



A Mixed-Methods Pilot Study of the Acceptability and Effectiveness of a Brief Meditation and Mindfulness Intervention for People with Diabetes and Coronary Heart Disease

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Mindfulness-based interventions can successfully target negative perseverative cognitions such as worry and thought suppression, but their acceptability and effectiveness in people with long-term conditions is uncertain. We therefore pilot tested a six-week meditation and mindfulness intervention in people ($n = 40$) with diabetes mellitus and coronary heart disease. We used a sequential mixed-methods approach that measured change in worry and thought suppression and qualitatively explored acceptability, feasibility, and user experience with a focus group ($n = 11$) and in-depth interviews ($n = 16$). The intervention was highly acceptable, with 90% completing ≥ 5 sessions. Meditation and mindfulness skills led to improved sleep, greater relaxation, and more-accepting approaches to illness and illness experience. At the end of the six-week meditation course, worry, and thought suppression were significantly reduced. Positive impacts of mindfulness-based interventions on psychological health may relate to acquisition and development of meta-cognitive skills but this needs experimental confirmation.

Keywords: long-term conditions, meditation, mindfulness, thought suppression, worry

INTRODUCTION

Over the past decade, there has been increasing interest in applied psychology in the utility and effectiveness of interventions that promote mindfulness.¹ Salient definitions in psychotherapeutic traditions conceptualize mindfulness as a

heightened sense of present centred self-awareness that fosters non-judgemental observations of emotions, bodily states and other sensations in the attentional field, leading to mental well-being.² Bishop et al's³ two component model of mindfulness involves: (1) the self-regulation of attention to focus on immediate experience, allowing mental events to be recognized in the present moment; and (2) an orientation of experience towards the present moment, leading to openness, curiosity, and acceptance.

Meditation and mindfulness have been popularized by the emergence of group-based meditation treatment programs such as mindfulness-based stress reduction (MBSR). First used to manage chronic pain,⁴ manualized and group based

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MBSR has since proven efficacious in reducing symptoms of anxiety and depression and reducing psychological distress in both clinical and non-clinical populations with and without chronic physical illness.^{1,5} However evidence about the magnitude of these effect is equivocal. Based on only higher quality randomized controlled trials Bohlmeijer et al⁶ found that MBSR was associated with a small effect for depression (standardized mean difference 0.26; 5 studies, $I^2 = 0\%$), and a small effect for anxiety (standardized mean difference 0.24, 2 studies, $I^2 = 50.5\%$) in people with physical long-term conditions (LTCs). By contrast Hoffman et al evaluated a much larger data set comprising 39 studies and found that mindfulness based approaches, including MBSR, were associated with larger effects for anxiety (standardized mean difference 0.63) and depression (standardized mean difference 0.53).⁷ However these effect sizes should be interpreted with caution as they are derived from meta-analyses that included non-randomized trials known to be affected by selection bias, potentially inflating overall effect sizes.⁸

Additionally, much of the published systematic review evidence about the effectiveness of mindfulness based interventions tend to only focus on effects on anxiety and depression and overlook the potential impact on negative psychological processes known to be associated with the onset of depression.

Perseverative negative cognitive processes such as rumination and thought suppression are associated with depression in people with LTCs.⁹ People with LTCs are two to three times more likely to experience depression which is associated with excess morbidity and disability.¹⁰ Even low or sub-threshold symptoms of depression predict worse medical outcomes in people with LTCs.¹¹ Additionally, perseverative negative cognitive processes also predict physiological activation that occurs in the presence of stress, such as raised blood pressure, known to be a risk factor for future cardiovascular morbidity and mortality.¹²

Purported mechanisms that might explain positive impacts of mindfulness-based interventions on health and well-being allude to mindfulness as a metacognitive process, owing to its potential to enhance control of cognitive processes through self-regulation of attention, and to elicit non-elaborative response styles to thoughts, feelings, and sensations in the stream of consciousness.¹³ Such metacognitive skills might provoke disengagement from negative thinking (such as worry and rumination), and unhealthy behaviors (such as suppression and avoidance of thoughts) known to predict the onset and maintenance of anxiety and mood disorders.^{13,14} It is also possible that mindfulness might provoke a decoupling of the association between negative thoughts and low mood—mindfulness can stop negative thoughts impacting on mood.¹⁵

Mindfulness interventions can reduce rumination but evidence is largely drawn from studies of non-clinical, self-selected samples.^{16,17} It is therefore still relatively unknown whether meditation and mindfulness interventions can reduce

worry and negative thinking and behavior, and confer physical and psychological benefits in people with LTCs. Generic mindfulness interventions proliferate but to avoid inappropriate use there is a need to adequately design and test programs that meet the specific needs of clinical populations.¹⁸ Acceptability and feasibility of mindfulness interventions that target negative perseverative processes for people with LTCs is not well known. Drop out from mindfulness programs can be high,¹⁹ and it is not certain how and when patients might use and assimilate meditation and mindfulness techniques with other (self) care approaches.

