*Pain Medicine*, 21(11), 2020, 2799–2810
doi: 10.1093/pm/pnaa208
Advance Access Publication Date: 8 September 2020
**Preliminary Research Article**

# Feasibility and Acceptability of an Abbreviated, Four-Week Mindfulness Program for Chronic Pain Management

**Carrie E. Brintz, PhD* Isabel Roth, DrPH† Keturah Faurot, PA, PhD† Sanjana Rao,† Susan A. Gaylord, PhD†**

*Division of Pain Medicine, Department of Anesthesiology, Vanderbilt University Medical Center, Nashville, Tennessee; †Program on Integrative Medicine, Department of Physical Medicine and Rehabilitation, University of North Carolina at Chapel Hill School of Medicine, Chapel Hill, North Carolina, USA

*Correspondence to:* Carrie E. Brintz, PhD, VUMC Interventional Pain Center, 719 Thompson Lane, Suite 22209, Nashville, TN 37201-3105, USA. Tel: 615-322-6033; Fax: 615-343-6144; E-mail: carrie.brintz@vumc.org.

Funding sources: The project was supported by the National Center for Advancing Translational Sciences (NCATS), National Institutes of Health (NIH), through Grant Award Number UL1TR002489. Services were provided through the North Carolina Translational and Clinical Sciences Institute. A Ruth L. Kirschstein Institutional National Research Service Award (T32 AT003378) from the National Center for Complementary and Integrative Health provided salary support for Dr. Brintz while she conducted this study.

Disclaimer: The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Conflict of interest: All authors have indicated they have no conflicts of interest or financial relationships relevant to this article to disclose.

## Abstract

**Objective.** The Mindfulness-Based Stress Reduction program is effective at improving chronic pain outcomes, but the time demand hinders participation. This preliminary study evaluated the feasibility, acceptability, and potential effects of providing an abbreviated mindfulness program for patients with chronic pain. **Design.** A single-arm, mixed-methods, pre–post intervention study. **Setting.** An outpatient rehabilitation clinic at an academic medical center. **Subjects.** Participants were N = 23 adults with chronic pain who were new to mindfulness practice. **Methods.** Mindfulness-based Stress Reduction was adapted to shorten the program to four weekly 90-minute sessions and to focus content on pain management. Three cohorts of six to nine participants completed baseline and post-treatment measures of 1) patient-reported outcomes, including pain intensity, pain interference, physical functioning, depressive/anxiety symptoms, positive affect and well-being, and sleep disturbance; 2) pain medication dosages; 3) psychosocial variables including pain acceptance, pain catastrophizing, and perceived stress; 4) dispositional mindfulness, as well as postintervention structured interviews about their experiences. **Results.** Acceptable rates of retention and attendance and high ratings of satisfaction indicated that the intervention was feasible and acceptable. In interviews, participants found the program acceptable and beneficial and provided suggestions to improve it. From pre- to post-treatment, significant improvements were reported in all measures except physical functioning and anxiety. **Conclusions.** In adults with chronic pain, a four-week mindfulness program is feasible and acceptable, addresses the barrier of a lengthy program, and may improve quality of life and psychological functioning. An appropriately powered randomized controlled trial with a comparison group is needed to assess the intervention's effectiveness.

**Key Words:** Chronic Pain; Mindfulness; Mindfulness-Based Stress Reduction; Abbreviated

## Introduction

Chronic pain affects millions of individuals in the United States [1–3], diminishes quality of life and functioning [2], and costs society an estimated $560 to $635 billion dollars annually in health care costs and lost worker productivity [4]. Chronic pain is widely recognized as a condition characterized by the complex interaction of biological, psychological, and social factors [5–7]. Individuals with chronic pain report high levels of pain-related emotional distress [5, 8], and there is evidence of structural and functional alterations in the areas of the brain responsible for the cognitive and emotional modulation of pain [9].

Biomedical interventions alone do not fully address important psychosocial factors that impact the development and maintenance of chronic pain and related functional impairment [5, 10]. Thus, chronic pain treatment is most effective when it also targets cognitive, emotional, and behavioral factors [10]. Moreover, medications such as opioids carry increased risks, including adverse side effects, opioid-induced hyperalgesia, abuse, and overdose [11–13]. Amidst a nationwide opioid crisis and a paradigm shift toward whole-person, multimodal pain management, it is imperative that effective biopsychosocial interventions be widely accessible to patients suffering with chronic pain.

Mindfulness training is a component of some mind–body interventions, which "focus on the interactions among the brain, mind, body, and behavior, with the intent to use the mind to affect physical functioning and promote health" [14]. Rooted in Eastern philosophy, psychology, and meditation practices, mindfulness is now widely taught as a secular practice within health care and community settings [15, 16]. In mindfulness training, one purposely brings one's attention to present-moment experiences, including thoughts, emotions, or sensations that arise, noticing them and letting them go without judgment [15]. Mindfulness-based Stress Reduction (MBSR), the most widely researched mindfulness-based intervention (MBI), involves training in an array of mindfulness skills, including mindful breathing, mindful eating, body scan, mindful movement, and compassion practices. It is typically delivered as a group intervention consisting of eight weekly, 2.5-hour sessions and a full-day silent retreat between weeks 6 and 7 [16, 17].

MBSR and similar MBIs have demonstrated efficacy compared with usual care and attention control conditions for improving pain-related and psychosocial outcomes in patients with various chronic pain conditions, such as low back pain, fibromyalgia, rheumatoid arthritis, and headache [18]. In a rigorous three-arm randomized controlled trial (RCT) for patients with chronic low back pain, MBSR demonstrated similar efficacy as cognitive behavioral therapy, the psychosocial treatment with the largest evidence base for chronic pain, compared with usual care, for reducing back pain bothersomeness, back pain–related functional limitations, and back pain intensity, with improvements sustained at 52 weeks [19]. Within the same study, the MBSR and cognitive behavioral therapy groups demonstrated similar changes in therapeutic mechanisms including pain catastrophizing, pain acceptance, dispositional mindfulness, and self-efficacy [20].

