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Feasibility of a Manualized Mindful Yoga Intervention for Patients With Chronic Mood Disorders

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Chronic mood disorders pose an important mental health problem. Individuals with these disorders experience a significant impairment, often fail to seek help, and their illnesses frequently do not respond to treatment. It is therefore important to develop innovative and attractive treatments for these disorders. Mindful yoga represents a promising treatment approach. This pilot study tested the feasibility of a 9-week manualized mindful yoga intervention for patients with chronic mood disorders. Eleven patients receiving standard treatment were recruited to complete a 9-week mindful yoga intervention. Qualitative methods were used to assess patients' experiences of the intervention and quantitative methods were used to assess psychological distress and mechanisms that play a role in chronic mood disorders. Eight patients completed the intervention and rated the overall quality of the intervention with a mean score of 8.8 (range of 8 to 9, using a scale of 1 to 10). All participants reported a reduction in psychological distress and no adverse events. Among the mechanisms that play a role in chronic mood disorders, the most potentially promising effects from the intervention were found for worry, fear of depression and anxiety, rumination, and areas related to body awareness, such as trusting bodily experiences and not distracting from sensations of discomfort. A 9-week mindful yoga intervention appears to be a feasible and attractive treatment when added to treatment as usual for a group of patients with chronic mood disorders. A randomized controlled trial to study the effects of mindful yoga is recommended. (*Journal of Psychiatric Practice* 2021;27;212–223)

KEY WORDS: chronic mood disorders, mindful yoga, feasibility, pilot study, mechanisms

Mood disorders [major depressive disorder (MDD) and bipolar disorder (BD)] are highly prevalent and create tremendous personal and societal costs.^{1,2} These disorders often become chronic,^{3,4} further contributing to

the burden for the individual and for society.^{5,6} A substantial minority of individuals with chronic mood disorders do not seek help (ie, 27% for MDD⁷ and 15% for BD⁶). Although those who seek treatment for BD and chronic MDD usually receive evidence-based interventions,^{8,9} the illnesses of patients with chronic MDD are less responsive to treatment than those of patients with a nonchronic course.¹⁰ In addition, available medications for BD are typically unable to

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produce a full remission.³ For patients who do respond to treatment, benefits often do not last, with studies showing relapse rates of 29% to 54% for MDD during the time span of 1 to 2 years posttreatment.^{11,12} Similar results occur among patients with BD, with yearly relapse rates of 21% to 26%.¹³

In sum, (1) chronic mood disorders have a large impact on individuals and society, (2) a substantial minority of patients with chronic mood disorders do not seek treatment, and (3) among treatment seekers, treatment does not always lead to recovery. Therefore, it is important to develop new interventions, both to improve outcomes for individuals with chronic, treatment-resistant mood disorders and to attract patients who need treatment.

One promising treatment approach for chronic mood disorders is mindful yoga, which involves physical postures, breathing exercises, meditation practices, and the cultivation of nonjudgmental awareness of body sensations and thoughts.¹⁴ Although yoga has been shown to reduce depressive affect,^{15–17} these results should be interpreted with caution because most studies have been conducted in nonclinical samples and involved methodological limitations such as the absence of a manualized intervention, small sample sizes, and short follow-up periods.¹⁸ Furthermore, very little research has examined yoga interventions for chronic mood disorders—a recent meta-analysis found only 2 such studies,¹⁸ with both studies showing some promise for yoga, but only at the follow-up assessments, not immediately after the intervention.^{16,19} Because little research on yoga interventions for patients with chronic mood disorders has been done, feasibility research on manual-based interventions with this population is needed.²⁰

In addition to the promising initial results discussed above, another rationale for mindful yoga as an intervention for chronic mood disorders is that yoga may target underlying mechanisms that play an important role in these disorders. One such mechanism is perseverative negative thinking, a process that has been shown to be associated with chronic mood disorders.^{21,22} Mindful yoga could reduce perseverative negative thinking because the practice involves shifting from an abstract thinking style to a concrete focus on body sensations. A second mechanism is fear of emotion, defined as a fear of “the loss of control of one’s emotions and one’s reaction to those emotions.”^{23(p239)} Fear of emotion is associated with maladaptive coping strategies such as avoidance,²⁴ which has been shown

to be a maintaining factor in chronic mood disorders.^{25,26} Mindful yoga could reduce fear of emotion because training involves developing an accepting attitude toward difficult emotions, body sensations, and cognitions. A third and final mechanism is body awareness, which has been described as the ability to adequately recognize and regulate bodily signals (eg, of emotions), with a focus on a nonjudgmental attitude towards these signals.^{27,28} Inability to recognize and describe one’s emotions has been shown to be associated with chronic mood disorders.²⁹ Mindful yoga might enhance body awareness as the intervention includes practices intended to develop an awareness of bodily sensations. Research supports the idea that mindful yoga might target these underlying mechanisms, with studies showing that yoga increases awareness of the present-moment experience, even more so than other meditative practices,³⁰ decreases perseverative thinking at 1-year follow-up,¹⁶ reduces avoidance,³¹ and increases body awareness.³²

OBJECTIVE OF THE STUDY

The current study is a feasibility and exploratory pilot study of a 9-week manualized mindful hatha yoga intervention for patients with chronic mood disorders. The primary reason for conducting this study was to gain information regarding the feasibility of the protocol. The importance of conducting feasibility studies before large-scale randomized controlled trials has been discussed by a number of researchers. For example, feasibility studies provide important information about the potential for successfully implementing an intervention in a large-scale randomized controlled trial.³³ In addition, pilot studies contribute to the development of effective interventions and feasible larger-scale trials by assessing recruitment capacity, sample characteristics, data collection procedures, as well as acceptability of the intervention and study procedures, and evaluation of the participants’ experiences of the intervention.³⁴ Moreover, they offer insight into potential outcome measures and hypothesized mechanisms of change.³⁴ Having this information before starting a randomized controlled trial can save a significant amount of financial resources, including participants’ and researchers’ time.³⁴ Feasibility studies can also contribute to studying the effectiveness (in addition to the efficacy) of interventions by assessing whether the treatment methods can be executed in a clinical setting.³⁵

PRACTITIONER'S CORNER

We were also interested in the effects of the intervention on mood disorder-related outcomes and potential mechanisms that play a role in chronic mood disorders. Patients' experiences with the intervention were evaluated with qualitative methods. Effects of the intervention were also explored with self-report quantitative measures after the intervention and at 4 and 12 months postintervention. Potential mechanisms included perseverative negative thinking, fear of emotion, and body awareness. Outcome measures also assessed depression, anxiety, stress, quality of life, and physical health.

