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Mindfulness-based cognitive therapy (MBCT) for patients with medically unexplained symptoms: Process of change

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ABSTRACT

Background: A recent randomized controlled trial provided preliminary evidence for the effectiveness of mindfulness based cognitive therapy (MBCT) for the top 10% frequent attenders in primary care with persistent medically unexplained symptoms (MUS). This qualitative study aims to explore working mechanisms and possible barriers of MBCT in this population.

Methods: Twelve participants of the trial were interviewed about their experiences. This was done before and after the MBCT course, and 12 months later. Written evaluations of participants and notes of participant observers were used for data-triangulation.

Results: In total, 35 qualitative interviews were conducted. MBCT initiated a process of change, starting with awareness of the present moment, the associated sensory experiences, thoughts and emotions and accepting rather than resisting these. Participants started to recognize their own behavioral patterns and change them, thus improving self-care. Self-compassion seemed to result from and facilitate this process. Main barriers were concurrent social problems and the inability or unwillingness to accept symptoms.

Conclusions: MBCT can start a process of change in patients with persistent MUS. Awareness and acceptance of painful symptoms and emotions are key factors in this process. Change of unhelpful behavioral patterns and increased self-care and self-compassion can result from this process.

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Introduction

Medically unexplained symptoms (MUS) are highly prevalent. In primary care 20–50% of the physical symptoms remain medically unexplained [1,2]. Often, these symptoms resolve over time. However, in a minority of the patients these symptoms persist [2–4]. Patients with persistent MUS suffer from psychological distress, functional impairment and social isolation [5].

At present, cognitive behavioral therapy is the intervention of choice for persistent medically unexplained symptoms. Several studies have shown modest improvements in somatic symptoms, psychological distress and functional impairment [6–8]. However, many patients with medically unexplained symptoms do not easily accept psychological treatment [9]. In a recent trial on the effectiveness of a group cognitive

behavioral intervention for medically unexplained symptoms, physical health improved significantly whereas mental health did not show a strong improvement [10]. Consequently, there is still a need for more acceptable and effective treatment options.

A promising intervention for MUS is mindfulness-based cognitive therapy (MBCT) [7,11,12]. MBCT combines insights from cognitive behavioral therapy with the mindfulness-based stress reduction program as developed by Jon Kabat-Zinn [13]. MBCT is a group-based skills training program, consisting of meditation, yoga exercises and psychoeducation, intended to enable participants to become more aware of their bodily sensations, thoughts, and feelings [12]. It has a body-focused and experiential approach, which is different from more cognitive approaches used in cognitive behavioral therapy and the reattribution model [14]. Previous studies have demonstrated the effectiveness of MBCT for patients with depressive and anxiety disorders [15], fibromyalgia [16,17], chronic pain [18,19] and chronic fatigue syndrome [20]. MBCT might be effective for patients with persistent MUS by increasing acceptance of symptoms and tolerance of distress [21–23].

Recently, we have conducted a randomized controlled trial (RCT) (n = 125) to examine the effectiveness of MBCT in frequently attending

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patients with persistent MUS [24]. Although physical health did not differ between the MBCT and usual care groups, at the end of treatment the MBCT group reported a significantly better mental health, particularly vitality and social functioning. They also reported less health anxiety than patients in the usual care group.

We wanted to gain a deeper understanding of the working mechanism of MBCT in patients with medically unexplained symptoms. Qualitative techniques enabled us to search for underlying processes and to identify barriers [25]. The strength of qualitative methods is their ability to explore the depth and complexity of phenomena. They permitted us to pay attention to the specific personal experiences of the patients participating in the trial. We considered this particularly helpful in facilitating interpretation of the trial findings and optimizing the intervention.

In recent years, several qualitative studies on the working mechanism of mindfulness training have been conducted. For example, Morone investigated mindfulness in older adults with chronic pain [22]. Participants reported using various methods of pain reduction, including: distraction, increased body awareness leading to behavior change, better coping with pain and direct pain reduction through meditation. Williams (2011) did a qualitative study of MBCT in patients with severe health anxiety. Participants described the mindfulness training as a validating and normalizing experience. Importantly, the focusing of attention upon bodily sensations did not exacerbate participants' health anxiety [21]. Our goal was to better understand the effectiveness of MBCT in patients who have been suffering from persisting physical symptoms. We examined the working mechanisms and possible barriers of MBCT in patients with persistent MUS.

