Caregivers are asked to indicate how often they had various thoughts or feelings on a scale from 0 (never) to 4 (nearly always) (e.g., how often do you feel that: he/she is dependent on you, your health has suffered because of your involvement with him/her, your relationships with others have been affected in a negative way). There is no reference time frame for this measure. The average score for this measure was 21.9 ($SD = 14.5$; range = 0 to 72) which is consistent with previous studies on family caregivers to depressed outpatients (e.g., Leinonen, et al., 2001; Scazufca et al., 2002) and a level characterized as a moderate to high level of burden in dementia caregivers (Hebert et al., 2000). Cronbach's alpha for this measure is .94.

2.3.2. Revised Memory and Behavior Problems Checklist (RMPBC)—

Depression subscale—Caregivers indicated whether or not patients exhibited each of the nine following behaviors in the past week: comments about hopelessness, comments about being a burden, appeared sad or depressed, comments about death, comments about being a failure, crying, comments about loneliness, appeared anxious, and threatened to hurt him or herself (Teri et al., 1992). Caregivers who endorsed these behaviors in patients were then asked how bothered or upset they were by each reported behavior using a 5-point scale ranging from 0 (not at all) to 4 (extremely). Reaction scores were calculated by summing scores across all behaviors and assigning 0 (not at all bothersome or upsetting) to behaviors that did not occur. The average score for this measure was 7.2 ($SD = 7.1$; range = 0 to 32). Cronbach's alpha for this measure was .78.

2.3.3. Caregiver rewards—The rewards associated with caring for the patient were assessed with a 6-item scale used in caregiving research (Norton et al., 2002; Norton et al., 2005). Caregivers were asked to indicate how rewarding each experience had been (e.g., "Doing things to help him/her," "Feeling needed by him/her") during the past month, using a scale from 1 (not at all) to 4 (very much). The average rewards score was 20.0 ($SD = 3.6$; range = 7 to 24) and Cronbach's alpha for this measure was .85.

2.3.4. Caregiver relationship satisfaction—Satisfaction in the relationship with the patient was assessed using an item from the Dyadic Adjustment Scale (Spanier, 1976) that correlates highly with the full measure (Sharpley & Cross, 1982). Caregivers rated their current overall satisfaction on a scale from 1 (perfectly unhappy) to 7 (perfectly happy) and average satisfaction was 4.2 ($SD = 1.5$; range = 1 to 7).

2. 4. Data Analysis Plan

First, descriptive data were examined for each frequency and reaction item of the MDBI. Second, scree plots and eigenvalues from an exploratory principal components factor analysis were examined in order to determine the structure of the MDBI. This analysis was conducted with the 27 core items not related to patient treatment because half of the patients had not received pharmacotherapy in the past month and the remainder were receiving free care through a supportive research clinic. Furthermore, the factor analysis focused on the 27 reaction subscale items based on evidence that the appraisal of caregiving experiences has the greatest impact on caregiver health (e.g., Schulz & Beach, 1999). Promax oblique rotation was specified because we expected different aspects of caregiver burden to be correlated.

Third, Cronbach's alpha was used to determine the internal consistency of the 27-item scale and the full 32-item scale, for the MDD and BD patient-caregiver dyads separately as well as combined. Finally, zero-order correlations of the MDBI with indicators of patient illness

severity and other caregiver measures were examined for evidence of convergent and discriminant validity.

3. Results

3.1. Descriptive Information for Scale Items

For each item of the MDBI, Table 2 shows the percentage of caregivers who agreed that the event occurred at least once during the past month and the average frequency and reaction of each event for those caregivers who agreed that it occurred. The three most frequent events were patients' fatigue or lack of energy (#7, 91%); patients' sadness or tearfulness (#1, 82%); and caregivers' worry about patients' future mental health (#27, 78%). The three least frequent events were patients' threats to self (#11, 2%); caregivers' difficulty in working with mental health care providers (#24, 4%); and caregivers' difficulty in managing the logistics of patients' treatment (#25, 7%). The low frequency of events related to working with providers and managing the logistics of treatment reflects in part that, as noted above, half of the patients had not received pharmacotherapy in the past month and the remainder were receiving free care through a supportive research clinic. On average, events assessed in the MDBI were rated as moderately bothersome or upsetting.

