Published in final edited form as:
J Pain. 2008 September ; 9(9): 841–848. doi:10.1016/j.jpain.2008.04.003.

"I felt like a new person." The effects of mindfulness meditation on older adults with chronic pain: qualitative narrative analysis of diary entries

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Abstract

To identify the effects of mindfulness meditation on older adults with chronic low back pain (CLBP) we conducted a qualitative study based on grounded theory and used content analysis of diary entries from older adults who had participated in a clinical trial of an eight week mindfulness meditation program. Participants were 27 adults ≥ 65 years with CLBP of at least moderate severity and of at least three months duration. We found several themes reflecting the beneficial effects of mindfulness meditation on pain, attention, sleep, and achieving well-being. Various methods of pain reduction were used, including distraction, increased body awareness leading to behavior change, better pain coping, and direct pain reduction through meditation. Participants described improved attention skills. A number of participants reported improved sleep latency as well as quality of sleep. Participants described achieving well-being during and after a meditation session that had immediate effects on mood elevation but also long-term global effects on improved quality of life. Several themes were identified related to pain reduction, improved attention, improved sleep, and achieving well-being resulting from mindfulness meditation that suggest it has promising potential as a non-pharmacologic treatment of chronic pain for older adults.

Perspective—Community dwelling older adults with chronic low back pain experience numerous benefits from mindfulness meditation including less pain, improved attention, better sleep, more energy, enhanced well-being, and improved quality of life. Additional research is needed to determine how mindfulness meditation works and how it might help with other chronic illnesses.

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Keywords

qualitative research; meditation; back pain; aging; mindfulness

Introduction

Pain is a universal human experience that conventional medicine has been challenged to satisfactorily treat. This is especially true among older adults who are highly likely to experience chronic pain from such common disorders as osteoarthritis. Yet therapy for older adults can be limited by intolerable side effects from the most commonly used medications to treat pain such as non-steroidal anti-inflammatory drugs and opiates.[29,27] This unfortunate reality leaves physicians with limited treatment choices that often lead them to advise their patients to learn to live with pain.

Pain has long been known to be a multidimensional experience. The early work of Melzack was the first to describe this, proposing sensory, affective and cognitive-evaluative components to the pain experience.[19,18] Mindfulness meditation is a mind-body therapy that may be able to affect the experience of pain on all three of these components. This possibility has lead investigators to study mindfulness meditation for the treatment of pain, beginning with the early work of Kabat-Zinn.[12] It has been found to reduce the intensity of pain, as well as increase mood and function.[1,10]

There are few first-person accounts that exist in the literature that describe what an individual experiences while learning mindfulness meditation[13,17,5,8,16] and none focus on an older population of chronic pain patients and how they use it to alleviate pain. Why is this important? Because personal descriptions of the experience of applying mindfulness meditation to reduce pain, as well as other unknown effects, can provide insight into possible mechanisms of effect, and help generate hypotheses for quantitative research methods. Given the early stage of research on mindfulness meditation and its effect on pain, studies that reveal patterns and themes and generate hypotheses for future research are timely.

In this context, we conducted a content analysis of meditation diaries written by older adults with chronic low back pain during their participation in a clinical trial of mindfulness meditation. The original trial randomized 37 older adults to an 8-week mindfulness meditation program or to a wait-list control group. The controls were crossed over into the meditation program after the intervention group completed the classes. Diaries from all 27 participants who completed the program were available for analysis. We found that the program was feasible in older adults, that participants meditated and average of 4 days a week for 30 minutes, and that coping as measured by acceptance of pain and self-reported physical function was significantly improved at the completion of the program.[22] These quantitative findings do not describe the means by which participants used mindfulness to work with pain or other effects of meditation. Since the diary entries revealed a rich depth of experience, our objective was to identify themes that best described or commonly suggested participants' experience of applying mindfulness meditation to pain as well as to their daily lives which would complement the quantitative analysis.