Method

Randomized controlled trial

This qualitative study was embedded in an RCT examining the effects of MBCT in 125 patients with persistent medically unexplained symptoms [24]. For the RCT general practitioners were provided with a list of their 10% most frequently attending patients, age 18 to 70 years. The general practitioners selected patients from this list who had persistent medically unexplained symptoms. Exclusion criteria were: frequent attendance for other reasons than physical symptoms, physical symptoms fully explained by somatic diseases, no significant distress or functional impairment due to the symptoms, psychosis or bipolar disorder in medical history, current alcohol or drug abuse, cognitive impairment, problems with Dutch language, and previous MBCT. Having chronic medical conditions was not a reason for exclusion. The selected patients were invited for a research interview. If they did not fulfill any of the exclusion criteria and met the DSM-IV criteria for undifferentiated somatoform disorder (having physical symptoms for at least six months, which are not fully explained by a physical disease or substance abuse, and which lead to functional impairment), they were asked to participate in the RCT in which they were randomized to MBCT or usual care. Of the 685 patients who were invited for a research interview by their general practitioner, 185 were interested in participation (27%). Reasons for declining were: not interested (47%) or lack of time (35%). After the research interview 125 patients were included in the trial. Most participants were female (75%), with a mean age of 47 years (SD 11). The most frequently mentioned medically unexplained symptom was fatigue (26%), followed by joint problems (16%). More than 80% of the patients had at least one co-morbid chronic physical disease; about one third had three or more chronic physical diseases. A depressive disorder and/or anxiety disorder were diagnosed in 35% of the patients. About half of the patients were unemployed, and education levels were evenly divided among low, middle and high. In the year preceding the study, the average number of visits to the general practitioner was 10 visits.

The MBCT course consisted of eight weekly 2.5-hour sessions and a silent day, delivered by experienced mindfulness trainers. The program

consisted of formal meditation exercises such as the body scan, sitting meditation, walking meditation and mindful movement. Participants were encouraged to cultivate awareness of everyday activities, such as eating or taking a shower. Participants were provided with CDs to practice at home for 45 min a day, 6 days a week.

Our training protocol was based on the MBCT format for patients with recurrent depression [12]. The themes of each of the eight sessions were identical to the themes in the MBCT protocol for recurrent depression and the homework exercises were also the same as those in the original MBCT protocol. We made minor adaptations to the protocol to make it more suitable for participants with physical symptoms. For example, the term 'depression' was replaced by 'bodily symptoms', or by 'symptoms'. Specific psycho-education about depression was removed from the protocol. We added information about dealing with (unexplained) physical symptoms and about respecting physical and mental boundaries and dealing with impairments. The relapse prevention plan, as is a component of session 7, was specifically aimed at periods of deterioration of physical symptoms.

Group size varied between 7 and 14 participants. Primary outcome measure was the health status at end of treatment (EQ-5D visual analog scale, 0–100) [26]. Secondary outcome measures were mental (SF-36 mental component summary, 0–100) and physical functioning (SF-36 physical component summary, 0–100) [27]. Assessments took place at baseline, end of treatment and 9 months follow-up.

Qualitative study

In order to perform a process analysis we performed a qualitative study based on three different sources of information: longitudinal interviews, participant observation reports and written evaluations of the participants. For the longitudinal interviews twelve patients randomized to the MBCT condition were selected by a purposive sampling strategy taking account of gender and age [28,29]. We were restricted in the time that we could spend on the interviews; we considered twelve patients the minimum sample size. In this sample the distribution of different ages was representative for the patients in the RCT [24]. Men were slightly overrepresented (33% vs. 25%), low education levels were slightly underrepresented in this sample (17% vs. 33%) and the mean age was a bit lower, 43 years versus 47 years, a non-significant difference. The type of symptoms and number of co-morbid physical diseases was representative for the participants in the RCT.