3.2. Findings from Exploratory Factor Analysis

Principal components analysis was conducted with the 27 core reaction items not pertaining to patient treatment. Examining eigenvalues using the Kaiser-Guttman criterion suggested up to seven factors. As this rule tends to overextract (Zwick & Velicer, 1986), a scree plot was examined and this plot suggested two or three factors. A three-factor solution best characterized the data and accounted for 45% of the variance in caregiver burden. Table 3 presents the final rotated factor pattern matrix using promax oblique rotation. In this table, loadings of .30 or higher are bolded and cross-loadings are bolded and italicized.

A total of 8 items loaded cleanly on the first factor and 4 items cross-loaded on Factors 1 and 2 or Factors 1 and 3. The majority of items loading on the first factor pertain to the burden associated with patient mood symptoms. Items related to worry about the patient's future mental health (#27) and the burden of explaining the patient's mood disorder to others (#26) also loaded or cross-loaded on this factor.

A total of 6 items loaded on the second factor and 2 items cross-loaded on Factors 2 and 3. The majority of items loading on the second factor pertain to the burden of interpersonal difficulties with the patient stemming from his or her mood disorder. The third factor contained 1 item that loaded cleanly on this factor and 2 items that cross-loaded on Factors 1 and 3.

There were 4 items that did not load on any of the three factors. These items reflect events related to patients' manic or depressive symptoms (i.e., patients' talkativeness, comments that life is not worth living, threats to self, and taking on too many activities) and were less frequently endorsed as occurring in the past month than many other events (see Table 2). However, these events were burdensome to caregivers when they did occur and thus these items should be retained in future testing of the MDBI. These items may be especially relevant for caregivers of patients currently in a manic episode.

The average score on the 27-item frequency subscale was 19.8 ($SD = 11.2$; range = 0 to 57 out of a possible range of 0 to 81) and the average score on the 27-item reaction subscale was 24.4 ($SD = 16.8$; range = 0 to 72 out of a possible range of 0 to 108). Scores on both of these subscales had adequate distributions, with skewness and kurtosis values of .67 and $-.11$ for the frequency subscale, respectively, and .63 and $-.48$ for the reaction subscale, respectively. The zero-order correlation between the frequency and reaction subscales was $r = .90$ ($p < .001$). Caregivers to

MDD patients and BD patients did not differ significantly from each other in terms of their score on the frequency subscale ($M = 20.4$ and 18.0 , respectively) or the reaction subscale ($M = 25.5$ and 20.9 , respectively). The MDBI took 6 to 7 minutes on average to administer.

3.3. Internal Consistency

The frequency and reaction items of the 27-item scale were internally consistent (Cronbach's $\alpha = .88$ and $.91$, respectively). The frequency and reaction items of the full 32-item scale also were internally consistent (Cronbach's $\alpha = .89$ and $.91$, respectively). Cronbach's α was virtually identical for caregivers of patients with MDD or with BD on all of these scales.

3.4. Convergent Validity

3.4.1. Correlations of MDBI frequency subscale with patient pre-treatment characteristics—We expected that caregivers of more impaired patients would report greater frequency of events assessed in the MDBI. For the MDD patient-caregiver dyads, we examined zero-order correlations of severity and duration of patients' current episode with the MDBI frequency subscale. Severity of the current episode was assessed using the HRSD no more than 2 weeks prior to the caregiver assessment and episode duration in weeks was reported by patients during the SCID interview. A natural log transformation was used for the duration variable prior to analysis. Depression severity was close to being significantly associated with a higher MDBI score ($r = .15$, $p = .11$) and duration was not ($r = .01$).