We have therefore undertaken an exploratory study using mixed methods to investigate whether a brief, manualized meditation and mindfulness intervention can reduce worry and thought suppression and improve subjective health and well-being in people with two exemplar LTCs: diabetes mellitus and/or coronary heart disease (CHD). In keeping with best practice to develop and evaluate complex interventions,²⁰ this pilot study also allows assessment of acceptability and feasibility of delivering this intervention, including assessments of recruitment and retention in the study.

METHODS

Design and Objectives

This study used a sequential mixed methods design to answer a series of exploratory questions about the acceptability and effectiveness of a meditation and mindfulness intervention for people with diabetes and/or CHD. We employed quantitative and multiple qualitative methods to specifically answer the following questions:

1. Is a six-week group based meditation and mindfulness program an acceptable intervention for people with diabetes or heart disease?
2. Does a six-week meditation and mindfulness program reduce worry and thought suppression in people with diabetes and/or CHD?
3. Was meditation and mindfulness associated with improvements in subjective health and well-being?
4. Can meditation and mindfulness feasibly be incorporated into the self-management practices of people with diabetes and/or CHD?

Recruitment and Participants

Between September 2010 and February 2011 we were invited to attend day and evening meetings at seven Greater Manchester, UK voluntary and charitably funded self-help groups for people with diabetes or heart disease. At these meetings, researchers, with the meditation teacher, gave a short presentation about the purpose of the study and answered any questions. Members of the self-help groups were invited to contact a member of the research team if they were

interested in taking part in the meditation classes. Inclusion criteria were: aged 18 years or over and have a diagnosis of diabetes and/or CHD. Exclusion criteria were: self-reported or carer identified cognitive impairment, and inability to travel to participating meditation venues.

Meditation and Mindfulness Program

The program consisted of six weekly sessions, supported by a patient manual (see supplemental appendix A) developed in collaboration with an experienced meditation teacher who has 15 years experience of running meditation programs for both clinical and non-clinical groups. The first session lasted two and a half hours and the next five sessions lasted two hours. Participants were given an option of attending a morning or an afternoon session. To maximize opportunities for group members to participate the mediation program was run twice, once from June 2011 and again, from September 2011. The classes were run by an experienced meditation teacher from the Meditation Foundation, which is a UK Department of Health supported Social Enterprise offering simple, secular meditation and mindfulness courses.

In this study, a limited range of simple meditation techniques were taught, some of which were based on 'insight' meditation, which is a foundation for mindfulness. All of the techniques taught cultivated moment-by-moment mindful awareness, which can facilitate non-reactive awareness about how thoughts are linked to emotions and behavior. Mindfulness can be conceptualized here as a mental state characterized by an enhanced state of non-judgemental awareness of the present moment and an ability to de-center from thoughts and emotions by embracing curiosity, openness, and acceptance.²¹

The meditation and mindfulness program incorporated the following meditation techniques: sitting meditation using the breath as the point of focus, where participants developed an awareness of how to concentrate on natural breathing patterns, creating an "anchor" to the present moment; moving (walking) meditation to develop awareness of movement; body awareness focus, whereby attention is systematically focused on parts of the body to develop awareness of sensations. Participants were encouraged to bring concentration, attention and awareness to various points of focus and subsequently, to internal experiences such as thoughts and emotions. Participants were also given a CD of guided meditation exercises and a manual which included instructions for daily home practice.

The content of the program offered in this study is a variant of MBSR but was adapted to meet the specific needs of people with diabetes mellitus and/or CHD. Unlike the tightly circumscribed MBSR program devised by Kabat-Zinn,⁴ the six-week course offered in this study offered greater flexibility of learning to allow participants to find and practice techniques that suited their physical abilities, thus promoting integration of ongoing practice into their routine life.

Sustaining self-management behaviors for people with LTCs is a challenge and the promotion of home practice using the manual and audio CD was a core component of the mediation and mindfulness program offered to participants in this study.

Data Collection and Outcomes

After the first round of meditation classes we conducted a focus group (see supplemental Appendix B for topic guide) with a sample of purposively selected participants to elicit views about the acceptability and benefits of using meditation and mindfulness. A purposive sampling method²² was used to ensure diversity in age, sex, and type of LTC, in order to capture the widest variation of existing views to answer the research questions. This approach provided a forum in which participants were encouraged to be responsive to each other and develop their own analysis of their experiences, and to permit the expression of criticism.²³ The sample included a cross-section of participants and was co-facilitated by two of the study authors (CK and JK).

All participants who completed the second round of meditation and mindfulness classes were invited to participate in an in-depth semi-structured interview. The topic guide (see supplemental Appendix C), initially modeled on the one used in the focus group, was iteratively modified to explore patients' perceptions about how meditation and mindfulness benefited their health and well-being in the context of self-management of their LTC. The interviewer (CK) combined open ended questions to elicit free responses, combined with more probing statements around the topics under investigation. The interviews took place either at the participant's home or the researcher's place of work.