In total 35 interviews were carried out with twelve patients (Table 1). We refer to these twelve patients when we use the term 'participant' in this article. To examine the working mechanism of MBCT over time, they were interviewed before and after the course and one year later. The first interview took place by telephone before the course and focused on the expectations about MBCT (Appendix A). The second interview was done face-to-face within a month after completion of the course and focused on the experiences during the MBCT and the effects on symptoms (Appendix B). The third, face-to-face, interview was conducted a year later and consisted of only two questions: 1) How are you now? 2) What did you learn from the mindfulness training? The first interview lasted between 5 and 10 min, the second and third interviews lasted between 25 and 45 min. All interviews were recorded, transcribed verbatim and anonymized. A researcher and psychiatrist in training (HR) conducted the first and third interviews; a medical student (JL) conducted the second interviews under supervision of two researchers (PL and HR). The interviewers did not have access to the participant's outcome data.

In addition to the interview data, we used the written evaluations of patients who had attended the MBCT course. During their last MBCT session they were asked to write down what they would like to tell their general practitioner about what they had learnt. At the time of analysis we had the written evaluations of 61 patients in the RCT. The form and content of these evaluations differed greatly. Some just used a couple of words, others wrote a complete letter about their

Table 1
Participant characteristics at baseline

Participant	Gender	Age	Education level ^a	Main symptom	Number of other symptoms	Number of physical diseases
P1	F	22	Middle	Abdominal pain	2	0
P2	F	66	Middle	Dizziness	4	2
P3	M	63	High	Back pain	4	8
P4	M	37	Low	Back pain	1	0
P5	F	36	Middle	Fatigue	2	0
P6	F	50	High	Throat complaints	4	1
P7	F	46	High	Pelvic pain	3	3
P8	F	40	High	Fatigue	3	1
P9	F	33	High	Fatigue	8	1
P10	M	30	Middle	Neck pain	1	2
P11	M	51	Middle	Fatigue	4	3
P12 ^b	F	47	Low	Pain in ankles	6	2

^a Education level was classified as low (primary and lower secondary education), middle (upper secondary education) and high (higher vocational training and university).

^b This participant was interviewed twice; she withdrew from the study a year after the mindfulness training due to religious considerations.

experiences. Some evaluations seemed rather superficial, whereas others were very personal.

As well, we had two sets of written observations by researchers who took part in the MBCT training as participant observers (HR and EM). They both attended eight sessions together with a group of patients ($n = 9$ and $n = 12$) who were participating in the trial. These patients were not the same patients as the participants who were interviewed over the year (Table 1). The observers performed the same practices as the other participants. After each session they made observation reports about what had happened and what the participants said during the session. Special attention was paid to comments of participants that indicated newly gained insights in their own functioning.

The Medical Ethical Committee of the region Arnhem Nijmegen approved the study and all participants gave informed consent.

Analysis

We used analytical induction from the grounded theory as strategy to build a theoretical framework [28,30] and a scientific qualitative research software program (Atlas.ti) to support the coding process. The starting point for the analysis was the content of the interviews conducted a year after the training. These interviews provided us with information about the longer-term effects of MBCT and the most important changes in the past year. By reading and re-reading the transcripts of the interviews, we familiarized ourselves with the data and searched for relevant phenomena (HR, YS). We independently generated sensitizing concepts as a starting point for the analysis in order to produce a grounded theory [31,32]. We coded the interviews independently to link raw data to these sensitizing concepts. Subsequently, we jointly assembled, modified and categorized these themes in main themes and subthemes to build a theoretical framework of the process of change, including the barriers to change. In addition, we read and discussed the transcripts of the earlier interviews, the written observation reports and the written evaluations of the participants. Next, we recoded all transcripts of the interviews paying particular attention to data diverging from the theoretical framework. No new themes or contradicting data were found. For verification of our theoretical framework we used the remaining data: the earlier interviews, written evaluations and observational reports, a process also known as data triangulation. We used characteristic quotes to illustrate the acquired theoretical framework.