METHODS

Design

This study was a nonrandomized, open-label pilot trial. This pilot study was planned and conducted following the guidelines of the CONSORT statement (Appendix A, Supplemental Digital Content 1, <http://links.lww.com/JPP/A44>).³⁶ Recruitment took place from January to February 2015, the intervention was implemented from February to April 2015, and follow-up assessments were conducted in August 2015 and April 2016. The protocol is available upon request.

Participants

Participants were recruited at the Center for Integrative Psychiatry of Lentis Psychiatric Institute in Groningen, The Netherlands. This is an outpatient clinic serving about 500 patients a year, most of whom are diagnosed with chronic mood and anxiety disorders.³⁷ Inclusion criteria were a diagnosis of a mood disorder (MDD, BD, dysthymic disorder) diagnosed using criteria from the fourth edition, text revision of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR),³⁸ illness duration of at least 2 years, age of 18 years or older, and willingness to attend 9 weekly sessions of yoga training. Exclusion criteria were current psychotic symptoms, current drug or alcohol dependence or abuse, acute suicidality, or a significant medical condition that could interfere with participation in the yoga intervention.

The protocol of this study was assessed by the Medical Ethical Committee of the University Medical Center Groningen, The Netherlands. The committee judged

the protocol to be exempted from review by the Medical Research Involving Human Subjects Act (in Dutch: WMO) because it concerned a non-randomized open study (registration number 2015/257). All participants were receiving treatment as usual in accordance with the Dutch guidelines for the treatment of MDD or BD.^{8,9} After having recruited 11 participants, we decided to start the trial because we considered this an adequate group size to test the feasibility of the intervention.

Procedures

The Intervention

The manualized mindful yoga intervention was developed by the first author (N.K.V.) in collaboration with several senior yoga teachers (all of whom were trained in hatha yoga with at least 10 years of teaching experience and all of whom had experience with teaching in a mental health care setting). The intervention was based on traditional yogic practices and texts,^{39–41} using hatha yoga, adapted to a clinical setting. The yoga practices were chosen based on their appropriateness for beginner yoga practitioners and the ability to adapt them if needed for participants with limited mobility (eg, doing a posture while sitting for participants who were unable to be on their hands and knees because of knee problems). Participants were repeatedly instructed to take good care of themselves and their bodies and to use yoga props (meditation cushions, blankets, blocks) whenever they felt the need to add some support during a posture. To increase the generalizability of the intervention, a manualized intervention consisting of 9 weekly sessions of 2.5 hours each was developed.

The intervention was secularized, in that it omitted references to the Hindu background of yoga (eg, use of mantras, traditional Sanskrit names of postures). The participants were given information about the Hindu background of yoga but instructed that the intervention would consist of the practices—breathing practices, yoga postures, and meditation—without reference to the religious background or other ethical or philosophical ideas that are part of traditional yoga. By secularizing the intervention, we wanted to ensure that participants of all religious backgrounds could participate in the program. All sessions consisted of yoga practices (postures, breathing exercises, meditation), psychoeducation, and group discussion.

PRACTITIONER'S CORNER

Each session had a different theme: (1) self-care, (2) having a body, (3) being grounded, (4) sensations and (difficult) emotions, (5) acceptance and curiosity, (6) observing automatic thoughts and patterns, (7) compassion, (8) making choices, and (9) taking it home. All sessions followed the same structure: (1) welcome and introduction (10 min), (2) group sharing about the previous week's exercises (20 min), (3) breathing or meditation practice (20 min), (4) sharing experience of the practice (10 min), (5) psychoeducation about the session's theme (15 min), (6) break (10 min), (7) yoga class (60 min) including breath awareness, a diverse range of yoga postures (Appendix B, Supplemental Digital Content 2, <http://links.lww.com/JPP/A45>) and a resting meditation, and (8) closing and homework (5 min). Participants received a manual with forms for recording weekly practice and practice videos that could be retrieved from a website. The first author [N.K.V., a psychologist and a registered yoga teacher® 200 (with 200 hours of yoga teacher training) with over 10 y of yoga experience and over 2 y of teaching experience] instructed the yoga sessions, assisted by a clinical psychology graduate student in case the participants had any questions or needed help during the sessions.

The instructor repeatedly prompted participants to focus their attention on the experience in the present moment (eg, breath or other body sensations) and to avoid self-judgment regarding their practice (eg, emphasizing that there is no ideal way to hold the posture, but instead to find the right amount of stretch for their bodies, and that participants were free to come out of the posture when necessary). Additional elements of the intervention to increase perception of safety in the group setting included participants being invited to open their eyes whenever they felt they needed to and no provision of personalized feedback or physical adjustments, which might have been perceived as intrusive.

Recruitment and Data Collection

Participants were recruited through their therapists. The therapist screened the patient according to the inclusion and exclusion criteria and, if the patient fitted the profile of the study, he or she was invited to participate. If patients agreed to participate, they were contacted by the research assistant to receive information about the study and to sign

the informed consent form, in which we also asked permission to access and review data in their medical files. Thereafter, participants were invited for a medical screening by a nurse practitioner to assess their general health (eg, height, weight, blood pressure, and any health concerns). After receiving medical clearance to participate, the patients completed the self-report questionnaires (administered via the internet). Participants also answered several questions regarding their expectations and wishes for the yoga intervention. After the 9-week intervention, patients were scheduled for a postintervention session to complete the same medical screening and questionnaires. They were also asked to evaluate the intervention and the teacher. All data were captured in a secure web-based data repository using a unique study identification number. After both 4 and 12 months, participants were invited to a follow-up assessment, using a link to an online questionnaire. Participants who did not respond to the follow-up measurements were contacted by telephone (with a maximum of 3 contact attempts) and asked to complete the questionnaires online. All measures were collected with Qualtrics, an online survey administration program (Seattle, WA, 2015; www.qualtrics.com).