Participants also completed, before and after the six-week round of the meditation and mindfulness programs, two self-report questionnaires: the *Penn State Worry Questionnaire* (PSWQ)²⁴ and the *White Bear Suppression Inventory* (WBSI).²⁵ The PSWQ is a 16-item questionnaire designed to assess the pathological worry characteristic of generalized anxiety disorder. The scores range from 16 to 80, with higher scores indicative of greater levels of pathological worry; the weekly scale has been shown to be highly reliable and valid.²⁶

The WBSI is a 15-item questionnaire designed to measure thought suppression and has proven discriminant and construct validity. The WBSI has good internal consistency (Cronbach's alpha, $\alpha = 0.89$) and satisfactory test-retest stability ($\alpha = 0.80$), and has acceptable convergent and predictive validity – individuals who score highly on the WBSI exhibit higher frequencies of unwanted intrusive thoughts than individuals with low WBSI scores.²⁷ It is scored using a five-point Likert scale. The total score can range from 15 to 75. Higher scores on the WBSI indicate greater tendencies to suppress thoughts.

Participants also completed, at baseline, a self-reported comorbidity burden scale.²⁸ A mean disease burden score was

calculated, with higher scores indicative of greater impact on activities of daily living.

Quantitative Data Analysis

A paired samples *t*-test was conducted to evaluate the impact of the intervention on participants' scores on the PSWQ and WBSI. A standardized mean difference was calculated for the PSWQ and WBSI by subtracting the post-intervention mean from the pre-intervention mean, divided by the pooled standard deviation. In keeping with established cut-offs of effect in behavioral medicine, effect sizes of 0.56 to 1.2 are large; effect sizes of 0.33 to 0.55 are moderate; and effect sizes ≤ 0.32 are small.²⁹

Qualitative Data Analysis

All interviews and the focus group were digitally audio-recorded and transcribed verbatim, and analyzed using Framework.³⁰ Framework is a systematic approach that remains grounded in the data, making use of emergent as well as a priori analytic categories. After familiarization of the data through repeated reading of the transcripts a thematic framework was developed using a priori questions drawn from the aims and objectives of the study. Two of the authors (CK and KR) independently analyzed the transcripts and a random sample was analyzed by a third author (PC). Emergent themes were discussed and agreed upon by the authors (CK, KR, PC) drawn from different disciplinary backgrounds to increase trustworthiness of the analytic process.³¹ Independent of the quantitative results, the focus group, and interview data were analyzed simultaneously to allow for within method triangulation and convergence of data.³²

Ethical Approval

The study was given ethical approval (reference number 11/NW/0091) by a UK Research Ethics Service Committee.

RESULTS

Characteristics of Participants

We invited 66 patients from seven self-help groups to take part in the study. Of these, 47 people returned an expression of interest form and 40 people (61%) participated in the meditation classes (20 in phase 1, and 20 in phase 2). Baseline demographic and clinical characteristics are displayed in Table 1. Patients were aged 54–85 (median 70 years) and reported a range of conditions and symptoms in addition to the inclusion criteria (i.e. diabetes mellitus and CHD); the mean number of self-reported conditions and symptoms was 7 (range 1–15). The most commonly reported conditions were heart disease ($n = 22$), diabetes mellitus ($n = 20$), gastrointestinal problems ($n = 15$), and osteoarthritis ($n = 13$).

TABLE 1
Baseline Demographic and Clinical Characteristics of Participants ($N = 40$)

Characteristic	Number (%)
Age—Mean (<i>SD</i>) Range	69.5 (8.21) 54–85
Gender	
Male	19 (47.5)
Female	21 (52.5)
Marital status	
Married	19 (47.5)
Widowed/widower	8 (20)
Divorced	6 (15)
Single	5 (12.5)
Civil partnership	1 (2.5)
Not specified	1 (2.5)
Ethnicity	
White/Caucasian	34 (85)
Other	5 (12.5)
Not specified	1 (2.5)
Self-reported diagnosis	
Diabetes	20 (50)
Heart condition	22 (55)
Both	8 (20)
Not specified	5 (12.5)
Self-reported co morbidities—Mean (<i>SD</i>) Range*	6.75 (3.63) 1–15
Mean disease burden (<i>SD</i>)	14.20 (10.22)

*From a list of 21 conditions, plus (up to 4) conditions added by the respondent. Range 1–15.

Attendance was high: 90% attended ≥ 5 sessions; only one participant dropped out.