For the BD patient-caregiver dyads, we examined zero-order correlations of overall bipolar illness severity and number of depressive symptoms within the previous 2 weeks with the MDBI frequency subscale. Overall bipolar illness severity consisted of a 1 to 7 rating by the clinician, using the CGI-BP. As expected, a higher MDBI score was significantly associated with greater overall bipolar illness severity ($r = .42$, $p < .01$) and more depressive symptoms ($r = .33$, $p < .05$).

3.4.2. Correlations of MDBI reaction subscale with other burden measures—We also examined how the reaction subscale correlated with other caregiver burden measures collected in the study, the Zarit Burden Interview (ZBI) and the RMBPC—Depression reaction subscale. We expected moderate, positive correlations of the MDBI reaction subscale with the ZBI, which captures more general caregiver burden, as well as with the RMBPC—Depression subscale which asks about various symptoms of distress (i.e., depressive symptoms as well as expressions of anxiety and loneliness). As shown in the first two columns of Table 4, the correlation between the MDBI reaction subscale and the ZBI ranged from was $r = .61$ to $.66$ ($p < .001$), consistent with our expectation, across different caregiver groups. In addition, the correlation between the MDBI and the RMBPC—Depression subscale was moderate, positive, and similar in magnitude across caregiver groups ($r = .51$ to $.62$, $p < .001$).

As further evidence of convergent validity, we expected a negative association between the reaction subscale and a measure of caregiver relationship satisfaction. As expected, the MDBI reaction subscale had a moderate, negative correlation with caregiver relationship satisfaction that was very similar in magnitude across different groups ($r = -.41$ to $-.42$, $p < .001$; third column of Table 4).

3.5. Discriminant Validity

In order to establish discriminant validity of the MDBI we examined its correlation with a measure of caregiver rewards (last column of Table 4). We expected a low correlation of the MDBI with this measure based on evidence that caregiver burden and rewards are not the opposite ends of the same continuum but rather separate dimensions that can be experienced simultaneously (e.g., Barlow et al., 2004). Consistent with our expectation, a higher burden

score on the MDBI reaction subscale was not significantly associated with caregiver rewards for any caregiver group.

4. Discussion

MDD and BD are increasingly prevalent, a source of significant impairment for affected individuals, and a strain on the health care system (Wang & Kessler, 2006). The number of older adults with bipolar disorder is expected to grow significantly over the next few decades, as will the disproportionate (higher) health care costs associated with this condition in comparison to unipolar depression (Bartels, Forester, Miles, & Joyce, 2000). However, we know little about the effects of mood disorders in late life on family members, in contrast to other psychiatric or neurological conditions such as schizophrenia and dementia. The MDBI quantifies caregivers' level of burden and provides useful clinical information regarding the frequency of patients' depressive or manic symptoms in the past month. In addition, the MDBI treatment module provides valuable data on patient nonadherence and other medication- or therapy-related issues that may burden caregivers.

Although future testing of the MDBI is needed with other populations, including caregivers of midlife patients, we have shown that this new measure is brief (i.e., 6 to 7 minutes to administer), the items are internally consistent, and scores are well distributed. The moderate correlations between the MDBI and measures of burden due to patients' general impairment and various symptoms of distress suggest that we are measuring a unique source of burden. In addition, the weak association of the MDBI with caregiver rewards provides evidence of its discriminant validity. We found low to moderate correlations between the MDBI frequency subscale and indicators of patient illness severity, perhaps reflecting that the MDBI captures more than patient mood symptoms (i.e., caregiver worry about the future, and interpersonal problems between caregiver and patient).

An exploratory factor analysis with the 27 core items of the MDBI showed that all but four items loaded or cross-loaded on one of three factors. Some of the items that did not load on any factor reflect events of relatively low frequency for the samples in which the MDBI was tested but are likely to be of greater relevance to caregivers of more impaired patients and those not receiving the level of treatment provided in research studies. Thus, at this time we recommend use of the 27 core items (frequency and reaction subscales), with or without the treatment module as appropriate.