Results

In the randomized controlled trial, health status and physical functioning did not significantly differ between groups at the end of treatment [24]. However, patients in the MBCT group reported a significantly greater improvement in mental functioning at the end of treatment (adjusted mean difference 3.9, 95% CI 0.24 to 7.6, effect size $d = 0.34$), in particular with regard to vitality and social functioning. In the per protocol analysis there was a significant decrease in health anxiety after attending MBCT.

For our qualitative study we performed interviews with twelve participants from the trial. One year after the MBCT, most participants were still practicing mindfulness although often in an informal way (paying attention to daily activities and breathing). Three participants (P4, P7, P8) reported hardly any change due to the MBCT; all others reported a decline of symptoms and changes in several life aspects. Based on the themes evolving from the data, we identified a common process by which the mindfulness training appeared to affect the participants: 'being in the present', 'being aware', 'acceptance', 'recognizing patterns', 'changing patterns' and 'self compassion' (see Table 2).

The process seemed to be circular and iterative rather than a linear one, as illustrated in Fig. 1. Participants moved back and forth through the different stages, e.g. between acceptance and awareness, or followed a different pace for different problems. For example, P3 was an extremely busy man, who visited many specialists for a wide range of physical symptoms and diseases. During the MBCT he changed the way he dealt with acute pain by focusing his attention at the painful spot; he had not changed his very busy agenda. At the end of the MBCT he noticed that he was quite hard on himself. A year later he had decided to lay down a very demanding volunteer job and had taken up new leisure activities, such as mountaineering. Self-compassion seemed to result from the process of change and at the same time an increase in self-compassion stimulated the process of change.

Some participants only made a start in the process, some encountered significant barriers that withheld them from further change (see Table 3). The main barriers were found at two levels: being in the present and acceptance. Those who had concurrent urgent social or financial problems did not seem able to be fully present during the mindfulness training sessions. As a result, the cultivation of awareness and recognition of patterns were hardly mentioned by these participants. The other main barrier was seen in the ability to accept. Participants who could not accept their symptoms as a part of their life were not able to move on in the process. Although they did reach some insights in their patterns, they did not seem able to change them. Acceptance seems to be an essential step in the process.

Being in the present

By participating in the mindfulness training, the participants had to come to a standstill for 2.5 h, at least once a week. The exercises invited them to be present in the here and now. A participant described how he experienced a state of tranquility and calmness during the MBCT sessions.

I have the idea that the mindfulness helped me because every Wednesday I just had (...) a sort of fixed point in the week, I just went there and I really came to a sense of relaxation. (P10)

Others gave examples of gaining new experiences by paying attention to the present moment.

Table 2
Themes frequently mentioned by participants during and after the MBCT training

Themes	Examples
Being in the present	"It gave me rest, inner rest"
Awareness	"I became more aware of my body and my bodily limitations" "A bit more distance: I'm not my symptoms"
Acceptance	"It is as it is, just take it as it is"
Recognizing patterns	"When I don't feel well it affects my body" "I was always tremendously crossing my boundaries"
Changing patterns	"You learn to stand up for yourself, listen to yourself and say 'no' in time"
Self care	"In a sense, I have created more peace in my life"
Self-compassion	"I may just be there"

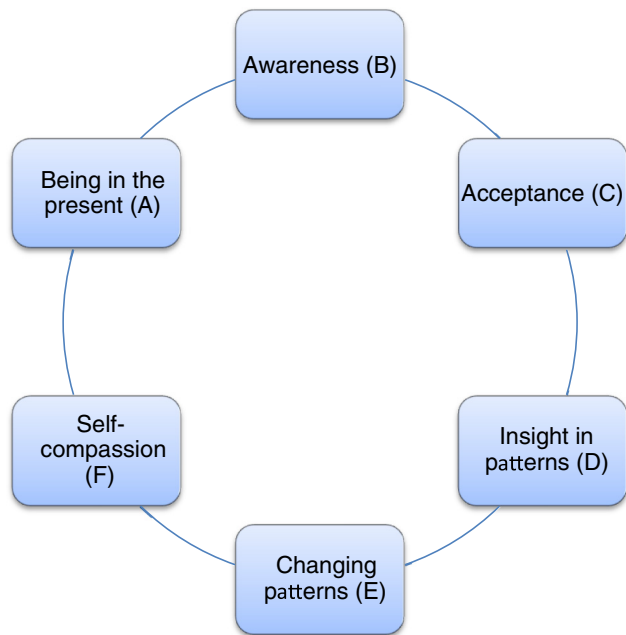


Fig. 1. Process of change. Illustration of steps in the process of change based on the descriptions of experiences of patients with persistent medically unexplained symptoms who followed an MBCT course.