Before-and-After Quantitative Results: Worry and Thought Suppression

Thirty eight people completed two self-report scales (PSWQ and WBSI) before and after completing the six week meditation course. There was a significant difference in the scores for the PSWQ pre- ($M = 48.55$, $SD = 14.14$) and post-intervention ($M = 42.84$, $SD = 12.05$); $t(37) = 4.39$, $p < .001$. There was also a significant difference in the scores for the WBSI pre- ($M = 49.53$, $SD = 12.44$) and post-intervention ($M = 46.34$, $SD = 11.47$); $t(37) = 2.55$, $p = .015$. Effect sizes for worry and thought suppression were 0.42 (95% CI -0.02 to 0.89) and 0.26 (95% CI -0.19 to 0.72) respectively (Table 2).

Qualitative Findings

A focus group with 11 participants and 16 in-depth semi-structured interviews were conducted to explore patients' perceptions about acceptability and feasibility and the benefits of meditation and mindfulness in the context of their membership of self-help groups and their experience of living with and (self) managing a LTC. Participant demographics are presented in Table 3.

TABLE 2
Mean, Median and Confidence Intervals for WBSI and PSWQ Scores Before and After Intervention

	WBSI Before	WBSI After	PSWQ Before	PSWQ After
Mean	49.53	46.34	48.55	42.84
Lower bound 95% CI for mean	45.44	42.57	43.90	38.88
Upper bound 95% CI for mean	53.61	50.11	53.20	46.80
Median	49	45	48	41
SD	12.44	11.47	14.14	12.05
Min	26	24	23	16
Max	72	67	74	68
Interquartile range	18.75	19.25	19.25	15.25

The mean length of the interviews was 44 minutes (range 28–63 min). Here, we present illustrative extracts of the data categorized into four themes, and identify participants by gender, condition, and whether they took part in the focus group or interviews.

Pathways to Mindfulness: From Self-help Groups to Meditation

In reflecting on their reasons for signing up to the meditation classes many participants acknowledged that their

membership of self-help groups had socialized them to engage in activities that incorporated both physical and psychosocial components aimed at improving their health and well-being. In this sense, opportunities to participate in meditation neatly aligned with the ethos and purpose of the support groups and mapped onto existing perceptions about using physical and psychosocial approaches to self-care. Key among the aims of the self-help groups was to provide members with advice from clinicians about how to maintain a balanced and healthy lifestyle:

Walking, dancing, cut down on your alcohol, you know, don't smoke, which are things I don't do, anyway, but, nevertheless, they're all the things that they talk about and, sort of, try and keep yourself on an even keel. (p. 1008, male, HD, focus group)

Members of the self-help groups also benefited from opportunities to hone peer learning skills, through sharing illness experiences in ways that demystified their condition and alleviated anxiety and fear associated with living with diabetes or heart disease:

A very significant thing is the socialisation, the fact that you can talk about the conditions and then you can observe other

TABLE 3
Participant Demographics for Interviews (I) and Focus Group (FG)

ID Number	I/FG	Diagnosis	Age	Sex	Ethnic Group ¹
P1002	FG	Diabetes	69	Male	Asian British
P1007	FG	Diabetes	66	Male	Asian or Asian British-Bangladeshi
P1009	FG	Heart Condition	56	Female	White British
P1012	FG	Heart Condition	77	Female	White British
P1013	FG	Diabetes	71	Male	White British
P1016	FG	Heart Condition	75	Female	White British
P1017	FG	Heart Condition	78	Female	Black or Black British-African
P1019	FG	Diabetes/Heart Condition	72	Female	White British
P1021	FG	Heart Condition	56	Male	not specified
P1022	FG	Heart Condition	67	Female	White British
P1023	FG	Diabetes	63	Female	White British
P1008	I	Heart Condition	67	Male	White British
P2001	I	Diabetes	58	Female	White British
P2002	I	Heart Condition	66	Female	White British
P2003	I	Heart Condition	70	Male	White British
P2004	I	Diabetes	64	Female	White British
P2005	I	Heart Condition	79	Male	White British
P2006	I	Diabetes	55	Female	White British
P2020	I	Heart Condition	54	Female	White British
P2021	I	Diabetes	71	Female	White British
P2022	I	Diabetes/Heart Condition	69	Female	White British
P2023	I	Diabetes	71	Female	White British
P2024	I	Heart Condition	77	Male	White British
P2030	I	Heart Condition	85	Male	Asian or Asian British-Bangladeshi
P2031	I	Heart Condition	81	Female	White British
P2037	I	Diabetes	72	Male	White British
P2039	I	Diabetes	60	Male	White British

Note. Categorized according to 2011 Census: Key Statistics for England and Wales, March 2011 (Office for National Statistics, 2012).