The standard length of MBSR and other MBIs (eight to 10 weekly sessions each lasting two to two and a half hours) is a deterrent for some chronic pain patients [21] who may be intimidated by long sessions, have physical limitations, find it cost-prohibitive, or attend multiple medical appointments every month. Studies of briefer MBIs in chronic pain populations are rare. A study in patients with back pain showed that, compared with a reading control group, an abbreviated MBSR course consisting of four weekly two-hour sessions significantly reduced back pain and increased regulation in brain areas associated with emotional awareness [22]. Another study in patients with chronic tension-type headache found that an abbreviated MBI consisting of six twice-weekly two-hour sessions significantly reduced headache frequency, but not intensity and duration, compared with a waitlist control condition [23]. To our knowledge, no studies have systematically examined an abbreviated MBI for groups of patients with mixed chronic pain conditions, a pragmatic option for clinical settings.

The purpose of this study was to evaluate the feasibility and acceptability of an abbreviated, four-week mindfulness program for adults with chronic noncancer pain recruited largely from clinics within an academic medical center. We included patients with any type of chronic noncancer pain, considering that in clinical settings, psychosocial interventions are typically offered to individuals with varying pain conditions and those who commonly present with multiple sites of pain or overlapping pain conditions [2, 24]. Furthermore, MBSR, as originally designed by Dr. Jon Kabat-Zinn, was developed and utilized for a mixed chronic pain population [25].

The primary hypotheses were that it would be feasible to enroll 24 participants, retain 85% of participants in the study, maintain an attendance rate of 75% (i.e., three out of four sessions attended), and receive ratings of moderate to high intervention satisfaction, on average. Secondary outcomes included evaluating pre- to postintervention changes in patient-reported outcomes (pain intensity, pain interference, physical functioning, anxiety, depression, positive affect and well-being, and sleep disturbance), potential psychosocial mechanisms (perceived stress, pain catastrophizing, and chronic pain acceptance), and dispositional mindfulness.

## Methods

This study used a mixed-methods, single-group, pre–post design to evaluate the feasibility and acceptability of a

mindfulness intervention for adults with chronic pain. The University of North Carolina (UNC) at Chapel Hill Institutional Review Board approved all study procedures.

## Participants

Participants were adults aged 18 and older with one or more chronic noncancer pain conditions (daily or almost daily pain for at least three months' duration). Individuals were eligible if they 1) reported more than minimal pain bothersomeness in the past seven days (>3 on a 0–10 scale) and/or pain interference with general activities in the past seven days (>2 on a 0–10 scale); 2) were established with at least one medical provider for pain management; and 3) were able to read and speak English. Participants were excluded if they reported any of the following: 1) a diagnosis of mental illness with psychotic features; 2) a history of inpatient admission for psychiatric disorder in the past two years; 3) a score >4 on the Alcohol Use Disorders Identification Test (AUDIT-C) [26] and/or a score >2 on the Drug Abuse Screening Test (DAST-10) [27] to exclude likely substance use disorders; 4) prior completion of a mindfulness course, participation in a psychosocial skills group with mindfulness instruction in the past year, or a current, regular mindfulness meditation practice.

## Measures

During the online baseline assessment, participants provided demographic information including age, gender, race/ethnicity, education level, and yearly household income. Participants also provided information about their pain condition, including the number of years with chronic pain, primary sources or locations of pain, and the names and dosages of any pain medications they were currently taking. Unless otherwise specified, all other measures were self-administered during the baseline and postintervention assessments.

### Patient-Reported Outcomes

Several short-form scales from the Patient-Reported Outcomes Measurement Information System (PROMIS) or Quality of Life in Neurological Disorders (Neuro-QoL) system were administered to assess pre- to postintervention changes in domains of health-related quality of life [28]. PROMIS and Neuro-QoL are two of four HealthMeasures systems for patient-reported outcomes assessment (accessible at healthmeaures.net) and include item banks measuring patients' perceived symptoms, distress, and function. Scales with four, six, and eight items (short forms) were developed from item banks using item response theory and validated in general and chronic illness populations [28, 29]. PROMIS adult short-form scales were administered at baseline and post-treatment and included Physical Function 4a (e.g., "Are you able to do chores such as vacuuming or yard work?"; Anxiety 4a (e.g., "In the past 7 days, my worries overwhelmed me"); Depression 4a (e.g., "In the past 7 days, I felt helpless"); Sleep Disturbance 4a (e.g., "In the past 7 days, I had difficulty falling asleep"); Pain Interference 6b (e.g., "In the past 7 days, how much did pain interfere with your enjoyment of life?"); and one item assessing average pain intensity over the past seven days from 0 (no pain) to 10 (worst pain imaginable). The number following each subscale name indicates the number of items. Items were rated on a five-point Likert scale. The Positive Affect and Wellbeing scale from the Neuro-QOL HealthMeasures system was also administered and consists of nine items (e.g., "Lately, I had a sense of well-being"). The PROMIS and NEURO-QOL scales were scored using the HealthMeasures Scoring system, which converts the scales' raw scores into standardized T-scores using a metric in which 50 is the mean and 10 is the standard deviation of the relevant reference population. Higher scores indicate higher levels of the construct measured.

### Perceived Stress

The Perceived Stress Scale (PSS-4) [30] consists of four items from the full scale (PSS-14) and measures stress perceptions over the past month. We used the shorter scale in order to reduce participant burden. The PSS-4 has been administered in various healthy and clinical populations, with internal reliability (Cronbach's alpha) ranging from 0.60 to 0.82 [31]. Items are rated on a Likert scale from 0 (never) to 4 (very often), and scores range from 0 to 16. Higher scores indicate higher levels of perceived stress. An example item is: "In the last month, how often have you felt that you were unable to control the important things in your life?"

### Chronic Pain Acceptance

The revised Chronic Pain Acceptance Questionnaire (CPAQ) [32] consists of 20 items assessing two aspects of chronic pain acceptance—activity engagement and pain willingness. Activity engagement refers to one's pursuit of life activities regardless of pain (e.g., "When my pain increases, I can still take care of my responsibilities"). Pain willingness refers to one's recognition that avoidance and control of pain are often unworkable strategies for adapting well to chronic pain (e.g., "Before I can make any serious plans, I have to get some control over my pain"). Items are rated on a Likert scale from 0 (never true) to 6 (always true). Item responses were summed to obtain a total score ranging from 0 to 120. Higher scores indicate higher levels of acceptance. The revised CPAQ has demonstrated good internal consistency, construct validity, and predictive validity [32].