Feasibility Measures: Evaluation of the Intervention

After the intervention, participants were asked to complete a series of quantitative and qualitative measures to evaluate the intervention. Nineteen quantitative questions assessed participants' evaluation of the content of the intervention (eg, "How useful did you consider the yoga postures?"), with those items rated on a 4-point scale, with 1 = not useful, 2 = somewhat useful, 3 = useful, and 4 = very useful. Fourteen quantitative questions assessed the expertise of the trainer (eg, "To what extent did you think the teacher was understanding?"), and 31 questions assessed the extent to which participants felt they met the goals of the intervention ("To what extent have you become more aware of your body?"), with those 2 categories of questions rated on a 5-point scale, with 1 = completely disagree, 2 = disagree somewhat, 3 = do not disagree/agree, 4 = agree somewhat, and 5 = completely agree. Participants were also asked to rate the overall quality of the intervention ("How would you rate the total

quality of the intervention?") on a 10-point scale, ranging from 1 = very low to 10 = very high. In addition, a number of qualitative questions were included in the survey which assessed intervention experiences (14 items, eg, "What positive effects of the yoga intervention did you notice?") and plans to continue with yoga (2 items, eg, "What are your plans to continue with yoga?"). Finally, we asked participants whether they had experienced any (and if so, which) negative effects of the intervention.

Assessment of Potential Mechanisms

Fear of Emotion

Fear of emotion was assessed with the Affect Control Scale (ACS), a 42-item scale that assesses fear of losing control over one's emotions and behavioral reactions to these emotions.²³ Subscales of the ACS involve the emotions of anger, depression, anxiety, and positive emotions (eg, "It scares me when I am nervous"). Participants were asked to rate the way they feel in general on a 7-point scale, ranging from 1 = very strongly disagree to 7 = very strongly agree. The scale showed good internal consistency (coefficient $\alpha = 0.85$ at baseline; 0.96 at the postintervention assessment; 0.94 at 4-mo follow-up; and 0.83 at 12-mo follow-up).

Perseverative Negative Thinking

To assess perseverative negative thinking, we used questionnaires that assess rumination and worry. Rumination was assessed with the brooding scale of the short version of the Rumination Response Scale.⁴² This scale consists of 5 items regarding reactions when feeling down, sad, or depressed (eg, "Think 'What am I doing to deserve this?'"). Participants were asked to rate the way they respond in general when they are feeling down, sad, or depressed on a 4-point scale, ranging from 1 = almost never to 4 = almost always. The scale showed good to acceptable internal consistency, except at 4-month follow-up (possibly reflecting the relatively small number of scale items in combination with the small sample size, which could potentially have influenced the stability of the internal consistency measure) (coefficient $\alpha = 0.82$ at baseline; 0.73 at postintervention assessment; 0.26 at 4-mo follow-up; and 0.72 at 12-mo follow-up).

Worry was assessed with the short version of the Penn State Worry Questionnaire, a 3-item questionnaire that assesses the tendency to worry (eg,

"Many situations make me worry").⁴³ Participants were asked to rate the way they feel in general on a 5-point scale, ranging from 1 = not at all typical of me to 5 = very typical of me. The scale showed good to acceptable internal consistency (coefficient $\alpha = 0.88$ at baseline; 0.95 at postintervention assessment; 0.86 at 4-mo follow-up; and 0.76 at 12-mo follow-up).

Body Awareness

Body awareness was assessed with 10 items of the Multidimensional Assessment of Interoceptive Awareness (MAIA), a 32-item scale that assesses different dimensions of body awareness (eg, emotional awareness, "When something is wrong in my life I can feel it in my body").²⁷ Participants were asked to rate the way they feel in general on a scale ranging from 0 = never to 5 = always. Since no Dutch translation of this scale was available, we used our own, non-validated, translation in this pilot study. The scale showed good to acceptable internal consistency, except at 12-month follow-up (coefficient $\alpha = 0.78$ at baseline; 0.81 at the post-intervention assessment; 0.90 at 4-mo follow-up; and 0.67 at 12-mo follow-up).

Outcome Measures

Psychological Distress

Symptoms of depression, anxiety, and stress were assessed with the Depression Anxiety Stress Scales, short-form, a 21-item questionnaire (eg, "I couldn't seem to experience any positive feeling at all").⁴⁴ Participants were asked to rate the way they were feeling over the past week on a 4-point scale ranging from 0 = never to 3 = almost always. In this study, the scale showed good internal consistency except at 12-month follow-up (coefficient $\alpha = 0.93$ at baseline; 0.92 at postintervention assessment; 0.91 at 4-mo follow-up; 0.67 at 12-mo follow-up).

Quality of Life

Quality of life and physical health were assessed with items from the World Health Organization's Quality of Life Questionnaire, short version (WHOQOL-BREF), a 26-item questionnaire that assesses the quality of life in different areas of functioning.⁴⁵ To assess general quality of life, we used one item of the WHOQOL-BREF ("How would you rate your quality of life?"), rated on a scale from 1 = very poor to 5 = very good. To assess the

quality of physical health, we used the physical health domain of the WHOQOL-BREF, consisting of 7 items (eg, "Do you have enough energy for everyday life?"). Participants were asked to rate these items based on the way they were feeling over the past 2 weeks on a 5-point scale ranging from 1 = not at all to 5 = completely, with higher scores indicating a more positive assessment of their health. This scale showed good to acceptable internal consistency (coefficient $\alpha = 0.81$ at baseline; 0.93 at postintervention assessment; 0.90 at 4-mo follow-up; and 0.85 at 12-mo follow-up).

Data Preparation

As some participants occasionally skipped an item of a questionnaire, we used the mean score of the questionnaire instead of the total score. The items that were missing were recorded and this information is available on request. Missing items generally consisted of only one item per participant per questionnaire. For 3 questionnaires, there were 2 items missing for 1 participant. For 1 questionnaire, there were 3 items missing for 1 participant. Because this last questionnaire was long (42 items), we considered the remaining percentage of items as acceptable.