It is important to quantify the unique burden on family that results from a loved one's mood disorder. First, high levels of caregiver burden place family members at significant risk for compromised immune, cardiovascular, and endocrine functioning, and at increased risk for mortality (Schulz & Beach, 1999; Vitaliano et al., 2003). Highly burdened caregivers to individuals with bipolar disorder, specifically, have more physical health problems, more depressive symptoms, use health services more often, and provide more financial support to their relative (Wolff et al., 2006; Perlick et al., 2007). Second, caregiver burden may affect adherence and response to antidepressant medication as patients recover and attempt to avoid relapse. Specifically, burden may lead to family behaviors such as expressed emotion (i.e., criticism, hostility, and over-involvement), which is associated with greater likelihood of depression relapse in treated individuals (Butzlaff & Hooley, 1998), including older patients (Hinrichsen & Pollack, 1997). In addition, burden may detract from caregivers' provision of emotional support, which has been shown to predict older adults' adherence to antidepressant medication (Voils, Steffens, Flint, & Bosworth, 2005). Therefore, quantifying depression-specific burden may help us to identify close friends and family members who may knowingly or unknowingly compromise patients' response to antidepressant treatment.

Caregiver burden may also be a predictor of response to psychotherapy, especially interpersonal psychotherapy or family-focused psychosocial treatments that focus on issues surrounding caregiver burden and attitudes toward mood disorder (e.g., Miklowitz et al, 2000). In turn, there may be significant decreases in caregiver burden as patients recover from mood disorder, a potentially valuable but rarely explored outcome in psychiatric treatment research.

Limitations of the current study are important to acknowledge. First, we were not able to examine the factor structure of the MDBI separately for family members of patients with BD because of the ratio of caregivers to scale items. However, the various MDBI subscales were internally consistent for these caregivers. Researchers who are interested in using the MDBI with caregivers to individuals with BD are encouraged to administer this measure in their research. Second, we were not able to examine the test-retest reliability of the MDBI in the current study because patients were either receiving treatment or began treatment soon after the caregiver assessment. Third, our analyses focused on caregivers of older patients who were enrolled in one of two university research studies. The extent to which our findings may apply to caregivers of older patients receiving treatment through more typical clinical settings is unknown.

In summary, our testing of a new measure of mood disorder burden with 161 patient-caregiver dyads indicates that it has sound psychometric properties and should be tested in future studies. Such research could also examine the specific negative family interactions that result from higher levels of caregiver burden. Ultimately, a better understanding of caregiver burden specific to mood disorder may lead to the tailoring of current treatments to better meet patient and caregiver needs, as well as the development of new treatments that help patients to recover and stay well.

Acknowledgments

This research was supported by NIMH grants K01 065547 R01 MH37869, P30 MH71944, P30 MH030915, and the Commonwealth of Pennsylvania Department of Health Grant ME-02385. The authors would also like to thank David J. Kupfer, M.D. and Ellen Frank, Ph.D., for their contributions to this report.

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Table 1
Sample Characteristics

	<i>M (SD)</i>	or	%
Patients			
Age	71.6 (7.6)		
Gender = female			67%
Ethnicity = White			89%
Years of education	12.0 (4.2)		
Diagnosis: MDD/BD			76% / 24%
Medical Burden (CIRS-G)	9.1 (3.0)		
Cognitive Status (MMSE)	28.5 (1.4)		
Co-morbid Axis I diagnoses	1.3 (1.2)		71%
Severity of current episode, MDD patients	18.6 (3.0)		
Duration of current episode (weeks), MDD patients	150.3 (234.3)		
Severity of bipolar illness, BD patients ^a	2.3 (1.5)		
Caregivers			
Age	58.8 (14.1)		
Gender = female			63%
Ethnicity = White			87%
Years of education	14.6 (2.0)		
Relationship to patient: Spouse/Adult Child/Other			47%/35%/18%

Note. MDD = major depressive disorder. BD = bipolar disorder. CIRS-G = Cumulative Illness Rating Scale for Geriatrics. MMSE = Mini-Mental Status Examination.