### Pain Catastrophizing

The Pain Catastrophizing Scale (PCS) [33] consists of 13 items asking participants to reflect on past painful experiences and to indicate the degree to which they experience

certain thoughts and feelings when in pain (e.g., "I become afraid that the pain will get worse") using a scale from 0 (not at all) to 4 (all the time). The PCS comprises three related dimensions of rumination, magnification, and helplessness [33, 34]. Total scores are calculated by summing all items and range from 0 to 52, with higher scores indicating higher levels of pain catastrophizing. The PCS has demonstrated strong evidence of internal consistency, test–retest reliability, concurrent validity, and construct validity in undergraduate, community, or outpatient chronic pain samples [33–35].

### Mindfulness

The short form of the Freiburg Mindfulness Inventory (FMI-14) consists of 14 items from the full 30-item FMI [36] and measures the extent to which an individual reports attending to the present moment in a nonreactive or nonjudgmental manner during the past seven days (e.g., "I watch my feelings without getting lost in them"). In contrast to the full scale, the short form is semantically independent from a Buddhist or meditation context, so it can be administered to participants who are naïve to meditation practice or Buddhist theory. Items are rated on a four-point scale from 1 (rarely) to 4 (almost always). Total scores are calculated by summing all items and range from 14 to 56, with higher scores indicating higher levels of mindfulness. The FMI-14 demonstrated adequate internal consistency and construct validity in healthy and clinical samples [36, 37] and significant inverse relationships with pain-related variables in individuals with chronic pain [38].

### Intervention Satisfaction

During the online post-treatment assessment, participants completed one item asking "Overall, how satisfied were you with the four-week Mindfulness Program?" The item was rated on a seven-point scale from very dissatisfied to very satisfied.

### Adverse or Unwanted Reactions to Mindfulness Practice

Participants completed brief daily online surveys between the first and final sessions asking participants to record if they experienced any unwanted or adverse reactions to their daily practice. If they checked yes, they were asked to describe the unwanted or adverse reaction.

### Qualitative Interview

Within two weeks after the final mindfulness class, participants completed a 20- to 30-minute structured phone interview with the first author (also the principal investigator and one of the mindfulness instructors) to obtain feedback about their experience with the program and suggestions to improve it. See the Appendix to view the interview guide. The interviewer transcribed participants' responses verbatim while conducting the interview. Thus, transcripts may contain minor errors.

## Intervention

The mindfulness intervention consisted of four weekly group mindfulness classes, each lasting 90 minutes, with a five-minute break in the middle of each session. The sessions were co-facilitated by the principal investigator (CB), who is a clinical psychologist specializing in pain management with a long-term personal mindfulness practice and MBSR teaching experience, and a study co-investigator (SG) who has >20 years of experience instructing mindfulness meditation and MBSR courses.

The course content was adapted primarily from MBSR [16, 17], with some content from the Mindfulness-based Pain Management program [39, 40], a United Kingdom–based program based on MBSR, but with specific applications to living with pain. Sessions were adapted to accommodate the reduced amount of class time, to focus content on chronic pain management, and to be sensitive to physical and emotional considerations when working with individuals with chronic pain. For example, the instructors were sensitive to the fact that some participants may have a history of trauma, and thus provided modifications should a participant have difficulty focusing on a particular part of the body or need additional suggestions to help with grounding in the present. Walking meditation and mindful yoga were not introduced due to large variability in the physical functioning of participants and the lack of sufficient time to tailor movement exercises to each individual's needs. However, a mindful movement break was introduced as a way for participants to bring awareness to the sensations of moving during the five-minute break allotted during each session. Loving-kindness meditation, commonly included in MBSR, was also not introduced to allow time for practices focused on bringing acceptance and self-compassion to experiences of pain and discomfort.

Assigned time for home practice was reduced compared with the standard MBSR course, which encourages at least 45 minutes per day of formal practice. Participants were encouraged to start with 10 to 20 minutes per day but could practice longer if they preferred and were encouraged to increase their practice time each week. The instructors emphasized that consistent daily practice, even for shorter time periods, is likely to be more beneficial than longer but infrequent practice sessions [41, 42]. Participants received guided audio recordings for the sitting meditation, body scan, and three-minute breathing space practices. They also received a binder with course handouts for each session, as well as an e-mail after each session with a class summary and encouragement to practice daily. See Table 1 for a breakdown of session content and home practice assignments.

## Procedure

Participants were recruited through provider referral, flyers placed in outpatient clinics, and a listserve e-mail

**Table 1.** Four-Week Mindfulness Program Curriculum

| Session Number | Session Focus | In-Session Mindfulness Exercises | Home Practice Assignments |
|---|---|---|---|
| 1 | • Introductions and guidelines<br>• Defining mindfulness vs autopilot<br>• Pain and the brain; neuroplasticity<br>• Primary and secondary pain* | • Sitting meditation (breath focused) | • Sitting meditation (breath focused) 10–20 minutes per day<br>• Noticing primary vs secondary pain |
| 2 | • The stress response; perceptions and stress<br>• Relationship between stress and pain<br>• Mindfulness in daily life | • Review sitting meditation: expand to letting go of thoughts<br>• Body scan<br>• Mindful eating (raisin exercise) | • Body scan once daily (15 minutes)<br>• Continue sitting meditation practice<br>• Mindfulness of routine activity each day (e.g., eating)<br>• Noticing automatic reactions to stress |
| 3 | • Interrupting cycle of secondary pain and stress with breathing space<br>• Working mindfully with discomfort and pain: resistance vs acceptance | • Review body scan<br>• Breathing space<br>• Mindfulness of pain and discomfort | • Continue sitting meditation and body scan practice<br>• Breathing space daily<br>• Mindfulness of pleasant experiences in daily life |
| 4 | • Opening to pain with acceptance and self-compassion<br>• Moving forward with mindfulness practice—tips for maintaining practice and resources | • Review body scan and breathing space<br>• Mindful acceptance of pain with self-compassion | • Resources: mindfulness apps, books, Web sites, and community mindfulness meditation groups |

*Primary pain (sensory experience) differentiated from secondary pain (cognitive and emotional reactions and resistance)

sent to university/hospital employees and students. Although the PI of the study was a clinical psychologist treating patients at one of the referring pain clinics, only providers not involved in the study made referrals. Interested individuals either initiated contact or were contacted by study personnel if they gave permission to a referring provider to be contacted. Individuals were given information about the study and procedures over the telephone. They were told that the objective of the study was to learn whether an abbreviated mindfulness program is feasible and may benefit individuals with chronic pain. If they provided verbal consent to a brief telephone screening, study personnel determined their eligibility, including administering the AUDIT-C and the DAST-10 to exclude substance use disorders. Study personnel then reviewed the informed consent form with interested and eligible individuals over the telephone, after which individuals provided written consent via an online form e-mailed through Research Electronic Data Capture (REDCap) electronic data capture tools, hosted at University of North Carolina at Chapel Hill. REDCap is a secure, Web-based software platform designed to support data capture for research studies, providing 1) an intuitive interface for validated data capture; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for data integration and interoperability with external sources [43, 44].