Materials and Methods

Participants

The sample consisted of 27 older adults (Table 1) with chronic low back pain (CLBP) who had participated in a trial of mindfulness meditation modeled on the mindfulness-based stress reduction (MBSR) program, and who had filled out a daily diary about their experience [27/37

(73.0%) of trial participants completed the meditation program and filled out diaries]. The mean number of participants who handed in a diary every week (one page per week) was 18 (range 10–26). The first three weeks 26, 22, and 23 participants, respectively, handed in a diary. The following four weeks 16, 16, 15, and 13 participants, respectively, handed in a diary, and the last week 10 participants handed in a diary. Including their comments about the class at 3-month follow-up there were 742 lines of text available for analysis (see reference for trial details).[22] The 10 participants who did not participate in the meditation program were not significantly different ($P>0.05$) in age, gender, ethnicity, education, religion, income, or marital status than participants who completed the 8-week program.

All participants were included if they 1) were 65 years of age or older, 2) had intact cognition (Mini-Mental Status Exam ≥ 23), 3) had CLBP, defined as moderate pain occurring daily or almost every day for at least the previous three months, and 4) spoke English. Participants were excluded if they 1) had previously participated in a mindfulness meditation program, or 2) had "red flags" suggestive of serious underlying illness (e.g. malignancy, infection, unexplained fever, weight loss or recent trauma) causing their pain.

The study was approved by the University of Pittsburgh Institutional Review Board and all participants signed informed consent prior to participating in the study.

Intervention

The intervention was modeled on the work of Jon Kabat-Zinn and the mindfulness-based stress reduction program he pioneered at the University of Massachusetts Medical Center.[13] Participants were seen in a group setting once a week for 90 minutes for a total of eight weeks. Mindfulness meditation takes everyday activities such as breathing, sitting, lying down, and walking and turns them into a meditation through directed attention on sensation, thoughts or emotions.

The techniques used were: 1) the body scan, where in a lying position, the participant is guided to place their attention non-judgmentally on each area of the body from the toes to the top of the head, 2) sitting practice, which is focused attention on breathing while sitting on a chair or on a meditation cushion on the floor, 3) walking meditation, which is mindful slow walking with focused attention on body sensation and/or breathing. The study protocol also included "homework" of daily meditation (six of seven days/week) lasting 50 minutes (45 minutes of meditation, 5 minutes to complete the diary). Support materials of audiotape, daily diary and reading materials were provided. The audiotape was a guided 45 minute recording of the steps in the body scan meditation on one side and a guided 30 minute recording of sitting meditation on the other side.[22]

The diary listed one full week per page, with space next to each day to record the number of minutes meditated, as well as space for comments about the day's meditation session. There was also a section for general comments about the meditation experience. Headings were "Amount of time spent meditating," "Any benefits or problems with the meditation?" and a "Comments" section. Diaries were collected weekly.

Analytic Approach

An approach based on grounded theory was used to analyze the diary entries of participants who recorded information about their experiences with mindfulness meditation. Grounded theory in qualitative research is a powerful analytic approach that refers to theory that is inductively generated from the researcher's observations and not deduced from the laboratory bench.[23] With this approach, the data were amassed and examined using content analysis to identify recurring words, phrases or concepts. These were then assigned codes. Key themes

were detected based on the codes that emerged from the data. We imported the diary data into the qualitative software package ATLAS.ti 5.0 (ATLAS.ti Scientific Software Development, Berlin, Germany) to facilitate the coding process. Two experienced coders (NM and CL) independently identified words, phrases, or concepts of similar meaning, assigned codes, and then placed the codes into categories. Via an iterative process of reviewing data and generating codes and code categories[24] followed by meeting to discuss and resolve differences, the two coders devised a final coding scheme. This final coding scheme was applied to all diary entries, where several common themes were identified, particularly concerning the effects of meditation. For the purpose of validation, we reviewed the diary data with other investigators (DW, HT, CG) to develop consensus regarding codes and themes, and to resolve any differences in the interpretation of the data.[9] The final coding scheme is presented in Table 2.

Results

Six main themes were identified from the diary entries of older adults with chronic low back pain (summarized in Table 3). The first was experiencing pain reduction from mindfulness meditation, the second was improvement in attention skills, the third was improved sleep resulting from meditation, the fourth was achieving well-being, the fifth was barriers to meditation, and the sixth was processes of meditation. Because of space considerations and clinical relevance, we focus the results on the first four themes as they reflect health outcomes and provide descriptive examples or quotes to illustrate these themes.