Being more aware of the present (...) like really tasting your food; I think that's something I have gained from mindfulness training. (P6)

Not all participants were able to fully participate during the mindfulness training. An important barrier was having social problems, such as death of a husband, an ill family member or broken relationship. Not being able to be fully present stopped participants in the process of paying attention to their physical symptoms and in the further process of change.

Deceased relatives, the end of my relationship and many financial problems (...) all happened so fast, I tumbled from one thing into the other (...) I mean, there was so much to worry about, no time for nothing, and I had to get my problems under control. (P4)

Awareness

Several participants described that they became more aware of bodily sensations. They experienced that their symptoms were not constantly bothering them with the same intensity. For some, awareness of bodily sensations made it possible to 'de-identify' with their symptoms.

In the training we approached a problem in a way in which you noticed that you were not that problem. You are not a chronic neck pain patient; you just have a lot of pain there at this moment. (P10)

Table 3
Levels of change after MBCT

Participant	Steps in the process of change ^a	Barriers
P1	A,B,C,D,E	
P2	A,B,C,D	
P3	A,B,C,D,E,F	Death of spouse
P4	A	Social and financial problems
P5	A,B,C,D,E,F	
P6	A,B,C,D	
P7	A,B,D	Anger about accident
P8	A,B	Fear for serious disease
P9	A,B,C,D,E,F	
P10	A,B,C,D,E,F	
P11	A,B,C,D,E	
P12 ^b	A,B,C,D	

^a A = Being in the present, B = awareness, C = acceptance, D = recognizing patterns, E = changing patterns, and F = self-compassion.

^b This participant was interviewed twice; she withdrew from the study a year after the mindfulness training due to religious considerations.

Also the awareness of the relationship between physical sensations and thoughts and emotions increased. They started to regard bodily symptoms as a warning sign and they reflected upon what had happened in the days before the symptoms came up.

What happens, is that my life affects my body. Now, whenever I feel something coming up, I first think: what has happened this week? Oh, wait, I have felt pressurized, or, I have been very busy, well look, my body reacts to that. (...) I think that this really got through to me: if I do not feel well, this will also affect my body. (P1)

Most of all, I am more aware (...) For example, if I sit in a certain way [sits with arms crossed in a tense posture] then something is going on, otherwise I wouldn't sit like that (...) I do something with my body and suddenly I notice that I do it and then I immediately wonder: what is it that is bothering me? (P5)

One participant, P4, did not give any examples of increased awareness due to MBCT. There were two participants who described that becoming more aware of bodily sensations was very uncomfortable. In the end, they preferred distraction to awareness.

It focused really at the body, so the body troubled me more [laughing] and I thought: I actually do not even want to think about the body. (P7)

Acceptance

Instead of avoiding or fighting against these experiences, some participants felt that by becoming more aware of physical sensations, emotions and thoughts they were better able to accept them. Nine out of twelve participants gave examples of acceptance. In some there was acceptance of their symptoms and physical limitations. In others, acceptance was mentioned in relation to experiencing anger or sadness.

During the training the most important thing that I learned, has become my motto: 'It is the way it is and that is it.' If anything [a symptom] comes up, I say: 'it is the way it is, you can't change it, it must first run its course.' (P3)

Two participants described having great difficulty to accept their symptoms, or being unwilling to do so. P7 reported that she found it very difficult to accept her symptoms because she was still angry at the person causing the accident that provoked her symptoms. P8 described how the possibility of having an underlying serious medical condition kept her from accepting the symptoms.

They actually presume that nothing is wrong, so I am not sick. But I think: it is not so simple, because if you can't prove anything, it doesn't mean that nothing is there. (P8)

Not being able to accept their symptoms was a major barrier for further change in these two participants.