All study surveys were e-mailed to participants with a link to a REDCap survey. Within one week before the first intervention session, participants were e-mailed a link to the baseline assessment survey, which needed to be completed before attending the first session. Participants completed the postintervention survey one week after the final session. Within one to two weeks after the final session, participants completed a 20- to 30-minute semistructured telephone interview with study personnel to assess participants' experience with the intervention sessions and overall study. Participants were given a $15 Amazon gift card for each assessment they completed, including the baseline survey, postintervention survey, and the telephone interview. The intervention was provided at no cost and was located at an outpatient clinic with free parking.

## Analytic and Statistical Approach

Baseline demographics, self-reported pain medication use, and pain conditions were characterized using means and percentages and their standard deviations. Primary feasibility and acceptability outcomes were analyzed using percentages (proportions) and 95% confidence intervals (CIs).

Qualitative interview data were analyzed using a reflexive thematic analysis approach, in which the researchers generated codes from the data and analyzed and interpreted the codes to identify thematic patterns in the data, rather than identifying codes and themes a priori [45]. Two coders experienced in qualitative analysis read and coded the interview transcripts independently. Codes were generated inductively and iteratively by both coders using descriptive coding, in which words or short phrases were assigned to label the primary topic of interview excerpts [46]. Axial coding was conducted jointly by the coders by grouping similarly coded data together and organizing codes by categories and subcategories, which became themes [46]. Themes related to feasibility and acceptability of the intervention for participants are

described here. Quantitative self-report measures were examined for missing data and scored, and distributions were evaluated for normality. Secondary outcomes were then analyzed using paired *t* tests and by examining the pre/postintervention change in scores and their respective standard errors with 95% confidence intervals.

## Results

### Sample Characteristics

Twenty-three participants aged 26 to 77 years (mean age = 53 years), enrolled in the study and completed at least the baseline assessment. The participants were mostly female (74%) and non-Hispanic white (78%), with a college degree or greater level of education (70%). On average, the number of years that the participants reported living with chronic pain was 6.9, with back pain being the most common source of pain (78%). The majority of participants (66%) reported three or more sources of pain. See Table 2 for participant demographics and pain characteristics.

**Table 2.** Participant demographics and pain characteristics (N = 23)

| Variable | No. (%) or M (SD), Range |
|---|---|
| Age, y | 53 (15.58), 26–77 |
| Female gender (remaining are male) | 17 (74) |
| Race/ethnicity | |
| White, non-Hispanic | 18 (78) |
| Black or African American | 4 (17) |
| Hispanic or Latinx | 1 (4) |
| All others or more than one | 0 (0) |
| Education Level | |
| Less than high school | 0 (0) |
| High school diploma or equivalent | 1 (4) |
| Some college, no college degree | 5 (22) |
| College degree or greater | 16 (70) |
| Chose not to answer | 1 (4) |
| Annual Income Level | |
| Less than $20,000 | 5 (22) |
| $20,000-40,000 | 2 (9) |
| $40,000-60,000 | 4 (17) |
| $60,000-80,000 | 2 (9) |
| More than $80,000 | 8 (35) |
| Chose not to answer | 2 (9) |
| Years with Chronic Pain | 6.9 (7.2), 1–30 |
| Sources of Pain | |
| Back | 18 (78) |
| Arthritis (any type) | 11 (48) |
| Fibromyalgia | 4 (17) |
| Neck | 12 (52) |
| Neuropathy | 11 (48) |
| Headache/migraine | 7 (30) |
| Pelvic | 4 (17) |
| Other | 8 (35) |
| Number of Sources of Pain | |
| 1 | 4 (17) |
| 2 | 4 (17) |
| 3 or greater | 15 (66) |
| Taking one or more pain medications | 18 (78) |

### Feasibility and Acceptability

Out of 45 individuals screened between April 2018 and September 2018, 26 individuals consented to participate in the study. Eleven of those screened were ineligible due to having taken a mindfulness course (N = 9), positive DAST-10 screening (N = 1), or reporting minimal pain interference and bothersomeness (N = 1). After consenting, three individuals were unable to participate due to scheduling conflicts or upcoming surgery. Thus, 23 participants completed the baseline assessment and attended at least one intervention session, after which one individual withdrew from the study due to scheduling conflicts, leaving a total of 22 participants who completed the study and for whom pre- to postintervention data were analyzed. Three sequential groups were offered with six to nine participants in each group. On average, participants attended three out of four sessions, and eight out of 23 participants (35%) attended all four mindfulness sessions. The majority of participants (82.6%) reported being moderately to very satisfied with the program. See Table 3 for all feasibility and acceptability results.

There were no serious adverse events reported during the course of the study. There was one mild adverse event likely related to the intervention, in which a participant who had a history of dissociation that was unknown to study staff expressed concern about feeling that she might dissociate during guided sitting meditation. The participant was in weekly psychotherapy and decided to remain in the study, as she was given additional grounding techniques and practice modifications to prevent feelings of dissociation, and she expressed that these feelings had diminished. Other unwanted reactions during mindfulness meditation practice that were reported in the daily practice surveys included increased pain from seated posture, increased attention to pain, difficulty focusing due to pain, falling asleep during mindfulness practice, emotional distress, anxiety, irritation, fatigue, and shortness of breath. These and other challenges were addressed during the weekly practice discussions.

### Qualitative Interviews

Twenty-two participants completed structured qualitative interviews conducted by the PI. Themes related to feasibility and acceptability are presented here and include *Acceptability of Four-Week Format, Content of Program, Impact of Group Experience,* and *Health Benefits of Program Participation*.