Experiencing pain reduction from mindfulness meditation

Many participants commented on the reduction of pain by indicating the methods and processes used to reduce it, such as distraction from pain, heightened awareness of pain sensation leading to behavior change, better coping with pain, and actual pain reduction using the meditation technique. In the context of distraction, some participants described their increased ability to constructively distract from pain by purposely placing their attention on routine activities, “I practice informal meditation, and try to be more fully aware, during every day activities in the house” (participant 22) and “[I] focus on things to distract from pain” (participant 5). Another specific distraction process involved redirecting the mind’s focus to more general body awareness, “I am able to reduce my back and leg pain by deflecting the pain and by focusing on other parts of my body” (participant 2).

Another means of pain reduction was the development of a heightened awareness of body sensations that led to behavior change that reduced pain. It was generally stated that, “I am learning to appreciate awareness of sensations” (participant 2). The awakened realization of subtle body sensations enabled participants to recognize pain earlier than was typical for them, thus allowing them to intervene before the pain escalated, “Upon first signs of pain, I stop and meditate, helpful at times” (participant 10). One participant’s increased awareness of body sensation led her to realize “minor” pains could be easily cured, “I realized I had a toenail so overgrown it was causing definite sharp pain…I shut off the CD [for the body scan meditation] and trimmed it and started again. It seemed silly not to eliminate such a small source of discomfort” (participant 18). We also found that heightened awareness with some participants stimulated imagery that helped reduce their pain and enhance their mood. This is depicted best by the quote, ”I hear a sound in the distance and felt it was bearing my pain away, replacing it with a joyful “lifting” of my spirits” (participant 18).

Interestingly, the process of learning meditation and becoming more aware of the body also allowed some participants to be more introspective. Some realized that they had adopted maladaptive coping strategies such as repression in order to deal with their pain. We received feedback from a participant who detailed her process stating, “It felt good to be ’directed’ to these quite soluble problems and I realized that in my stoic, actually…rather angry, ’at the end

of my rope' reaction to my seemingly insoluble back pain…I was neglecting my whole body trying as it were to blot out all pain even the minor "itch" I can scratch. I was in a strange way turning myself into a whole 'petrified forest', because one area, my lower back, was in need of relief from the pain." (participant 18). In general, participants stated they were better able to cope with their pain using various methods realized or learned through mindfulness meditation "I still have the same back pain but am coping with it much better" (participant 6). It was reported several times that pain was improved and meditation was frequently used in different situations, "I have used mindfulness in other situations (i.e. stress, improved memory, decision making)" (participant 14).

As participants became more skilled at using the mindfulness meditation technique, some indicated that it directly eliminated their pain. They spoke of relieving pain by concentrating on their breathing, "I have used the breath concentration to successfully relieve pain in a number of situations" (participant 6). Another stated "When I was able to concentrate I had a great experience. The only time I had a sensation is when I was concentrating on my lower back. I felt like something was happening to that section of my body and … the pain would disappear" (participant 9). Most diary entries described a feeling of relaxation and serenity post meditation which caused participants to continue using meditation for this pain-reducing, mood-elevating effect. "I have no pain lying down and I do feel more comfortable with my back when I am finished. I can stand on my feet longer" (participant 11).

Improvement in attention skills resulting from mindfulness meditation

Participants noted improvement in their ability to pay attention. As one participant described, "My concentration and awareness improved so much. My mind does not wander anymore as much as it used to. I am more focused" (participant 12). Additionally, a participant noted their increased attention was also associated with a sense of well-being, "Learning mindfulness meditation helped me to be more relaxed and focused in day to day living" (participant 4).

Improved sleep resulting from meditation

Participants consistently commented on how meditation increased the quality of sleep. Though it was stated that sleep came very easily during meditation, participants also often said that sleep latency (the time from the decision to sleep to the onset of sleep) was reduced and more restful or refreshing. Even if night awakenings occurred some participants were able to "get back to sleep more readily" (participant 6). A woman who had difficulty with insomnia also found a great benefit from meditation as she reported that "sleeplessness was harming my quality of life in every aspect and I am grateful I no longer have the problem. It has made a huge difference in my life" (participant 4).