¹Categorized according to "2011 Census: Key Statistics for England and Wales, March 2011," Office for National Statistics, 2012, London: Crown.

people with similar conditions, and it gives you an idea to get things in perspective. (p. 2005, male, HD, interviews)

Universally, throughout both the interviews and focus group, participants highlighted how self-help groups either ran or facilitated access to tailored exercise classes. Exercise underscored approaches for keeping physically fit:

The aerobic exercises are a quite excellent follow-on on the rehabilitation procedures at the hospital, which finished after six to eight weeks. So this picks it up, I decided to go on doing that. And that kept me in reasonable fettle. (p. 2005, male, HD, interviews)

And for improving well-being:

I absolutely love the exercise. The exercise is great because if you go in and you're feeling fed up you do the exercise, it sort of gives you that lift. (p. 1021, female, HD, focus group)

In this context, meditation classes were perceived as a way to build on existing group based and inclusive activities to promote physical health and well-being. In particular, some participants chose to join the meditation classes because meditation was promoted as a secular pursuit linked to maintenance of health:

The fact that it [the meditation program] was NHS supported was one of the things that made me definitely think "oh it's not a mumbo-jumbo attached to some obscure religion thing," it's actually something that somewhere along the line people think has a health benefit, and it was that also that encouraged me I think to join. (p. 1009, female, HD, focus group)

In joining the meditation classes, participants anticipated that meditation would yield both physical and psychological benefits:

I think it will remove anxiety, and removing anxiety would lower the blood pressure certainly, and lowering the blood pressure will certainly benefit other conditions. (p. 2030, male, HD, interviews)

In people with multiple conditions, minimally disruptive medicine is key to reducing treatment burden on patients.³³ Participants with complex health needs anticipated that meditation would be a simple self-care strategy to potentially reduce medication burden:

I would like to try anything to take me off the tablets, because you take one tablet it gives you another side effect. . . especially with the blood pressure that if I relax and it can help me to bring down my blood pressure maybe. My doctor always said well I'll reduce the strength of the tablets I'm giving you because your blood pressure's getting under

control, and that's what interested me. (p. 1013, female, DM, focus group)

Transformative Capacities of Meditation: Learning to be Mindful

The six-week meditation program included a stepped and practical approach to building skills and confidence in developing mindful states which encouraged participants to engage in non-judgmental self-observation, leading to greater understanding and awareness about their thoughts, actions, and emotions. In achieving this aim, participants spoke about how meditation created mental spaces for themselves—they felt less rushed and less distracted and worried about significant others, allowing themselves to be more self-oriented and focused:

You can withdraw from the hurly burly and be in your own little world, you know, and just think about you, as an individual, rather than, you know, what's our Florrie doing . . . I've been able to get on with things better than I did, yeah, I can, like, the thought pattern, you know, of having to do something, a task, whatever it is, yeah. I find I can think about it more, before I do it, you know, and set out a plan of action, whereas, before, I just, probably, rush into it and not think too much. (p. 1008, male, HD, focus group)

This ability to develop a more mindful and accepting mode of thinking was reflected in participants' accounts about how meditation allowed them to focus on "the moment" and to worry less about the past or future:

Forget about the past, that's gone. The future you haven't got that much control over. You have some control over it, but you haven't got that much control, especially when you get older, so concentrate on here and now and the present. I think that's been brought home to me a lot. (p. 1023, male, DM, focus group)

Reinforcing the quantitative findings, meditation was also linked with a new found ability to deal with negative thinking styles by switching to an accepting and non-ruminative mode of mind:

I do tend to feel obliged by what other people say . . . and now I just, sort of, take a deep breath and go, it doesn't matter. . . . And, this has, sort of, made me reconsider. . . . I tend to be able to think, it doesn't matter what other people say or what other people think, am I happy with what I've done? Yes, fair enough. (p. 2006, female, DM, interviews)

Significantly, achieving these key learning outcomes was not associated exclusively with a physical or a psychological act. Instead meditation enrolled both physical awareness practices, such as using the body or movement (walking) as the point of focus and more cognitive approaches such as breath

awareness and mindfulness meditation techniques to serve as a conduit between participants' minds and bodies:

I'm much better now, because I can sort of think, stop doing that, calm, take two deep breaths and think about something completely different, you know, think about a mountain, or whatever. (p. 2006, female, interviews)

Bridging Mind and Body: Meditation and Self-Managing LTCs

Consistent with the hypothesis that meditation might accrue physical health benefits some participants associated recent and often quite remarkable improvements in their diabetes or cardiovascular health with their completion of the meditation course:

Well I've done everything the same for basically ten years: cycling, gym, swimming, shooting. Exactly the same. And since I did the course at the beginning, six weeks, after two and a half weeks my blood sugar was between, before the course, seven and ten; and after I'd done this course and meditated it went down and it was like five, six, which I've never been that. It's always been high, and I thought well, yes, it's something to do with that. And now I'm like four, seven. (p. 1002, male, DM, focus group)

Others, while not discounting the purported health benefits of meditation, were more uncertain about how meditation might bring about physiological changes such as reduced glycated hemoglobin (HbA1c):

I'm not sure about the diabetes side of it, to be honest. I'll have to think about that one because apart from . . . I don't know if it affects your actual blood sugar as such because I've not seen it long enough. (p. 2001, female, DM, interviews)