#### Acceptability of Four-Week Format

Participants varied in their experience of the novel four-week format, with most finding substantial benefit from the course, and several participants expressed the desire for something more. Over half (59%) of participants stated that they would have preferred more than four sessions, with the remaining 41% stating that four was just right. The majority of participants (73%) stated that the

**Table 3.** Feasibility and Acceptability Results

| | |
|---|---|
| Individuals who expressed interest or were referred (N) | 75 |
| Completed phone screenings (N) | 45 |
| Number eligible (N) | 34 |
| Consented to participate out of those eligible (N) | 26 |
| Completed baseline assessments (N) | 23 |
| Participants retained out of 23 (proportion) | 0.96 (95% CI: 0.87, 1.04) |
| Average sessions attended (proportion) | 0.77 (95% CI: 0.58, 0.96) |
| Completed all 4 sessions | 35% |
| Satisfaction with Mindfulness Program | |
| Very dissatisfied | 0% |
| Moderately dissatisfied | 0% |
| Slightly dissatisfied | 4.5% |
| Neutral | 4.5% |
| Slightly satisfied | 4.5% |
| Moderately satisfied | 30.4% |
| Very satisfied | 52.2% |
| Participant opinions regarding number and length of sessions | |
| Would have preferred more than four sessions | 59% |
| Four sessions was just right | 41% |
| Wanted sessions shorter than 90 minutes | 9% |
| 90 minutes was just right | 73% |
| Wanted sessions longer than 90 minutes | 18% |

session length of 90 minutes was just right, with only 9% of participants preferring shorter sessions.

For one of the most physically disabled participants, getting to the sessions was an ordeal, with their pain making session attendance difficult.

> The main obstacle was my requirements for what I need in order to be able to sit for that long—the chair and pillows and all that stuff. I was going to have to bring my son-in-law to the next meeting in order to set me up. It was such an ordeal that even my aide couldn't do it. (Participant 2)

A total of four participants related barriers to attendance of some of the course meetings, with two participants noting schedule difficulties related to caregiving commitments.

The majority of participants did not have difficulty attending sessions and noted that the shortened format added benefit for fitting the course into their schedules. Participant 21 said, "If it had been a five-week program, I wouldn't have done it. And I couldn't conceive of doing an eight-week program." Regarding the four-week format, many found the shortened format less intimidating and a better fit for their schedules.

> I thought that worked really well; it has prevented me from signing up for MBSR workshops at other times. They're three hours long for eight weeks—seems like a really big commitment. Especially as a person with chronic pain and PhD student, four weeks seems really manageable. (Participant 12)

For these participants, the abbreviated, modified format reduced barriers to using MBSR, where an eight-week program would have been inaccessible.

While many participants were able to develop a regular routine of home practice, some expressed that the length of the course was not sufficient to fully build the skill of a regular mindfulness routine. Participant 7 said, "I am having some trouble doing it every day, because it was only three weeks of practice, and I think that I didn't do it long enough and frequently enough for me to form a very deep way or schedule." However, for other participants, the exposure during the course set them up for a regular mindfulness practice. Participant 9 said, "Doing it even just a little bit on a regular basis really made a difference in how I experienced the world and how I experience stress, so it didn't take much to see the benefit." For these participants, even the brief exposure to mindfulness practice was enough to produce a notable benefit.

### Content of Program

Regarding the program content, several participants expressed their appreciation for the additional resources, such as recordings and handouts, provided by the instructors to support their practice outside of class.

> I expected I would set out these times I would do my practice, and it just didn't happen like that, so having a mobile set of tools helped me go with the flow about it. (Participant 12)

These mobile tools allowed participants to fit their mindfulness practice into their lives.

For some participants, there was an expectation or desire for more focus on chronic pain than was included in the curriculum. Participant 11 said, "I thought it would be more focused on how to control the pain, less on exercises and breathing, [and more on] how to get off medication." Some participants felt that the curriculum did not focus directly on chronic pain as much as they were hoping.

Three participants wanted more physical movement in the course, content that had been removed in order to condense the standard MBSR course content.

> I know a lot of people are in pain in different ways, but if we had been more focused on moving around, we wouldn't have been thinking on the pain as much.... I think if we had more movement it would have been better. (Participant 11)

These participants felt that some type of physical movement would have added value to their experience and helped the time pass more quickly.

Some participants suggested that the sessions be offered multiple days per week to reinforce the material. Others suggested including more information on anxiety, pain, and the mind–body connection.

#### Impact of Group Experience

Many participants appreciated the social support they received from group participation, finding that the input they received from group members helped them to feel less isolated in their pain experience. Participant 20 said, "I kind of like groups. You find out you're not by yourself. And you find other people are sort of struggling." Other participants found that sharing with other group members helped them to feel better about what they were struggling with while learning mindfulness.

> It was helpful to me to learn about other people's experiences with it [mindfulness practice], to hear about other people's perspectives, because sometimes I had experiences and thought it was just me, and it was good to hear it's not only me that has trouble staying focused. (Participant 13)

While most participants expressed a sense of community and social support from the program, some felt that there was insufficient group bonding. Two participants felt that if the class had been longer, there would have been more of an opportunity to bond as a group and that four meetings simply was not enough for group cohesion. Participant 15 said, "If the class had gone longer, like ongoing, it would have been nice, because you barely get to know people just a little." While most participants expressed satisfaction with the group format, some participants expressed that they would have preferred a one-on-one format for the course and that they found the group detracted from their experience.

#### Health Benefits of Program Participation

Participants described numerous health benefits related to their pain, mental health, and sleep from the mindfulness program. This included an improved sense of awareness in daily activities, including self-awareness, an improved ability to access a sense of calm and focus on the present moment, and improved self-compassion. Participants also reported that they were able to have a sense of distance from their pain, observing it without judgment. Some patients reported that their sleep improved. Participants said the intervention contributed to an overall reduction in pain, reduced pain bothersomeness or interference, and reduced negative thinking. Patients also reported reduced stigma about their pain and improved ability to cope with chronic pain.

### Pre- to Postintervention Changes

The distribution of paired differences for each outcome was approximately normally distributed, so a paired $t$ test was used for all variables. There were very few missing data for most variables (<5%); thus, for each participant missing an item, the missing value was imputed by taking the average of the participant's item responses for that variable. The CPAQ was missing >5% of item responses, so multiple imputation was used for CPAQ analyses.