^a 1 = normal, 2 = minimally ill, 3 = mildly ill, 4 = moderately ill, 5 = markedly ill, 6 = severely ill, 7 = very severely ill.

Table 2

Mood Disorder Burden Index (MDBI) Items

Item	% for whom event occurred in past month	Frequency (1-3) ^a <i>M (SD)</i>	Reaction (1-4) ^b <i>M (SD)</i>
1. PT was sad or tearful	82	1.52 (0.65)	2.05 (0.96)
2. PT had less interest or pleasure in activities	70	1.75 (0.81)	2.11 (1.09)
3. PT gained or lost weight, or had a significant change in appetite	50	1.43 (0.61)	1.68 (1.15)
4. PT slept too much	52	1.68 (0.76)	1.64 (1.24)
5. PT slept too little	54	1.59 (0.73)	1.61 (1.00)
6. PT was restless or agitated	72	1.47 (0.63)	1.76 (0.96)
7. PT was tired or had no energy	91	1.79 (0.80)	1.86 (1.12)
8. PT talked about feeling worthless or guilty	36	1.52 (0.68)	2.28 (1.11)
9. PT had trouble concentrating, making a decision, or remembering things	69	1.65 (0.75)	1.92 (1.11)
10. PT said that life is not worth living	21	1.29 (0.58)	2.76 (1.08)
11. PT threatened to hurt him/herself	2	1.25 (0.50)	2.75 (0.50)
12. PT did not take care of his/her physical appearance or personal hygiene	24	1.39 (0.68)	2.26 (1.13)
13. PT was very egotistic or self-centered	36	1.61 (0.75)	1.88 (1.14)
14. PT was more talkative than usual	30	1.46 (0.65)	0.77 (0.95)
15. PT said there were too many thoughts running through his/her head	31	1.38 (0.60)	1.38 (0.99)
16. PT was easily distracted or unable to pay attention	60	1.51 (0.65)	1.57 (0.98)
17. PT took on a lot more activities than usual	30	1.46 (0.65)	1.23 (1.17)
18. PT spent a lot of money, made foolish business investments, or was more sexually interested or active than usual	17	1.52 (0.64)	2.30 (1.10)
19. PT used alcohol or other substances because of mood problems	17	1.26 (0.59)	2.15 (1.13)
20. PT had difficulty working, caring for the home, or other activities that he/she is normally responsible for	56	1.55 (0.77)	1.83 (1.09)
21. PT skipped doses of psychiatric medication or took the medication in the wrong way	13	1.28 (0.46)	2.17 (1.38)
22. PT had side effects from his/her psychiatric medication	34	1.27 (0.50)	1.91 (1.16)
23. PT was reluctant to go for, or refused to keep, his/her medical appointments for mood disorder	15	1.35 (0.49)	2.39 (1.23)
24. CG had difficulty contacting or communicating with mental health care providers in regard to PT's treatment for mood disorder	4	1.33 (0.52)	1.83 (1.72)
25. CG had difficulty paying for medications, medical appointments, or dealing with health insurance related to PT's treatment for mood disorder	7	1.17 (0.39)	2.25 (1.22)
26. CG had to tell friends or relatives about PT's mood disorder	41	1.25 (0.50)	1.23 (1.17)
27. CG thought about the possibility that PT may continue to have mental health problems	78	1.73 (0.78)	2.12 (1.19)

Item	% for whom event occurred in past month	Frequency (1–3) ^a <i>M (SD)</i>	Reaction (1–4) ^b <i>M (SD)</i>
28. CG thought about own mental health, or that of children or siblings	66	1.51 (0.68)	1.95 (1.11)
29. CG had arguments or conflict with PT as a result of PT's mood disorder	46	1.23 (0.46)	2.11 (1.11)
30. CG felt that PT had withdrawn from CG as a result of PT's mood disorder	47	1.37 (0.63)	2.23 (1.07)
31. CG felt that efforts to be helpful to PT when PT was having mood problems were rejected	52	1.58 (0.67)	2.23 (1.14)
32. CG felt a loss of companionship or closeness with PT as a result of PT's mood disorder	52	1.67 (0.78)	2.48 (1.09)

Note. Caregivers were asked to report how often the patient had exhibited specific behaviors (#s 1–23), or how often the caregivers had specific experiences related to the patient (#s 24–32), in the past month.