Recognizing patterns

Through enhanced awareness and acceptance participants could gain insight in their own automatic patterns. Ten out of twelve participants gained insight in cognitive and behavioral patterns that maintained their symptoms or the anxiety about their symptoms. Some described recognizing a pattern of worrying about many different issues; catastrophic thinking had become a habit. Some specifically worried about physical symptoms. Visiting the GP had become a way of finding reassurance for their fears.

In the past I would've worried about it, about certain symptoms, mainly because of the family history. The whole family has died from cancer, (...) you start to worry, you start to ruminate. (P3)

Some became aware of their avoidance of negative emotions. P5 described how she came to understand that the suppression of her emotions was a family pattern.

In the past I put it all away, because I didn't want to deal with it, because then I would feel pain and sadness. (...) My father, mother and sisters, they do exactly the same. One could say that we were spoon-fed with it. (P5)

Six participants described becoming aware of having difficulties with setting limits. Some became aware of the fact that they frequently crossed their own boundaries, especially by not paying attention to their physical symptoms and by not daring to say 'no' to others.

I crossed my limits tremendously (...) every time when I felt a little bit better I took up running again and started working extra hours and cycling everywhere and simply doing so much and my body was simply extremely tired. I have ignored this time and time again. (P8)

Changing patterns

With the newly gained insights six out of twelve participants were able to let go of old patterns. For example, P5 noticed being able to observe worries and let them go, instead of identifying with them and slipping into rumination.

It happens to be there, that in itself is not a problem. It all depends on how you deal with it. (...) I feel calmer now because I can set things aside and leave it there, whereas in the past I would get stuck in it and it would keep running in my head. (P5)

Some participants noticed that their way of coping with physical symptoms had changed, for example avoidance or reassurance seeking behavior. Now they were able to wait and see for a while. Several participants mentioned that their health care use had changed.

Astonishing, when I called the doctor's assistant she said: Wow, P3, I haven't seen you in a long time. (P3)

In addition to changing old patterns, they gave examples of having developed new patterns that enhanced their self-care. Some gave examples of striving for a healthier lifestyle, for example by quitting smoking and nutritional changes. They became motivated to reduce stress in their lives and increase pleasant activities, or changed jobs in order to take better care of themselves.

I've changed jobs. I used to work in a bar and now I have a nine to five job. So I have a much better daily pattern, which makes me feel much better. (P9)

Others learned to set priorities and became more assertive.

It is easier for me now to be frank (...) I just say: 'I don't appreciate it, or I don't like it.' (...) I am allowed to say that you know. (...) My mom thinks that I changed completely [laughing]. I react really differently now. (P5)

Five out of twelve participants described that their physical symptoms had diminished during and after the mindfulness training. Some felt less tired. Others experienced less pain. Mostly this was described as a gradual process, however there were a couple of participants who described purposefully using meditation to directly reduce the pain.

I am able to relax the specific spot (...) I do not tighten a single muscle (...) I call that 'getting beneath the pain'. I just go to the spot and I fully relax. (P3)

Two participants, P7 and P8, were aware that they frequently crossed their own physical limits, but they did not want to change this. They expected that their quality of life would be diminished if they would listen to their symptoms. These two participants were also unwilling to experience their bodily sensations and could not accept their symptoms. Strikingly, they both specifically asked for a longer duration of the mindfulness training.

I do way too much in a given week (...) and immediately I get those symptoms. (...) But I really feel that I otherwise would not have a satisfying life, as it would consist solely out of working and sitting at home suffering from pain. So I decided to just keep on doing things. (P7)

Self-compassion

Four participants gave examples that demonstrated an increase in self-compassion. By recognizing their self-criticism, they experienced that they could be kinder towards themselves. Some described that they were now able to allow themselves to just be there. Self-compassion seemed to enhance participants' motivation to take good care of themselves.

I really felt that I was allowed to be there: everything is okay, whatever I feel. (P6)

I've learned that I am important too. If I'm not doing well, then it's hard for me to take care of someone else. (P5)

P3 described how he also felt more compassionate to others since the MBCT training.