Achieving well-being

Learning mindfulness meditation resulted in positive affect and experiences of greater mental and physical well being which occurred immediately post meditation, but also remained long-term. Meditation also provided participants with a tool to positively handle stress.

Well-being: Short-term effects

A meditation session frequently had immediate general physical and mental restorative effects on participants. As alluded to in the pain section of the results, participants consistently and repeatedly wrote about feelings of relaxation and serenity in their diaries. Most stated that their experience of being refreshed or regenerated was stimulated by practicing meditation as one participant wrote after completing a session, "feel refreshed and relaxed" (participant 23). Some participants translated the experience of mindfulness meditation using metaphors, "when

I was able to concentrate I felt like the mattress commercial--sleeping on a cloud" (participant 9).

Well-being: Long-term effects

Several entries centered on a theme of stress reduction. It appeared that learning mindfulness meditation helped facilitate the transition from a stressful to a less stressful state for participants. One participant expressed that "mindfulness meditation has a quieting effect on me…it gives me a peaceful feeling while doing it" (participant 2). While, in another entry, it was articulated that meditation was important as a method for coping with everyday stressors and "that the full effectiveness of the [meditation] program is a continuity of practice over a lifetime" (participant 5). The practice of meditation was easily used by participants as a tool to manage difficult aspects of their lives regardless of whether the source of their discomfort was of a physical or mental/emotional nature.

The process of learning mindfulness meditation was described in diary entries as resulting in profound, life-altering changes that created for one participant "a huge change in my personality and outlook" (participant 9) and stated by another as "I'm deeply grateful to have been able to participate- I can truthfully say my quality of life has been stepped up a notch" (participant 14). These observations were representative of its potential to effect comprehensive positive change in these older adults' lives with low back pain.

Discussion

Mindfulness meditation had beneficial effects on pain, attention, sleep, and well-being in older adults who experience chronic low back pain. Various methods of pain reduction were used, including distraction, increased body awareness leading to behavior change, better coping skills, imagery, and direct pain reduction through meditation. Sleep latency was improved as well as quality of sleep. Participants described well-being during and after a meditation session that had immediate effects on mood elevation but also lasting global effects on quality of life.

Main findings in the context of the existing literature

Distraction is a commonly used method of coping with pain, and typically refers to the voluntary or involuntary moving of attention away from pain.[20] However, distraction as described by our participants, involved *purposefully* bringing and maintaining attention to the present moment's activities. Hence, through mindfulness meditation older adults described learning to fully engage in present moment activities like listening to music and exercise. This full engagement increased absorption in another activity and effectively caused distraction from pain. Therefore, mindfulness meditation may have permitted greater attention regulation, so that participants could become aware of, and choose how to direct their attention. It should be noted that these routine activities did not necessarily cause pain reduction prior to learning mindfulness meditation. Thus, participants were equipped with a simple tool for pain reduction that they could apply at any time and in a variety of daily life situations.

Interestingly, the instruction in mindfulness meditation to become more aware of body sensations had a paradoxical effect. Usually, ignoring pain sensations is considered one of the mechanisms people use to cope with pain.[26] However, our participants experienced pain reduction by attending to the experience of their pain. The pain reduction may have occurred through several mechanisms. One possible mechanism was an increased awareness of physical activities or postures that worsened pain. Thus simply "stopping" a given activity at the first hint of pain may have allowed a person to intervene before pain escalated.

Another possible mechanism was personal insight into negative emotional processing that worsened pain. Thus, the awareness of a particular body sensation was also noted to be linked to a negative affective response that resulted in heightened pain. Negative affect such as anxiety and fear is known to increase a person's sensation of pain,[14] and therefore modifying such responses has the potential to reduce the experience of pain. By encouraging awareness of present moment experience, mindfulness meditation taught participants how to become aware of these negative emotional responses to their pain, which in turn may have allowed participants to manage their reactions in a less self-destructive manner.