Uncertainty about causal mechanisms led some interviewees to suggest that the positive effects of meditation on diabetes and cardiovascular health were possibly mediated by improved sleep and relaxation:

I might not be in control. And I suppose that is one of the problems with diabetes, you could easily be out of control, and that in itself is a bit of a panic situation isn't it? . . . And the fact that you think about it, and if it clarifies your thought better, then it [meditation] must be good for you . . . I've not had any dramatic results, but I can see that it's probably, indirectly, done me some good. . . It helps me to relax more, and that's a physical benefit isn't it? (p. 2023, female, DM, interviews)

Alternatively, in accounting for the positive effects of meditation participants also adopted a more psychological narrative, citing that adopting a more balanced or accepting attitude had helped them cope and adjust to the uncertainty associated with living with a long-term illness:

Chronic conditions always leave at the back of your mind a level of anxiety, you're always concerned in case you've not taken your medication or the medication's not been enough, or your diet's got out of kilter, you're going to go hyperglycaemic, or you've not taken your statins. There's always this level of: "Am I dealing with it correctly?" . . . after a little while you can become quite dismissive, a bit blasé. I think the meditation allows you to take a more balanced view of it. (p. 2005, male, HD, interviews)

Meditation was also sometimes used to either directly combat acute exacerbations or used in combination with conventional medical management of illness, suggesting that some participants had begun to integrate meditation into their routine self-care practices:

It relieved the angina without me using my (glyceryl trinitrate) spray. I do it [meditation] upstairs and I was upstairs when it started [angina] and I thought I'll go and sit in my room with the tape on and I'll do my exercises and did and when I got up it had gone. (p. 2020, female, HD, interviews)

Timing and Making Time for Being Mindful

It has long been established that receiving a diagnosis of diabetes can cause considerable distress, in adults as well as younger people.^{34,35} Similarly, there is strong evidence that acute events such as cardiac surgery are associated with shock and emotional trauma, and in some cases, posttraumatic stress disorder.^{36,37} Shock, uncertainty, fear of unexplained physical symptoms, and social isolation were regularly cited by participants who had struggled with the onset of an illness or had undergone cardiac surgery.

The high prevalence of acute emotional trauma among respondents in this study triggered calls for meditation to be part of earlier, non-medical interventions to support people to manage the physical and psychological consequences of their illness:

I wished I'd have done this two years ago when I first came out of [the] hospital . . . It's a frightening experience for people. (p. 2002, female, HD, interviews)

I just think when you're ill you're very vulnerable and when you're diagnosed with something you think it's the end of the world. So I really think while you're on the pills, they tell you what pills to take and what injections to have and also they should bring the meditation in . . . You should be given these options right away I think, because when you're vulnerable you are looking for . . . something to make you better quicker, and I think if you're given these options a lot of people will take them on board. (p. 1002, male, DM, focus group)

Discussions about timing also blended with discussions about making time for meditation. Questions about time were key to understanding whether a manualized short meditation course could be feasibly used by people with LTCs. Positive

responses highlighted the fact that people with LTCs are accustomed to managing their illness with regularity. In this sense, meditation was experienced as another element of self-care that could be routinely assimilated into daily care cycles:

I think it's more than feasible; most people who've got a chronic condition are habituated to managing their time, you have to be able to give your medication at the right time, make sure it's the right amount for the right period of time, etcetera. So the use of time is part and parcel of it I think that 20 minutes, 30 minutes, 35 minutes, which will give you this sort of ease of mind, this clarity of mind, is a very feasible adjunct to any pattern of treatment. (p. 2005, male, HD, interviews)

Furthermore, the course was designed to be sufficiently flexible to allow people to practice meditation and mindfulness at anytime and anywhere, with minimal input and guidance from either a teacher or an audio guide:

I can go anywhere with that and if I find a quiet time, I can do it then, but, also, now, I find that I can go through meditation, quite a lot of it, now, without listening, you know, I can just do it on my own. (p. 1008, male, HD, focus group)

However, echoing previous themes about the benefits of peer learning, participants also signalled that meditation and mindfulness programs were possibly most effectively practiced in groups:

I think to be part of a group is excellent because it's always good to listen to other peoples' thoughts . . . 'cause sometimes you're a bit surprised and, you know, they interpret things differently from you. And that's another thing, isn't it? (p. 2021, female, DM, interviews)

Additionally, despite the acknowledged flexibility of the program, some participants twinned the benefits of group meditation with the need for expert instruction from a teacher:

It's not something I think you can do on your own. I know people who have, sort of, read the books and seen . . . but, it's nowhere near as informative as having someone tell you. (p. 2006, female, DM, interviews)

DISCUSSION

Summary

This exploratory study found that a six-week, manualized group meditation and mindfulness program that taught meditation and mindfulness skills was an acceptable health and well-being intervention for people with LTCs. In addition, after the intervention, participants reported significant reductions in worry and thought suppression. Qualitative data

also highlighted that participants perceived that meditation represented an opportunity to engage in an integrated activity that bridged mind and body, citing relaxation, improved sleep and physical health, and the acquisition of more mindful modes of thinking, such as acceptance and acknowledgment, as key outcomes of the program. Furthermore, participants reported that meditation and the application of mindfulness can feasibly be incorporated into daily self-care routines and potentially reduce reliance on medical management of illness.