The judgment that I had about him [colleague] was actually undeserved. (...) I have clearly become more forgiving. (P3)

In some participants an increase in self-compassion seemed to result from the process of change. By paying full attention to their body and their mind, they felt more appreciation for themselves. Also, by recognizing automatic unhelpful patterns, they recognized how unfriendly they had sometimes been to their own bodies. At the same time self-compassion also seemed to facilitate the process of change. Those who had a more self-compassionate attitude were more inclined to pay full attention to their painful symptoms, thoughts and emotions, by which their awareness and acceptance were enhanced. They seemed to move through the process in a quicker pace than those who had less friendly attitude towards themselves.

When regarding the differences between the male and female participants after attending MBCT, the men (except for P4) seemed to make bigger and faster changes in their life patterns than the women. For the men it seemed easier to develop a more self-compassionate attitude than for most of the women.

Discussion

Main findings

A process of change due to the MBCT was identified. The process was characterized by the following stages: paying attention to the present moment, becoming aware of bodily sensations, emotions and thoughts and their inter-relatedness, acceptance of these experiences, recognizing ineffective patterns and changing these patterns. In the end, some participants expressed a more self-compassionate attitude. The process was non-linear, participants moved back and forth in the process and had different paces for different problems. Not all participants reached all stages, some encountered barriers that withheld them from further change.

Two main barriers that could strongly hamper this process have been identified: concurrent social problems and the inability to accept the symptoms. The barriers were most apparent in the earlier steps of the process of change, probably because the participants dealing with these difficulties, did not reach the 'more advanced' steps. Being absorbed by concurrent problems reduced the ability to be in the present moment. It is possible that their situation asked for a problem-solving 'doing' mode, which is different from the more accepting 'being' mode that is at the core of MBCT. As being in the present moment is a prerequisite to practice mindfulness exercises, this barrier strongly reduced the possibility to change. The other barrier, the inability to accept the symptoms, was related to an unwillingness to be aware of bodily sensations. It also reduced the ability to change unhelpful behavioral patterns. It could be that in order to be able to change unhelpful patterns one should first be able to fully attend to the pain. Our data suggest that this is true for both emotional and physical pain.

Comparison with literature

Recently a theoretical framework, based upon conceptual and neuroscientific findings, has been proposed for the working mechanisms of mindfulness meditation [33]. Four mechanisms of action are described: attention regulation, body awareness, emotion regulation and change in perspective on the self. Our model (see Fig. 1) shows substantial overlap with the elements of this framework. A striking difference is the rather limited role of emotions in our study. This might be due to our particular population. Patients with persistent MUS have been described as 'alexithymic', which means having difficulty with recognizing and describing emotions [34,35]. Emotion regulation as described by Hölzel [33] was described as "exposing oneself to whatever is present in the field of awareness; letting oneself be affected by it; refraining from internal reactivity" [33]. This process was also present in our participants, but possibly focusing more on physical sensations than on emotions. Being able to expose oneself to aversive phenomena, like physical symptoms, paying attention to them and not automatically reacting but 'being with the symptoms' seem to be quintessential aspects of the process of change in our patients. Having an attitude which purposefully focuses the attention on aversive phenomena might not only be helpful to patients, but possibly also to the health care professionals attending to these patients.

Our model of change as seen in patients with persistent MUS who attended MBCT, shows some similarities to the 'stages of change' model as developed by Prochaska and DiClemente in 1984 [36]. They developed the 'stages of change' model that consists of 6 steps: pre-contemplation, contemplation, preparation, action, maintenance and termination. Contemplation is described as getting ready for change by recognizing problems, which might be related to Awareness as identified in our model. Preparation and Action show similarities to Recognizing and Changing Patterns, respectively. However, the 'stages of change' model emphasizes cognitive processes underlying change, whereas mindfulness addresses change in a broader, experiential sense.