In Kabat-Zinn's seminal paper about mindfulness meditation and pain[12] he describes the process of pain reduction occurring by "an attitude of detached observation toward a sensation when it becomes prominent in the field of awareness, and to observe with similar detachment the accompanying but independent cognitive processes which lead to evaluation and labeling of the sensation as painful, as hurt." Thus, by "uncoupling" the physical sensation, from the emotional and cognitive experience of pain, the patient is able to reduce pain. We believe our findings are consistent with Kabat-Zinn's proposed mechanism, and expand it, by describing *how* participants uncouple the different components of the complex experience of pain. Thus, participants' descriptions of distraction from pain, understanding maladaptive coping strategies for pain, and heightened awareness of pain sensation leading to behavior change are examples of how pain is uncoupled from emotion, cognition, and sensation.

The direct resolution of pain while meditating is intriguing and may be explained by several potential mechanisms. One was already discussed above-the uncoupling of pain into its different components. This is consistent with Melzack's gate control theory,[19] in that conditioned or emotional responses to pain can be modified through meditation by disengaging habitual reactivity, and therefore a top-down inhibition of pain via the gate control system. Another potential mechanism is the relaxation response as proposed by Herbert Benson. The hypometabolic state characterized by decreased heart rate, respiratory rate, and oxygen consumption,[28,2] may well be associated with decreased muscle tension and release of neurotransmitters that cause immediate pain relief. This has direct relevance to older adults with chronic low back pain, as the majority of older adults have myofascial pain as at least one contributor to their low back pain.[30]

Another possible explanation with support from neuroimaging studies is that mind body therapies may favorably alter pathways that modify the experience of pain. For example, hypnotic suggestions for experiencing either high or low pain unpleasantness produced corresponding changes in activity in the anterior cingulate cortex (ACC), but not the primary somatosensory cortex.[25] Top-down inhibition through voluntary control of the rostral ACC has been suggested by deCharms who used real-time functional magnetic resonance imaging to demonstrate that participants could voluntarily increase or decrease stimulation to the rostral ACC. This in turn was associated with an increase or decrease, respectively, in their rating of a painful thermal stimulus.[7]

One of the themes was improved attention skills resulting from mindfulness meditation. Improved attention skills was also asked of participants at 3-month follow-up and 16/25 (64%) of them responded affirmatively that they could concentrate better after learning mindfulness meditation.[22] This is a particularly interesting finding since slowing cognitive decline is especially relevant to the aging population. Experimental evidence from Jha suggests that mindfulness meditation may improve the conflict monitoring (prioritizes competing tasks) and alerting (maintaining an alert state of awareness) components of attention.[11]

Improved sleep from mindfulness meditation has also been described in a variety of populations.[3,4,15] However, qualitative studies mention sleep only briefly[5], and do not

describe the effects on sleep quality and improved sleep latency with the detail used by the older adults in this study. Sleep promotion was both a negative short term side effect, since it interfered with the ability to stay alert and awake during meditation, and also a long-term benefit, because of its ability to enhance sleep quality and reduce sleep latency outside of the meditation setting.

Mindfulness meditation led to increased well being for participants that was present both during meditation and carried over post meditation. This improved well being was associated with an immediate shift towards a positive affect during a meditation session as revealed by participants' descriptions of being calm and peaceful while meditating. Immediately after meditation, this positive change persisted so much that a participant described feeling like "a new person." Brain neuroplasticity, with a shift towards a more positive affect as a result of mindfulness meditation has support in the neuroscience literature. Davidson found that participants in an eight week Mindfulness Based Stress Reduction program demonstrated on EEG a left shift in their pre-frontal cortex response to a positive and negative emotion provoking writing task.[6] This left shift may be an indicator for increased positive affect. Management of emotion with an overall increase in positive affect is emerging as one of the central mechanisms by which mindfulness meditation may effect change.

Strengths of this study

The first person accounts of the experience of mindfulness meditation in older adults with chronic pain allowed us to describe effects that could not be captured by quantitative techniques. We sampled older adults with persistent pain, who have little written about them regarding mind-body therapies for treating pain.[13,21] Many of the findings lend themselves to both qualitative and quantitative research and can apply to a younger population.