^aFrequency was rated on the following scale: 0 = never, 1 = sometimes, 2 = quite frequently, 3 = nearly always. Values are based on data from caregivers who reported that the event occurred in the past month.

^bBother or upset was rated on the following scale: 0 = not at all, 1 = a little, 2 = moderately, 3 = very, 4 = extremely. Values are based on data from caregivers who reported that the event occurred in the past month.

Table 3

Factor Loadings of 27 Core Items of the MDBI

Item	Factor 1	Factor 2	Factor 3
How bothered or upset were you by this:			
7. PT was tired or had no energy	.89	-.11	.11
2. PT had less interest or pleasure in activities	.73	.09	-.16
20. PT had difficulty working, caring for the home, or other activities that he/she is normally responsible for	.67	-.04	.36
3. PT gained or lost weight, or had a significant change in appetite	.67	-.13	-.04
9. PT had difficulty concentrating, making a decision, or remembering things	.61	.19	.03
4. PT slept too much	.55	-.10	.20
16. PT was easily distracted or unable to pay attention	.52	.27	.01
15. PT said there were too many thoughts running through his/her head	.51	.00	-.19
27. CG thought about the possibility that PT may continue to have mental health problems	.47	.30	.05
8. PT talked about feeling worthless or guilty	.43	.19	.08
26. CG had to tell friends or relatives about PT's mood disorder	.41	.17	.11
1. PT was sad or tearful	.38	.26	-.08
31. CG felt that efforts to be helpful to PT when he/she was having mood problems were rejected	-.01	.82	-.03
29. CG had arguments or conflict with PT as a result of PT's mood disorder	-.02	.77	.20
32. CG felt a loss of companionship or closeness with PT as a result of PT's mood disorder	.06	.75	-.10
30. CG felt that PT had withdrawn from CG as a result of PT's mood disorder	.08	.69	-.06
13. PT was very egotistic or self-centered	-.01	.51	.29
28. CG thought about own mental health, or that of children or siblings	.10	.48	.08
6. PT was restless or agitated	.29	.39	-.34
18. PT spent a lot of money, made foolish business investments, or was more sexually interested or active than usual	-.06	.33	.14
14. PT was more talkative than usual	-.05	.28	-.02
10. PT said that life is not worth living	.18	.24	.22
12. PT did not take care of his/her physical appearance or personal hygiene	.36	.06	.50
19. PT used alcohol or other substances because of mood problems	.10	.05	.48
5. PT slept too little	.28	.09	-.38
11. PT threatened to hurt him/herself	-.11	.12	.27
17. PT took on a lot more activities than usual	.08	.17	-.21

Note. Rotated factor loadings are presented. Loadings $\geq .30$ are bolded; cross-loadings ($\geq .25$) are bolded and italicized.

Table 4
Correlations Between MDBI Reaction Scale and Other Caregiver Measures

Group	Zarit Burden Interview <i>r</i>	RMBPC-Depression Subscale <i>R</i>	Caregiver Relationship Satisfaction <i>r</i>	Caregiver Rewards <i>r</i>
All Caregivers (<i>N</i> = 161)	.65***	.61***	-.41***	-.07
Caregivers to MDD patients (<i>n</i> = 123)	.66***	.62***	-.41***	-.05
Caregivers to BD patients (<i>n</i> = 38)	.61***	.51***	-.42**	-.18

Note. RMBPC = Revised Memory and Problems Checklist.

**
p ≤ .01.

p ≤ .001.