Statistical Analyses

All analyses were performed in IBM SPSS Statistics, version 24.⁴⁶ We explored changes in the self-report measures using paired-sample *t* tests for differences between baseline and postintervention, baseline and 4-month follow-up, and baseline and 12-month follow-up. For the qualitative measures, we report (but did not analyze) the answers of the participants to these questions.

RESULTS

Figure 1 shows the flow of participants through the study. Thirteen patients were invited to participate in the study, 11 of whom agreed to participate. Eight participants completed at least 5 sessions of the mindful yoga intervention and also completed the posttraining assessments. Six participants completed the 4-month follow-up (though one of them completed only the Depression Anxiety Stress Scales and ACS questionnaires at this assessment) and 7 participants completed the 12-month assessment. Information on the

patients' diagnoses was taken from the patients' medical files. Table 1 summarizes the clinical and demographic characteristics of the sample at baseline. The mean level of symptoms of depression, anxiety, and stress was considered moderate.⁴⁴

General Health

We used height and weight to calculate body mass index; 5 of the 11 patients were considered overweight (body mass index ≥ 25). We assessed blood pressure, and high blood pressure (systolic pressure ≥ 140) was found in 2 of the 11 patients. Other health issues reported by the participants at the medical screening were pain in neck, back, shoulders, hips, or other joints ($n = 8$); fatigue ($n = 6$); arrhythmia ($n = 1$); menopausal symptoms ($n = 1$); Meniere's disease ($n = 1$); migraine ($n = 1$); osteoarthritis ($n = 1$); osteoporosis ($n = 1$); premenstrual syndrome ($n = 1$); tinnitus ($n = 1$); and type 2 diabetes ($n = 1$).

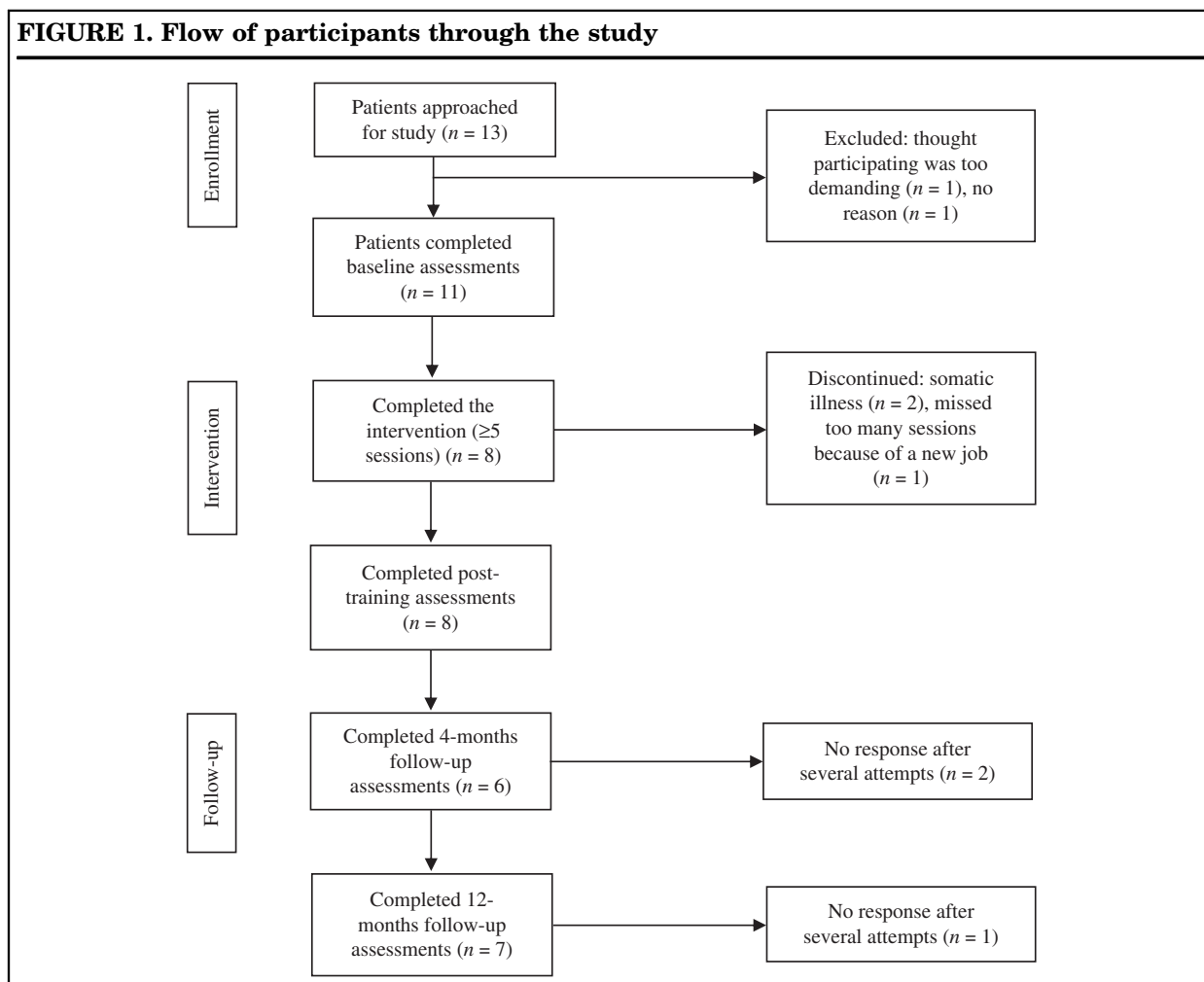
Attendance and Home Practice

The 8 participants who completed the intervention attended a mean of 7.5 sessions ($SD = 1.07$, range: 6 to 9 sessions). The most frequently mentioned reasons for missing a session were illness, feeling too tired, and other obligations. Of the 8 participants, 5 spent 15 to 30 minutes a day on homework and practices; 2 participants spent <15 minutes a day on homework and practices; and 1 participant spent 30 to 45 minutes a day on homework and practices.