Results of all paired $t$ tests are shown in Table 4. From pre- to postintervention, paired $t$ tests indicated that there were significant improvements in patient-reported outcomes including pain intensity (mean difference [MD] = –0.77), pain interference (MD = –3.67), depression (MD = –3.34), positive affect and well-being (MD = 2.79), and sleep disturbance (MD = –4.69). Physical functioning changed very little (MD = 0.06). Anxiety decreased by a mean of 2.21 points, but the change was not statistically significant. Additionally, there were significant improvements in psychosocial variables, including perceived stress (MD = –1.27), pain catastrophizing (MD = –4.96), chronic pain acceptance (MD = 13.27), and dispositional mindfulness (MD = 8.00).

## Discussion

MBIs such as the extensively researched MBSR program are effective behavioral complements to biomedical chronic pain treatment. However, the typical time commitment of eight to 10 weekly two- to two and a half–hour sessions is a barrier to participation for some individuals living with chronic pain. In fact, time commitment is a primary reason people report declining to participate in mindfulness intervention studies [21]. This preliminary study demonstrated that an abbreviated mindfulness program consisting of four weekly 90-minute sessions was feasible to deliver at a large academic medical center and was acceptable to patients new to mindfulness practice and with a variety of types of chronic noncancer pain. Furthermore, there were significant within-subject, pre- to postintervention changes in patient-reported outcomes and potential psychosocial mediating variables. The results warrant further evaluating the efficacy of the abbreviated MBI, as it may be an effective option for individuals with chronic pain who could benefit from learning mindfulness skills but who encounter challenges to participating in a full-length program.

**Table 4.** Results of paired T-tests on pain-related and psychosocial measures (N=22)

| Variable | Pre-Intervention M (SD) | Post-Intervention M (SD) | Pre to Post Mean Difference (SE) | 95% CI of Mean Difference | *P*-Value |
|---|---|---|---|---|---|
| *Physical Functioning* | 38.17 (5.35) | 38.22 (6.81) | 0.06 (.70) | [−1.39, 1.50] | .938 |
| *Anxiety* | 59.06 (9.44) | 56.84 (8.02) | −2.21 (1.38) | [−5.09, 0.66] | .124 |
| *Depression* | 56.82 (9.75) | 53.49 (8.62) | −3.34 (1.05) | [−5.53, −1.15] | .005 |
| *Sleep Disturbance* | 56.52 (7.79) | 51.83 (9.75) | −4.69 (1.26) | [−7.30, −2.07] | .001 |
| *Pain Interference* | 63.76 (7.31) | 60.10 (5.65) | −3.67 (1.42) | [−6.63, −.71] | .017 |
| Pain Intensity | 5.91 (2.05) | 5.14 (1.86) | −0.77 (.37) | [−1.55, <.001] | .050 |
| *Positive Affect and Well-being* | 47.86 (7.41) | 50.66 (7.89) | 2.79 (1.07) | [.58, 5.01] | .016 |
| Perceived Stress | 7.23 (3.70) | 5.95 (3.55) | −1.27 (0.50) | [−2.31, −.24] | .018 |
| Mindfulness | 34.23 (12.03) | 42.23 (8.10) | 8.00 (1.96) | [3.92, 12.08] | .001 |
| Pain Catastrophizing | 23.64 (12.79) | 18.68 (12.38) | −4.96 (1.41) | [−7.88, −2.03] | .002 |
| Pain Acceptance | 57.64 (4.22) | 70.91 (4.46) | 13.27 (2.45) | [8.47, 18.07] | <.001 |

M = Mean. SD = Standard Deviation. SE = Standard Error. CI = Confidence Interval. Italicized measures are normed and have a mean of 50 and standard deviation of 10.

Recruitment for the study was feasible, and we were able to enroll participants for each of the three consecutive cohorts within recruitment periods of four to six weeks. Furthermore, retention was high, with only 4% (N = 1) withdrawing from the study after completing the baseline assessment. Attendance averaged ∼75%, or three out of four sessions, which is within the range of 5.5 to 7.6 sessions attended (out of eight) found in previous studies of MBIs for chronic pain [19, 47–49].

Most participants reported moderate to high satisfaction at the end of the intervention. With regards to the abbreviated format, many participants reported that they would have preferred attending more than four sessions. As self-management interventions, MBIs empower participants to integrate formal and informal mindfulness practices into daily life. Dr. Jon Kabat-Zinn, the developer of MBSR, stated, "Mindfulness develops and deepens over time but invariably requires an ongoing commitment to its practice and cultivation in any and every moment. . .over days, weeks, months, and years" [15]. From this perspective, even an eight-week mindfulness course is considered only a brief introduction to what can be a life-long practice in cultivating mindfulness. Some participants in our study found it difficult to integrate the skills deeply after only three full weeks of formal practice, particularly as it can take time at the course outset to establish a practice routine. Alternatively, other participants were satisfied with the number of sessions and noted that the longer length of other mindfulness programs had been a deterrent to participating in the past, even though their doctors had recommended it. No participants would have preferred a program of fewer than four sessions. Thus, a four-week program seems to be a viable option for patients who would otherwise not enroll in a longer program and may be an entryway for patients who later decide to pursue additional mindfulness training options.

Three participants reported a preference for including more structured mindful movement during the classes, an aspect of the original intervention we altered to accommodate the substantially shorter class time and varying physical conditions of participants. A standard MBSR course incorporates mindful movement with walking meditation and gentle stretching practices. Although we introduced the concept of informal mindful movement practice by suggesting that participants take a mindful movement break for five minutes half-way through each class, it was unclear whether participants used the time as such. Based on the feedback received, it may be valuable to restructure the abbreviated program to include a very brief walking meditation practice or gentle movement practice that can be completed while standing or sitting, in which participants can choose to engage as formal meditation or informal practice while moving in daily life.

Similar to other studies of MBIs in chronic pain populations [50], our qualitative findings show that participants experienced social support from the group format. Given the abbreviated nature of the program, it seems that the bonds participants formed were not as deep or significant as in full-length MBIs, although the element of social support was still present. Some participants expressed a desire for one-on-one instruction, another possible format for increasing accessibility of MBSR courses for patients with chronic pain.