Limitations of this study

Because this is a small sample of predominantly white, older adults, with chronic low back pain, the results may not be generalizable to a wider population. All the participants did not consistently turn in weekly diaries, and this should be more strictly enforced in future studies. The diaries were open-ended and did not direct the participant to comment on any specific topic, so other themes or methods for pain reduction may not have been captured.

Mindfulness meditation has promising potential as a non-pharmacologic method of pain reduction in older populations. This is particularly pertinent to older adults, who frequently are limited in the kinds of pain therapy they can receive due to unwanted side effects. Thus, clinicians have another tool available to them to recommend to patients who suffer with chronic pain. Additionally, the results from this study may have applicability to a younger pain population as well. We were able to identify themes related to pain reduction resulting from mindfulness meditation that suggest several avenues for future quantitative research including improved attention skills, emotional processing of pain, direct relief of pain during meditation, and enhanced sleep.

Acknowledgments

Supported by AG23641 K07 of Dr. Stephanie Studenski from the National Institutes of Health. During the time of this work Dr. Morone and Dr. Tindle were supported by the NIH Roadmap Multidisciplinary Clinical Research Career Development Award Grant (1KL2RR024154-01) from the National Center for Research Resources (NCRR), a component of the National Institutes of Health (NIH), and NIH Roadmap for Medical Research, and its contents are solely the responsibility of the authors and do not necessarily represent the official view of NCRR or NIH.

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Table 1

Characteristics of Study Participants

Characteristic	***n*** **= 27**
Age, mean ± SD	74.3 ± 5.3
Gender, n	
Male	13
Female	14
Ethnicity, n	
White	24
African American	1
Asian	2
Education, n	
High School Graduate	5
Technical School	4
Some College	4
College	8
Master's or greater	6
Religion, n	
Catholic	15
Jewish	9
Protestant	1
Other	2
Income, n[a]	
$10,000–$29,999	10
$30,000–$59,999	9
$60,000 or greater	3
Marital status, n	
Single	3
Married	15
Separated/divorced	3
Widowed	6
Low back pain cause, n	
Osteoarthritis	23
Spinal stenosis	6
Fibromyalgia	1
Not sure	4
Medications, n	
Opioids	5
Other analgesics	21
None	3

[a]Not all participants chose to disclose their income

Table 2

Final Coding Scheme

Effect pain
Effect sleep
Effect cognition
Effect well-being: physical
Effect well-being: mental
Global effects
Stress reduction

Table 3

Themes and sample quotes from diary entries of older adults with chronic low back pain

Themes	Example
Experiencing pain reduction from mindfulness meditation	
Distraction from pain	"I have known for years that distraction made me forget my pain to a great extent…with mindfulness I can concentrate on prayer, music, exercise, and probably many other things that distract me from the pain. This is something I did not realize on my own."
Heightened awareness of pain sensation leading to behavior change	"I learned to stop when the pain starts up."
Better coping with pain	"The pain is still with me; however, it just doesn't feel as intense as it was. I feel results of the study and the practice is having a positive effect."
Direct elimination of pain	"By using meditation I have been able to reduce the feeling of pain."
Improvement in attention skills resulting frxom mindfulness meditation	
Improved attention	"Benefits of clearer thinking/focusing continue."
Improved sleep resulting from mindfulness meditation	
Decreased sleep latency	"Felt very well relaxed for sleep, which came quickly."
Increased sleep quality	"Slept great after meditation."
Getting back to sleep more readily	"It has helped me to get back to sleep more readily when I awake at night."
Achieving well-being	
Short-term effects	"When I finished the meditation I felt like a new person."
Long-term effects	"This program has really changed my life. Because of the meditation, I not only have less back pain, I am more aware of my life and am learning to live it to the fullest."
Barriers to meditation	
Becoming sleepy	"I always fall asleep after 15–30 minutes [of meditation]."
Finding time	"It seems like there is never a good time to meditate."
Processes of Meditation	
Becoming familiar with meditation	"It is easier and easier to jump right into the meditation mode."
Location of focus	"Concentrating on deep breathing."
Attending	"I am learning to appreciate awareness of sensations."