Psychotherapy and Antidepressant Use During the Study

All participants received treatment, as usual, consisting of medication [antidepressants, $n = 3$ (duloxetine, mirtazapine, St. John's Wort)], mood stabilizers, $n = 1$ (lithium), psychological interventions ($n = 4$), psychiatric nursing treatment ($n = 5$), or other therapies (psychomotor or movement therapy, $n = 2$; creative expression therapy, $n = 4$). Most participants received > 1 form of treatment as usual ($n = 7$). During the study, the participants received the following number of sessions (other than the sessions of the mindful yoga intervention): 30 ($n = 1$), 17 ($n = 1$), 12 ($n = 1$), 8 ($n = 2$), 5 ($n = 1$), 2 ($n = 1$), and 1 ($n = 1$).

FIGURE 1. Flow of participants through the study



Intervention Evaluation

Quantitative Questions

Participants rated the overall quality of the course as 8.8 (*SD* = 0.46; range: 8 to 9), on a 10-point scale where 1 = very low quality and 10 = very high quality. All participants found the yoga, breathing, meditative, and home practices *useful* or *very useful*. Participants rated exchanging experiences in the group as somewhat less useful: 1 participant did not find this useful, 3 found it *somewhat useful*, and 4 found it *useful* or *very useful*. In terms of difficulty, all participants rated the intervention as *good*. Six participants appreciated the length of the intervention, 2 participants wished the intervention had been longer. All participants would recommend the intervention to others with the same kind of psychological problems.

In terms of overall quality, the teacher was rated 8.4 (*SD* = 0.74; range: 7 to 9) on the scale where 10 = very high quality. All participants scored *completely agree* to the teacher having the qualities of being “clear,” “kind,” “responsible,” “understanding,” and “careful.” For the qualities “emphatic,” “peaceful,” “enthusiastic,” “authentic,” and “patient,” 7 participants rated *completely agree* and 1 participant rated *agree somewhat*.

Qualitative Questions

All 8 of the completers found the intervention to be a valuable addition to their ongoing treatment. Examples of participants’ reasons for this are presented in Table 2, as are statements regarding specific positive experiences from the intervention.

TABLE 1. Clinical and Demographical Characteristics of the Sample at Baseline

<i>Variables</i>	<i>Mean (SD), Range</i>
Sex (female/male)	10/1
Age (y)	49 (13.81), 22-71
Current diagnosis (n)	
Major depressive disorder	7
Bipolar disorder	3
Dysthymic disorder	1
Additional current diagnoses (n)	
Posttraumatic stress disorder	4
Dissociative disorder	2
Eating disorder NOS	1
Somatoform disorder	1
Current axis-II diagnosis (n)	
Personality disorder NOS	2
Borderline personality disorder	1
Dependent personality disorder	1
Obsessive-compulsive personality disorder	1
Avoidant personality disorder	1
Illness duration (y)	11.36 (7.20), 2.12-22.84
Current treatment duration (y)	5.01 (5.30), 0.37-18.77
Symptoms of depression*	17.27 (9.85), 8-38
Symptoms of anxiety*	12.18 (5.47), 6-24
Symptoms of stress*	19.45 (6.64), 12-32

**On the basis of ratings on items from the Depression Anxiety Stress Scales.⁴⁴ The mean depression, anxiety, and stress scores indicate moderate severity. NOS indicates not otherwise specified.*

None of the participants mentioned negative effects from the intervention. All participants wanted to continue their yoga practice, either at home or by finding a group in their neighborhood they could attend.

Measures of Outcomes and Potential Mechanisms

Results for the outcome measures are presented in Table 3. Participants reported reductions in

TABLE 2. Participants' Statements About Why Mindful Yoga Is an Addition to Their Current Treatment and Positive Effects of the Intervention They Experienced

<i>Participants</i>	<i>What Positive Effects of the Mindful Yoga Intervention Did You Experience?</i>
001	“I feel more satisfied about myself when I have done the practices; my body has become more flexible and I feel somewhat more stable.”
002	“I have been able to do more things and meet more often with people, I have challenged myself, set boundaries in my spiritual practice, learned how to set boundaries in what I can do in a week.”
003	“[I have become] more aware of my body, emotions and thoughts [...], and mainly: I have become more aware of the impossibility of being constantly in balance [...], I may focus on finding balance again and again every time.”
004	“[I have become] more flexible, somewhat more peaceful inside my mind, [and have] somewhat more acceptance and less rumination.”
005	“[...] I have learned to accept my physical limitations, they are what they are [...]. Eventually it was insightful to see how often I try to go over my limitations and how important it is to stay aware or become aware of this.”
006	“[The intervention gave me] peace, clarity, insight into my state of being; I have been able to start meditating again; my self-image has improved, my memory works better, I use less medication to sleep, I can experience more difference between thinking and feeling and I can feel more distance from an emotion.”
007	“[I have learned to] find balance, [I am] better able to deal with restlessness and imbalance, I have found acceptance, peace; I can take up more space for myself, give myself what I need, and I feel less need to shut myself off in a group.”
008	“I have discovered that oftentimes I know what is good for me, but I do not act accordingly. This was a eye-opener for me.”