Strengths and Limitations of the Study

To our knowledge, this is the first study to demonstrate that a meditation and mindfulness program, which teaches meditation techniques and mindfulness skills, can potentially reduce worry and thought suppression in people with LTCs. The high retention rates, which are higher than those in previous meditation and mindfulness studies,^{38–40} suggest that the adapted MBSR format used in this study did not reduce acceptability normally associated with conventional eight-week MBSR programs. Furthermore, by using mixed methods we were also able to qualitatively explore hypotheses about the benefits and mode of action of meditation.

This was a non-experimental pilot study without a control group, primarily assessing issues around acceptability and feasibility of delivering a mindfulness intervention for people with LTCs. Therefore the study is not sufficiently powered to detect significant differences in the quantitative measures used. Conclusions about the physical and psychological benefits of meditation reported in this study, including reductions in worry and thought suppression, must be made with caution, as they cannot be directly attributed to the intervention. In addition, we were not able to assess the long-term impact of meditation and mindfulness practices. Training in mindfulness might bring about longer-term perceptual change up to 12 months after brief interventions,⁴¹ and this change could be lasting.⁴² Mindfulness is more akin to a state than a trait, but we cannot tell from this study whether it is only evoked during meditation, or if it can be evoked outside of meditation practice, or whether its effects are enduring. Relatedly, because this study recruited a self-selected sample drawn from self-help groups, participants may have been especially motivated to take part in group-based interventions and prone to social desirability bias in response to questions about the acceptability and benefits of meditation. However, we did recruit from a wide range of charitable- and voluntary-sector self-help groups across a wide geographical area to maximize the representativeness of the sample, and sampling from self-help groups offered greater opportunities to capture suitable numbers of participants to undertake this feasibility study. In this sense, as is typical of feasibility studies, internal validity was prioritized at the expense of external validity, and the future challenge will be to demonstrate whether this adapted MBSR program

can be delivered successfully to wider groups of patients with other LTCs. Additionally, there was also separation within the study team between data collection and delivery of the intervention, reducing risk of assessment bias.

Future studies may consider using measures of teacher competency⁴³ and adherence to the intervention protocol⁴⁴ along with measures of mindfulness, to disentangle therapist effects from intervention-content effects. Moreover, as this study primarily aimed to assess acceptability and feasibility and measure effects on worry and thought suppression, we did not include symptom measures (related to disease-specific quality of life). To more accurately gauge the effects of meditation and mindfulness on physical health, future studies could therefore consider the inclusion of measures of physical functioning. Importantly, it is recommended that measures of both generic and disease-specific quality of life are used to facilitate comparisons in health status across mixed populations, thereby enhancing the external validity of study results and affording opportunities to undertake cost-effectiveness analyses. In addition, although the WBSI is a reliable self-report measure, there is little reliable data about its sensitivity to change, and future studies may consider the use of other measures of thought suppression where this data is available.⁴⁵ Authors should also aim to report the reliabilities of measures included as outcomes.

While we measured the effects of meditation on worry and thought suppression we did not measure depression, and were therefore not able to test whether reductions in negative perseverative cognitive processes improve mood in people with LTCs. Future studies should therefore aim to assess whether the same effects on worry and thought suppression found in our study are evident in patients with LTCs and depression. However, one of the key aims of this study was to pilot test whether a bespoke meditation and mindfulness program improved subjective health and well-being in a general population with diabetes mellitus and/or heart disease. This aim is in keeping with the thrust of positive psychology, which places an emphasis on the use of mindfulness interventions to generate and maintain health and well-being rather than to treat mental illness *per se*.⁴⁶

Understanding Acceptability, Feasibility, and Potential Modes of Action of Mindfulness

The qualitative data points to a range of social, pedagogical, and psychological factors that might account for the acceptability, feasibility and positive impact of this six-week meditation and mindfulness program. Acceptability can partly be explained by the fact that the meditation and mindfulness teaching sessions took place in groups and were delivered by an experienced teacher. The group process has been regarded as an important feature that supports and motivates participants to engage in activities that promote mindfulness,^{47–49} and this was found to be true in this study as well. However, whereas Malpass et al⁵⁰ have emphasised that the

group process is heavily implicated in the putative therapeutic process associated with mindfulness, for example, by reducing stigma associated with illness, we found that the group format was more instrumental in breaking down stigma and uncertainty associated with novel and unknown psychological approaches such as mindfulness. In particular we found that participants joined and continued with the meditation and mindfulness program because it appealed to their prior experiences and understanding of secular group-based peer learning—participants were more willing to engage in meditation together rather than as individuals. In addition, the presence of an expert teacher and the availability of a training manual are among key factors that support implementation and fidelity of complex health interventions.⁵¹ Also, in this study we also noted that the role of the expert teacher was instrumental in building confidence and competence in meditative practices, both during the classes and, for some participants, at home too.