Participants started their learning process by experiencing what was present, and by reflecting upon these experiences, they gained insight in their ineffective patterns and started to change their behavior. This is closely related to the Experiential Learning Theory of experiencing, reflecting, thinking and acting as developed by Kolb [37]. Recently, Yeganeh and Kolb examined how mindfulness training could be used to assist learners in unlocking their full learning potential [38]. They concluded that self-monitoring when coupled with practicing acceptance creates new opportunities to think and act. Acceptance disallows the mind and body to suffer from things beyond one's control. This can paradoxically enable one to attain goals that may have otherwise been self-sabotaged by stress and attempts at over-controlling. In patients with MUS, MBCT indeed seemed to stimulate change through self-monitoring and increasing acceptance, which opened up possibilities to change.

Strengths and limitations

The qualitative design of our study enabled us to formulate a model for the change processes patients with MUS experienced during and after MBCT. By making use of different qualitative data sources for data-triangulation, the internal validity and reliability were enhanced [39]. Another strength of our study was making use of a heterogeneous group of participants with variety in age, gender and symptoms. As all participants belonged to the 10% most frequently attending patients of GPs, our population is representative of patients who are severely impaired by their symptoms and who lay a high burden on our health care system.

There are limitations to the study that should be taken into account. To begin with, the study had a small sample size. Due to time constraints, we were unable to keep selecting patients until data saturation occurred [40]. However, both too few and too many interviews can lower the quality of the data; the more hours of taped interviews or pages of transcribed material, the less depth and richness we would be able to extract from the material [41]. With the relatively small sample size we were able to put depth into the follow-up interviews. By making use of additional data sources we have checked whether there were major gaps in the results from the interviews. We compared the interview data with the observational reports of two full MBCT courses and with the notes of in total 61 patients with persistent MUS at the end of a MBCT course. There was great overlap between these data sources. Similar themes came up in all sources. We are quite confident that our results reflect the most important aspects of the process of change taking place.

Not all interviews were conducted face-to-face. The first interview, before the MBCT, was conducted by telephone. Another limitation is that two researchers conducted the interviews, the first and third interviews were held by one researcher and the second by another researcher. For the quality of the interviews it would have been better if all serial interviews were conducted by the same person, as the relationship between researcher and participant develops over time [42]. As researchers play a dynamic role in generating the data, they can facilitate different outcomes. Due to personal circumstances, it was unfortunately not possible for all interviews to be conducted by one interviewer. By carefully reading the transcripts of the previous interviews and by referring to these interviews during the follow up interviews we have tried to compensate for this.

Recommendations

There are some clinical recommendations that could be derived from our findings. In the first place, patients with significant social problems might be advised to postpone participation in MBCT until their problems have more or less been resolved. The same might apply for patients with a relatively low 'readiness for change'. These patients might

need individual support to increase their willingness to experience and face their symptoms, before they are ready to fully benefit from MBCT.

In addition, MBCT training for patients with persistent MUS might need further adaptations. Acceptance might need more emphasis during the training as the non-acceptance of symptoms, or the intolerance of distress, was an important barrier for some participants. Some patients might be in need of a longer training or more booster sessions to support their process of change.

From a research point of view, further research is needed to examine whether our proposed model is valid for other patients attending MBCT. New instruments should be developed to specifically measure processes of change. Measures regarding behavioral change in problem situations, resilience and self-compassion might be included in study designs [43]. We also recommend the integration of qualitative evaluations in future RCTs as more dimensions of the effects of the intervention can be discovered in this way.

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Appendix A

Topic list first semi-structured interview

- Expectations about MBCT; "what do you expect from mindfulness training?"
- Influence on physical symptoms; "which influence do you expect on your symptoms?"
- Mindfulness trainer; "what do you expect from the mindfulness trainer?"
- Group sessions; "what do you expect from being in a mindfulness group?"

Appendix B

Topic list second semi-structured interview

- Expectations about MBCT; "were your expectations about mindfulness training met?"
- Physical symptoms; "did you notice any changes in your physical symptoms related to the mindfulness training?"
- Structure of training; "what do you think about the duration of the training?"
- Elements of training; "which elements were most beneficial, which least?"
- Homework; "how did you practice at home?"
- Group; "how was your experience with participation in the group?"
- Trainer; "what did you think of the mindfulness trainer?"
- Influences on everyday life; "did you notice influences of the mindfulness training on daily life?"
- Ongoing practice; "are there any techniques you continue to use?"

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