TABLE 3. Self-report Data

Variables	Mean (SD); 95% CI of Difference			
	Baseline [Mean (SD)]	Postintervention	4-Month Follow-up	12-Month Follow-up
Depression, anxiety, stress total	1.01 (0.14)	0.65* (0.43); 0.06, 0.66	0.61* (0.32); 0.12, 0.70	0.81 (0.22); -0.06, 0.48
Depression	1.00 (0.42)	0.67 (0.59); -0.15, 0.82	0.61 (0.43); -0.15, 1.00	0.88 (0.44); -0.50, 0.83
Anxiety	0.75 (0.25)	0.48* (0.42); 0.00, 0.53	0.37* (0.41); 0.11, 0.59	0.55 (0.36); -0.04, 0.37
Stress	1.27 (0.31)	0.79* (0.48); 0.14, 0.81	0.85* (0.26); 0.06, 0.84	1.00* (0.29); 0.02, 0.60
Quality of life	2.88 (0.83)	3.25 (0.71); -0.81, 0.06	3.50 (0.84); -2.06, 0.39	3.00 (0.00); -0.98, 0.41
Quality of physical health	2.57 (0.52)	2.91* (0.31); -0.63, -0.06	2.76 (0.38); -0.60, 0.13	2.73 (0.24); -0.59, 0.14
Fear of emotion total	4.02 (0.56)	3.64 (0.56); -0.19, 0.95	3.66* (0.52); 0.03, 0.72	3.63* (0.46); 0.04, 0.77
Anger	4.19 (0.69)	4.13 (1.11); -0.92, 1.04	3.88 (0.73); -0.31, 0.91	3.93 (0.76); -0.47, 0.97
Anxiety	3.84 (0.62)	3.23** (0.68); 0.23, 1.00	3.42** (0.54); 0.23, 0.67	3.35* (0.44); 0.11, 0.93
Depression	4.27 (0.48)	3.59* (0.49); 0.12, 1.22	3.70* (0.30); 0.17, 1.05	3.61* (0.62); 0.05, 1.34
Positive emotions	3.79 (0.76)	3.61 (0.71); -0.43, 0.80	3.65 (0.78); -0.21, 0.51	3.63 (0.96); -0.13, 0.46
Rumination (brooding)	2.40 (0.48)	2.45 (0.33); -0.43, 0.33	2.10 [†] (0.35); -0.02, 0.75	2.29 (0.45); -0.35, 0.58
Worry	3.67 (0.50)	3.13 (1.01); -0.12, 1.21	3.06* (0.49); 0.04, 1.40	3.14** (0.54); 0.27, 1.06
Body awareness total	2.96 (0.44)	3.36* (0.45); -0.67, -0.12	3.19 (0.49); -0.70, 0.12	3.34* (0.44); -0.77, -0.03
Attention regulation	3.25 (0.71)	3.63 (0.52); -0.81, 0.06	3.50 (0.55); -0.88, 0.21	3.57 (0.79); -0.98, 0.41
Not distracting	2.38 (0.35)	2.75* (0.60); -0.67, -0.08	2.75 (0.52); -1.03, 0.20	2.57* (0.27); -0.53, -0.04
Not worrying	3.00 (0.76)	3.38 (0.52); -0.81, 0.06	3.50 (0.55); -1.38, 0.38	3.14 (0.69); -0.78, 0.50
Self-regulation	3.33 (0.51)	3.52 (0.48); -0.74, 0.37	3.28 (0.49); -0.59, 0.70	3.62 (0.59); -0.90, 0.42
Trust	2.90 (0.81)	3.50* (0.73); -1.12, -0.09	3.11 (0.72); -1.03, 0.25	3.52** (0.60); -1.09, -0.34

Depression, anxiety, and stress ratings were based on mean ratings on individual items on the Depression Anxiety Stress Scales,⁴⁴ ranging from 0 to 3, with 3 indicating the person almost always experienced the item.

Quality of life ratings were based on 1 item (ratings ranging from 1 = very poor to 5 = very good) and quality of physical health ratings were based on 7 items (mean ratings ranging from 1 = not at all to 5 = completely, with higher scores indicating a more positive assessment of health) on the World Health Organization's Quality of Life Questionnaire, short version.⁴⁵

Fear of emotion total and fear of anger, anxiety, depression, and positive emotions were assessed using the Affect Control Scale,²³ with mean ratings ranging from 1 = very strongly disagree to 7 = very strongly agree, with 7 indicating a greater level of fear.

Rumination ratings were based on the brooding scale of the Rumination Response Scale,⁴² with mean ratings ranging from 1 = almost never to 4 = almost always, with higher scores indicating a greater level of rumination.

Worry ratings were based on the short version of the Penn State Worry Questionnaire,⁴³ with mean ratings ranging from 1 = not at all typical of me to 5 = very typical of me, with higher ratings indicating a greater level of worry.

Body awareness was assessed with 10 items of the Multidimensional Assessment of Interoceptive Awareness,²⁷ with mean ratings ranging from 0 = never to 5 = always, with higher scores indicating more positive ratings (eg, increased trust in bodily experiences).

CI indicates confidence interval.

* $P < 0.05$.

** $P < 0.01$.

[†]Trend ($P < 0.06$).

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psychological distress—specifically for symptoms of anxiety and stress—at postintervention and at 4-month follow-up, and at 12-month follow-up only for symptoms of stress. We found an improvement in the quality of physical health from baseline to postintervention, but not at the follow-up assessments. Regarding potential mechanisms that may play a role in chronic mood disorders, worry was decreased from baseline to both the 4- and 12-month follow-up sessions but did not show changes at the postintervention assessment. There was a trend toward a reduction in rumination at the 4-month follow-up, but not at the other assessment points. Fear of emotions of depression and anxiety decreased from baseline to postintervention and at 4- and 12-month follow-ups. Body awareness, in particular trusting bodily experiences and not distracting from sensations of discomfort, increased from baseline to postintervention and at 12-month follow-up, but not at 4-month follow-up.

DISCUSSION

The goal of this pilot study was to investigate the feasibility and acceptability of a 9-week manualized mindful yoga training for patients with chronic mood disorders. In addition, the potential effects of the training on psychological distress and potential mechanisms were explored to gain insights for future research. As is recommended for pilot studies,⁴⁷ this was not a hypothesis testing study given the small sample size and lack of a control group. Rather, this study was conducted as a first step to explore mindful yoga as an innovative intervention for patients with chronic mood disorders.

A number of our findings are relevant for the feasibility question. Participants gave the training a high rating, they all found the practices (both in the sessions and at home) useful and a valuable addition to their current treatment, most participants completed at least half of the sessions, and all participants practiced at home. Given that the sample was a diverse group of patients in terms of age, physical fitness, body type, and physical limitations, the training may be suitable for a wide variety of patients. All patients reported positive effects from the training and none mentioned negative effects. These findings are in line with previous research,^{19,48} and they suggest that the mindful yoga intervention was feasible for this group of patients.