While we cannot rule out that non-specific group and teacher effects led to reductions in worry and thought suppression and improvements in subjective health and well-being, the qualitative data suggests that other physiological or more plausible psychological mechanisms underpinned the positive effects of meditation. Evidence of direct effects of mindfulness meditation on mental and physical health is still scarce.⁵² There is, however, abundant data about the potentially mediating role relaxation plays in producing positive effects of meditation on stress associated with LTCs.¹ Indeed, in this study we explored participants' claims that greater relaxation following meditation led to improvements in physical health, especially improved sleep and lowered blood pressure. We can be certain that some participants did feel more relaxed after meditation but remain uncertain about whether this led to improved physical health. Relaxation effects are not unique to meditation. Nor is relaxation the goal of meditation. Instead, meditation that teaches mindfulness seeks to promote non-elaborative processing and regulation of attention of moment-to-moment experiences while cultivating an attitude of openness, curiosity, and acceptance. Training in these meta-cognitive skills might therefore explain why mindfulness meditation, rather than relaxation alone, is more effective in overriding maladaptive response-focused emotional-regulation strategies such as avoidance and thought suppression.¹⁶

This mode of action points to the notion that mindfulness interventions belong to a family of “third wave” behavioral interventions in which cognitions are conceptualized as private behaviors rather than as thought processes.⁵³ The focus of these more contextual approaches is not on changing the content of cognitions, as in conventional cognitive and behavioral approaches, but rather on changing the function of behaviors and an individuals' orientation to experiences.⁵⁴ Acceptance and being present are key techniques of these interventions and are foundational properties of meditation and mindfulness. Our qualitative data set was replete with

examples of how meditation and training in mindfulness led participants to adopt more balanced and accepting orientations to illness and the illness experience. This was signaled by participants voicing de-centered perspectives on the past, and citing enhanced abilities to focus and concentrate on the present, and worry less about the future. In this sense the qualitative findings from this study reinforce the notion that mindfulness-naïve individuals who participate in meditation undergo a therapeutic process that first transforms their expectations and mode of inquiry, and secondly, transforms their perception of self and illness and thirdly, transforms their ability to cope with their illness through a more accepting and flexible mode of action.⁵⁰ Such accepting approaches have been implicated in better adjustment and coping among people with multiple sclerosis⁵⁵ and our findings similarly show that training in mindfulness skills such as acceptance can improve coping with clinical and non-clinical problems.

Implications for Practice and Research

A concrete example of coping is self-management which is central to the LTC care model in the English NHS.⁵⁶ We found that participants were more readily able to deploy meditative practices and engage in mindful moments when prompted by bodily sensations, thoughts, or feelings typically associated with physical or psychological health threats. The degree to which some participants were able to integrate meditation and mindfulness into their daily self-care routines suggests that the skills learned during brief meditation programs can be feasibly applied in everyday settings by people with LTCs. Moreover, the success of mindfulness-based interventions may hinge on the amount of home practice undertaken,⁵⁷ and most participants in this study pointed to the importance of home practice in shaping their ability to integrate meditation and mindfulness into their routine lives. However, in keeping with other qualitative work about patients' experiences of mindfulness-based interventions, some participants in this study alluded to difficulties in undertaking home practice, owing to the complexity of tasks and pointing to the need for further clarity about which tasks are essential to home practice and which are not.⁵⁸

CONCLUSIONS

Our data suggest that meditation and mindfulness may have been particularly useful during the early phase of LTCs or immediately after an acute event, when participants' perceived that anxiety and worry were more potent health threats. There is thus scope to investigate optimal timing of meditation and mindfulness training for people with LTCs. Mindfulness skills learnt as part of meditation could potentially play a role in reducing negative perseverative cognitions, thereby preventing the onset of anxiety and mood disorders known to complicate medical management and self-care in people with

LTCs. This research focus underscores questions about the temporal stability and situational specificity of mindfulness: Do mindfulness skills endure beyond brief interventions, and can they be learnt at different time points and in different settings during the life course of LTCs? Finally, there is scarce evidence that conventional psychological therapies improve both physical and mental health in people with LTCs.⁵⁹ Meditation programs that teach mindfulness skills may be effective in targeting response-focused emotional regulation strategies such as worry and improve physical health in people with LTCs, but this hypothesis needs testing in robust randomized controlled trials with active control groups.

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SUPPLEMENTAL MATERIAL

Supplemental data for this article can be accessed on the publisher's website.

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