There were significant pre- to postintervention changes reported over four weeks in several patient-centered outcomes (pain intensity, pain interference, depression, sleep disturbance, and positive affect and well-being), in addition to hypothesized psychosocial mediators of the mindfulness program's effects on chronic pain management (perceived stress, pain catastrophizing, pain acceptance, and dispositional mindfulness). The quantitative results were corroborated through the qualitative interviews, in which participants described increases in multiple facets of mindfulness, changes in cognitive aspects of pain (e.g., reduced negative thinking), and improvements in pain intensity, pain interference, pain coping, and sleep. These results align with findings of other studies of MBIs for chronic pain. For example, a recent systematic review and meta-analysis of 38 RCTs on

mindfulness interventions for chronic pain [18] found that mindfulness reduced pain and depression symptoms and improved quality of life.

There are limitations of the study to consider. As the aims were to evaluate the feasibility and acceptability of the abbreviated intervention, we did not include a comparison group, and the sample size was small, limiting generalizability and inferences of causality. There are limitations to the qualitative methods conducted here. Because the qualitative interviews were conducted by one of the mindfulness instructors who was also the study PI, there is potential for participant social desirability bias in the data and for researcher bias in the data and analyses. Further, transcription was done in real time, and interviews were not recorded, which may limit the accuracy of the coded transcripts. The study was not powered to test intervention efficacy; thus, the significant improvements reported on most measures were supportive but should be tested in an adequately powered randomized clinical trial with an attention-matched comparison group before definitive conclusions can be drawn. A future trial should also include longer-term follow-up assessments to determine the sustainability of treatment effects over time. It is possible that booster sessions should be included to augment and maintain treatment gains, as are offered in some MBSR programs.

## Conclusions

Mindfulness-based interventions for chronic pain have been used successfully to help patients cope with chronic pain for more than three decades. However, there are challenges with accessibility for this population in terms of time commitments. This program piloted an abbreviated four-week mindfulness training program for a mixed population of chronic pain patients in a clinical setting and found it to be both feasible and acceptable. The next steps will determine whether this model is effective compared with an attention-matched control condition and whether it is financially viable and sustainable when incorporated into conventional and integrative health care systems.

## References


1. Kennedy J, Roll JM, Schraudner T, Murphy S, McPherson S. Prevalence of persistent pain in the U.S. adult population: New data from the 2010 National Health Interview Survey. J Pain 2014;15(10):979–84.
2. Institute of Medicine. Committee on Advancing Pain Research, Care, Education. Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research. Washington, DC: National Academies Press; 2011.
3. Nahin RL. Estimates of pain prevalence and severity in adults: United States, 2012. J Pain 2015;16(8):769–80.
4. Gaskin DJ, Richard P. The economic costs of pain in the United States. J Pain 2012;13(8):715–24.
5. Gatchel RJ, Peng YB, Peters ML, Fuchs PN, Turk DC. The biopsychosocial approach to chronic pain: Scientific advances and future directions. Psychol Bull 2007;133(4):581–624.
6. Pincus T, Kent P, Bronfort G, Loisel P, Pransky G, Hartvigsen J. Twenty-five years with the biopsychosocial model of low back pain—is it time to celebrate? A report from the Twelfth International Forum for Primary Care Research on Low Back Pain. Spine 2013;38(24):2118–23.
7. Turk DC, Okifuji A. Psychological factors in chronic pain: Evolution and revolution. J Consult Clin Psychol 2002;70 (3):678–90.
8. Svanberg M, Stålnacke B, Enthoven P, Brodda-Jansen G, Gerdle B, Boersma K. Impact of emotional distress and pain-related fear on patients with chronic pain: Subgroup analysis of patients referred to multimodal rehabilitation. J Rehabil Med 2017;49 (4):354–61.
9. Bushnell MC, Čeko M, Low LA. Cognitive and emotional control of pain and its disruption in chronic pain. Nat Rev Neurosci 2013;14(7):502–11.
10. Gatchel RJ, McGeary DD, McGeary CA, Lippe B. Interdisciplinary chronic pain management: Past, present, and future. Am Psychol 2014;69(2):119–30.
11. Chou R, Turner JA, Devine EB, et al. The effectiveness and risks of long-term opioid therapy for chronic pain: A systematic review for a National Institutes of Health Pathways to Prevention Workshop. Ann Intern Med 2015;162(4):276–86.
12. Kalso E, Edwards JE, Moore AR, McQuay HJ. Opioids in chronic non-cancer pain: Systematic review of efficacy and safety: Pain 2004;112(3):372–80.
13. Higgins C, Smith BH, Matthews K. Evidence of opioid-induced hyperalgesia in clinical populations after chronic opioid exposure: A systematic review and meta-analysis. Br J Anaesth 2019; 122(6):e114–26.
14. National Center for Complementary and Integrative Health. The science of mind and body therapies. Available at: https://nccih.nih.gov/video/series/mindbody. Accessed August 6, 2019.
15. Kabat-Zinn J. Mindfulness-based interventions in context: Past, present, and future. Clin Psychol Sci Pract 2006;10(2):144–56.
16. Kabat-Zinn J. Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness. Revised and updated ed. New York: Bantam Books Trade Paperback; 2013.
17. Santorelli SF, Meleo-Meyer F, Koerbel L, Kabat-Zinn J. Mindfulness-Based Stress Reduction (MBSR) Authorized Curriculum Guide. Worcester, MA: Center for Mindfulness in Medicine, Health Care, and Society; 2017.
18. Hilton L, Hempel S, Ewing BA, Apaydin E, Xenakis L, Newberry S, et al. Mindfulness meditation for chronic pain: Systematic review and meta-analysis. Ann Behav Med 2017;51 (2):199–213.
19. Cherkin DC, Sherman KJ, Balderson BH, et al. Effect of mindfulness-based stress reduction vs cognitive behavioral therapy or usual care on back pain and functional limitations in adults with chronic low back pain: A randomized clinical trial. JAMA 2016;315(12):1240–9.
20. Turner JA, Anderson ML, Balderson BH, Cook AJ, Sherman KJ, Cherkin DC. Mindfulness-based stress reduction and cognitive behavioral therapy for chronic low back pain: Similar effects on mindfulness, catastrophizing, self-efficacy, and acceptance in a randomized controlled trial. Pain 2016;157(11):2434–44.
21. Carmody J, Baer RA. How long does a mindfulness-based stress reduction program need to be? A review of class contact hours and effect sizes for psychological distress. J Clin Psychol 2009;65 (6):627–38.
22. Braden BB, Pipe TB, Smith R, Glaspy TK, Deatherage BR, Baxter LC. Brain and behavior changes associated with an abbreviated 4-week mindfulness-based stress reduction course in back pain patients. Brain Behav 2016;6(3):e00443.