With regard to the potential for successful implementation, we also had a number of relevant findings. We were able to recruit 11 patients with chronic mood disorders within 8 weeks, an inclusion rate of 85%, which is higher than similar larger-scale randomized controlled trials (comparable studies have reported inclusion rates of 55%).^{16,19} This finding might suggest that the intervention will be attractive to patients, thus helping with a successful transition to actual clinical practice. The attrition rate in this pilot study was 27% which is comparable to rates reported in other larger-scale randomized controlled trials (comparable studies reported rates of 15% to 33%).^{16,19} It is important to note, in contrast to the criterion of <50% rate of attendance that we used to define attrition, the studies cited above used more liberal criteria and defined attrition as participants (a) with a 0% rate of attendance^{16,19} or (b) who attended only the first or second class.¹⁶ If we had used the criteria from these previous research studies, our study would have had 0% attrition as all of the participants attended at least the first 2 classes. The inclusion and attrition rates are encouraging in supporting the feasibility of this type and dose of intervention in a group of patients suffering from chronic mood disorders.

Even though the relatively large number of assessments created a time burden for the patients, the majority of them completed the outcome measures at postintervention (all 8 treatment completers), at 4-month follow-up (6 completers), and at 12-month follow-up (7 completers). These numbers are comparable to another study that used a 6-month follow-up,¹⁹ and much higher than a study that used a 12-month follow-up.¹⁶ These findings suggest that the study procedures were acceptable to this group of patients and that the methods could be included in a larger-scale randomized controlled trial. They also suggest that the intervention and procedures have the potential to be successfully implemented in a clinical setting, which would facilitate research into the intervention's effectiveness in real-world contexts.³⁵

The results indicated positive changes both in the psychological distress outcomes and in potential mechanisms that may play a role in chronic mood disorders (worry, fear of emotions of depression and anxiety, and body awareness). Given that this was an open trial with a small sample size, we cannot conclude that these changes were the result of the mindful yoga training. However, as this was a group

of chronic patients with an average illness duration of 11 years and an average treatment duration of 5 years, the findings regarding psychological distress and potential mechanisms are promising.

The finding that the main changes in symptoms involved anxiety and stress rather than depression was somewhat surprising. This result might be due to the fact that, although the participants were all diagnosed with a chronic mood disorder, the current level of symptoms of depression was only moderate. Regarding potential mechanisms, worry, fear of emotions of depression and anxiety, and, to a lesser extent, rumination, and trusting bodily experiences and not distracting from sensations of discomfort (both aspects of body awareness) seem promising to explore in future studies on the effects of mindful yoga interventions in patients with a chronic mood disorder.

Limitations

Limitations of the current study include the small sample size, lack of a control group, and the absence of a Structured Clinical Interview for DSM-IV (SCID)⁴⁹ to confirm the psychiatric diagnosis. By relying on the diagnosis made by the clinicians, we did not have a reliable confirmation of the diagnosis. In addition, because this was an open-label study without a control group, we cannot attribute any changes to the causal effects of the mindful yoga intervention. To gain more insight into the effects of a yoga intervention for this population, we recommend a large-scale randomized controlled trial with a yoga intervention added to treatment as usual compared with a structurally equivalent control group, with adequate sample size.

REFERENCES

1. Demyttenaere K, Bruffaerts R, Posada-Villa J, et al. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA*. 2004;291:2581–2590.
2. Kessler RC, Petukhova M, Sampson NA, et al. Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. *Int J Methods Psychiatr Res*. 2012;21:169–184.
3. Berk M, Conus P, Lucas N, et al. Setting the stage: from prodrome to treatment resistance in bipolar disorder. *Bipolar Disord*. 2007;9:671–678.
4. Penninx BWJH, Nolen WA, Lamers F, et al. Two-year course of depressive and anxiety disorders: results from the Netherlands Study of Depression and Anxiety (NESDA). *J Affect Disord*. 2011;133:76–85.
5. World Health Organization. Global burden of disease report 2000–2016. Available at: www.who.int/healthinfo/global_burden_disease/estimates/en. Accessed January 25, 2021.
6. Merikangas KR, Jin R, He J, et al. Prevalence and correlates of bipolar spectrum disorder in the World Mental Health Survey Initiative. *Arch Gen Psychiatry*. 2011;68:241–251.
7. Rubio JM, Markowitz JC, Alegria A, et al. Epidemiology of chronic and nonchronic major depressive disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Depress Anxiety*. 2011;28:622–631.
8. Kupka R, Goossens P, Van Bendegem M, et al. Multidisciplinary guideline bipolar disorders [Multidisciplinaire richtlijn bipolaire stoornissen], 3rd edition; 2015. Available at: www.ggzrichtlijnen.nl. Accessed September 10, 2018.
9. Spijker J, Bockting CLH, Meeuwissen JAC, et al. Multidisciplinary guideline depression [Multidisciplinaire richtlijn depressie], 2nd edition; 2013. Available at: www.ggzrichtlijnen.nl. Accessed September 10, 2018.
10. Cuijpers P, van Straten A, Schuurmans J, et al. Psychotherapy for chronic major depression and dysthymia: a meta-analysis. *Clin Psychol Rev*. 2010;30:51–62.
11. Ramana R, Paykel E, Cooper Z, et al. Remission and relapse in major depression—a 2-year prospective follow-up study. *Psychol Med*. 1995;25:1161–1170.
12. Vittengl JR, Clark LA, Dunn TW, et al. Reducing relapse and recurrence in bipolar depression: a comparative meta-analysis of cognitive-behavioral therapy's effects. *J Consult Clin Psychol*. 2007;75:475–488.
13. Vazquez GH, Holtzman JN, Lolich M, et al. Recurrence rates in bipolar disorder: systematic comparison of long-term prospective, naturalistic studies versus randomized controlled trials. *Eur Neuropsychopharmacol*. 2015;25:1501–1512.
14. Anderson S, Sovik R. *Yoga: Mastering the Basics*. Honesdale, PA: Himalayan Institute Press; 2000.
15. Woolery A, Myers H, Sternlieb B, et al. A yoga intervention for young adults with elevated symptoms of depression. *Altern Ther Health Med*. 2004;10:60–63.
16. Kinsler PA, Elswick RK, Kornstein S. Potential long-term effects of a mind-body intervention for women with major depressive disorder: sustained mental health improvements with a pilot yoga intervention. *Arch Psychiatr Nurs*. 2014;28:377–383.
17. Prathikanti S, Rivera R, Cochran A, et al. Treating major depression with yoga: a prospective, randomized, controlled pilot trial. *PLoS One*. 2017;12:e0173869.
18. Vollbehr NK, Bartels-Velthuis AA, Nauta MH, et al. Hatha yoga for acute, chronic and/or treatment-resistant mood and anxiety disorders: a systematic review and meta-analysis. *PLoS One*. 2018;13:e0204925.
19. Uebelacker LA, Tremont G, Gillette LT, et al. Adjunctive yoga v. health education for persistent major depression: a randomized controlled trial. *Psychol Med*. 2017;47:2130–2142.
20. Sherman KJ. Guidelines for developing yoga interventions for randomized trials. *Evid Based Complement Alternat Med*. 2012;2012:143271.
21. Wiersma J, Van Oppen P, Van Schaik DJF, et al. Psychological characteristics of chronic depression: a longitudinal cohort study. *J Clin Psychiatry*. 2010;72:288–294.
22. Silveira EdM Jr, Kauer-Sant'Anna M. Rumination in bipolar disorder: a systematic review. *Braz J Psychiatry*. 2015;37:256–263.

PRACTITIONER'S CORNER

23. Williams K, Chambless D, Ahrens A. Are emotions frightening? An extension of the fear of fear construct. *Behav Res Ther.* 1997;35:239–248.
24. Sydenham M, Beardwood J, Rimes KA. Beliefs about emotions, depression, anxiety and fatigue: a mediational analysis. *Behav Cogn Psychother.* 2017;45:73–78.
25. Trew JL. Exploring the roles of approach and avoidance in depression: an integrative model. *Clin Psychol Rev.* 2011;31:1156–1168.
26. Mandelli L, Mazza M, Di Nicola M, et al. Role of substance abuse comorbidity and personality on the outcome of depression in bipolar disorder: harm avoidance influences medium-term treatment outcome. *Psychopathology.* 2012;45:174–178.
27. Mehling WE, Price C, Daubenmier JJ, et al. The Multi-dimensional Assessment of Interoceptive Awareness (MAIA). *PLoS One.* 2012;7:e48230.
28. Farb N, Daubenmier J, Price CJ, et al. Interoception, contemplative practice, and health. *Front Psychol.* 2015;6:763.
29. van Randenborgh A, Hueffmeier J, Victor D, et al. Contrasting chronic with episodic depression: an analysis of distorted socio-emotional information processing in chronic depression. *J Affect Disord.* 2012;141:177–184.
30. Carmody J, Baer RA. Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *J Behav Med.* 2008;31:23–33.
31. Sherman KJ, Wellman RD, Cook AJ, et al. Mediators of yoga and stretching for chronic low back pain. *Evid Based Complement Alternat Med.* 2013;130818.
32. Cramer H, Thoms MS, Anheyer D, et al. Yoga in women with abdominal obesity—a randomized controlled trial. *Dtsch Arztebl Int.* 2016;113:645–652.
33. Tickle-Degnen L. Nuts and bolts of conducting feasibility studies. *Am J Occup Ther.* 2013;67:171–176.
34. Orsmond GI, Cohn ES. The distinctive features of a feasibility study: objectives and guiding questions. *OTJR (Thorofare N J).* 2015;35:169–177.
35. Hunsley J, Lee CM. Research-informed benchmarks for psychological treatments: efficacy studies, effectiveness studies, and beyond. *Prof Psychol Res Pract.* 2007;38:21–33.
36. Eldridge SM, Chan CL, Campbell MJ, et al. CONSORT 2010 statement: extension to randomised pilot and feasibility trials. *BMJ.* 2016;355:i5239.
37. Hoenders HJR, Bos EH, Bartels-Velthuis AA, et al. Pitfalls in the assessment, analysis, and interpretation of routine outcome monitoring (ROM) data; results from an outpatient clinic for integrative mental health. *Adm Policy Ment Health.* 2013;41:647–659.
38. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV-TR).* Washington, DC: American Psychiatric Association; 2000.
39. Desikachar TKV. *The Heart of Yoga: Developing a Personal Practice, Revised.* Rochester, VT: Inner Traditions; 1999.
40. Iyengar BKS. *Light on Yoga, revised.* New York, NY: Schocken Books; 1979.
41. Tiganait PR. *The Secret of the Yoga Sutra: Samadhi Pada.* Honesdale, PA: Himalayan Institute; 2014.
42. Nolen-Hoeksema S, Morrow J. A prospective-study of depression and posttraumatic stress symptoms after a natural disaster—the 1989 Loma-Prieta Earthquake. *J Pers Soc Psychol.* 1991;61:115–121.
43. Meyer TJ, Miller ML, Metzger RL, et al. Development and validation of the Penn State Worry Questionnaire. *Behav Res Ther.* 1990;28:487–495.
44. Lovibond SH, Lovibond PF. *Manual for the Depression Anxiety Stress Scales, 2nd edition.* Sydney, NSW, Australia: Psychology Foundation; 1995.
45. Harper A, Power M. Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group. *Psychol Med.* 1998;28:551–558.
46. IBM Corp. *IBM SPSS Statistics for Windows, Version 24.0.* Armonk, NY: IBM Corp.; 2016.
47. Leon AC, Davis LL, Kraemer HC. The role and interpretation of pilot studies in clinical research. *J Psychiatr Res.* 2011;45:626–629.
48. Kinser PA, Bourguignon C, Whaley D, et al. Feasibility, acceptability, and effects of gentle hatha yoga for women with major depression: findings from a randomized controlled mixed-methods study. *Arch Psychiatr Nurs.* 2013;27:137–147.
49. First MB, Spitzer RL, Williams JBW, et al. *Structured Clinical Interview for DSM-IV (SCID-I) Research Version.* New York, NY: Biometrics Research, New York Psychiatric Institute; 1995.