23. Cathcart S, Galatis N, Immink M, Proeve M, Petkov J. Brief mindfulness-based therapy for chronic tension-type headache: A randomized controlled pilot study. Behav Cogn Psychother 2014;42(1):1–15.
24. Maixner W, Fillingim RB, Williams DA, Smith SB, Slade GD. Overlapping chronic pain conditions: Implications for diagnosis and classification. J Pain 2016;17(9 Suppl):T93–107.
25. Kabat-Zinn J. An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. Gen Hosp Psychiatry 1982;4(1):33–47.
26. Bush K, Kivlahan DR, McDonell MB, Fihn SD, Bradley KA. The AUDIT Alcohol Consumption Questions (AUDIT-C): An effective brief screening test for problem drinking. Arch Intern Med 1998;158(16):1789–95.
27. Skinner HA. The drug abuse screening test. Addict Behav 1982;7 (4):363–71.
28. Cella D, Riley W, Stone A, et al. The Patient-Reported Outcomes Measurement Information System (PROMIS) developed and tested its first wave of adult self-reported health outcome item banks: 2005–2008. J Clin Epidemiol 2010;63 (11):1179–94.
29. Cella D, Choi SW, Condon DM, et al. PROMIS® adult health profiles: Efficient short-form measures of seven health domains. Value Health 2019;22(5):537–44.
30. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav 1983;24(4):385–96.
31. Lee E-H. Review of the psychometric evidence of the perceived stress scale. Asian Nurs Res 2012;6(4):121–7.
32. McCracken LM, Vowles KE, Eccleston C. Acceptance of chronic pain: Component analysis and a revised assessment method. Pain 2004;107(1–2):159–66.
33. Sullivan MJL, Bishop SR, Pivik J. The Pain Catastrophizing Scale: Development and validation. Psychol Assess 1995;7 (4):524–32.
34. Osman A, Barrios FX, Gutierrez PM, Kopper BA, Merrifield T, Grittmann L. The Pain Catastrophizing Scale: Further psychometric evaluation with adult samples. J Behav Med 2000;23 (4):351–65.
35. Lamé IE, Peters ML, Kessels AG, Kleef MV, Patijn J. Test–retest stability of the Pain Catastrophizing Scale and the Tampa Scale for Kinesiophobia in chronic pain over a longer period of time. J Health Psychol 2008;13(6):820–6.
36. Walach H, Buchheld N, Buttenmüller V, Kleinknecht N, Schmidt S. Measuring mindfulness—the Freiburg Mindfulness Inventory (FMI). Personal Individ Differ 2006;40(8):1543–55.
37. Kohls N, Sauer S, Walach H. Facets of mindfulness – results of an online study investigating the Freiburg Mindfulness Inventory. Personal Individ Differ 2009;46(2):224–30.
38. Wright CJ, Schutte NS. The relationship between greater mindfulness and less subjective experience of chronic pain: Mediating functions of pain management self-efficacy and emotional intelligence: Mindfulness and experience of pain. Aust J Psychol 2014; 66(3):181–6.
39. Cusens B, Duggan GB, Thorne K, Burch V. Evaluation of the breathworks mindfulness-based pain management programme: Effects on well-being and multiple measures of mindfulness. Clin Psychol Psychother 2010;17(1):63–78.
40. Burch V, Penman D. You Are Not Your Pain: Using Mindfulness to Relieve Pain, Reduce Stress, and Restore Well-Being—An Eight-Week Program. First US ed. New York: Flatiron Books; 2015.
41. 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(1):23–33.
42. Rosenzweig S, Greeson JM, Reibel DK, Green JS, Jasser SA, Beasley D. Mindfulness-based stress reduction for chronic pain conditions: Variation in treatment outcomes and role of home meditation practice. J Psychosom Res 2010;68(1):29–36.
43. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research Electronic Data Capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform 2009;42 (2):377–81.
44. Harris PA, Taylor R, Minor BL, et al. The REDCap consortium: Building an international community of software platform partners. J Biomed Inform 2019;95:103208.
45. Braun V, Clarke V, Hayfield N, Terry G. Thematic analysis. In: Liamputtong P, ed. Handbook of Research Methods in Health Social Sciences. Singapore: Springer Singapore; 2018:1–18.
46. Saldaña J. The Coding Manual for Qualitative Researchers. 3rd ed. Los Angeles: SAGE; 2016.
47. Morone NE, Rollman BL, Moore CG, Li Q, Weiner DK. A mind–body program for older adults with chronic low back pain: Results of a pilot study. Pain Med 2009;10(8):1395–407.
48. Morone N, Greco C, Moore C, et al. A mind-body program for older adults with chronic low back pain: A randomized clinical trial. Dtsch Z Für Akupunkt 2017;60(1):30–1.
49. Cash E, Salmon P, Weissbecker I, et al. Mindfulness meditation alleviates fibromyalgia symptoms in women: Results of a randomized clinical trial. Ann Behav Med 2015;49(3):319–30.
50. Dresner D, Gergen Barnett K, Resnick K, Laird LD, Gardiner P. Listening to their words: A qualitative analysis of integrative medicine group visits in an urban underserved medical setting. Pain Med 2016;17(6):1183–91.

## Appendix

Qualitative Interview Guide

1) What, if any, benefits did you experience from participating in the mindfulness program?

2) I'd like to ask you about particular aspects of the program. How, if at all, did you find each of the following helpful?

a. Learning and practicing mindfulness skills in class?

b. Practicing mindfulness skills outside of weekly sessions?

c. Using the audio recordings between sessions?

d. Any of the didactic content? (e.g., information on stress and pain, pain and the nervous system, primary vs secondary pain)

e. The handouts?

f. Being in a group setting?

3) What aspects of the program did you find unhelpful, if any?

4) What, if any, challenges or obstacles were involved in attending the weekly sessions? (can probe if needed)

5) What, if any, challenges or obstacles did you encounter in finding time to complete home practice?

6) What did you think about the number of classes? Too few, about right, too many?

7) What did you think about the length of each class? Too short, about right, too long?

8) What, if any, content or practices would you have liked to see included that were not?

9) How, if at all, are you likely to utilize the mindfulness practice in your daily life?

10) What additional feedback can you give us to improve future classes?