Mindfulness-Based Interventions and Fibromyalgia: A Literature Review

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Fibromyalgia is a chronic illness characterized by musculoskeletal pain, pain catastrophizing and associated sleep disturbance, depression and anxiety symptoms. Mindfulness meditation training in its group counselling form has been found to have a salutary effect on chronic pain as well as reduce relapse in depression. To date, there has been substantial research on the effects of mindfulness for the treatment of fibromyalgia, however the outcomes have been inconsistent. Therefore, this literature review summarises the most recent research and their findings, as well as discusses the mechanisms of mindfulness in the treatment of chronic pain and depression. In general, there are current issues in reaching conclusive evidence on the efficacy of mindfulness for fibromyalgia due to the lack of robustness in the research methodology, small sample sizes, inconsistencies in the mindfulness programs and the inherent heterogeneity of the illness. A consistent and standardized mindfulness meditation program specifically tailored for the treatment of fibromyalgia is still required.

Keywords: *Fibromyalgia, Mindfulness meditation, Mindfulness-Based Stress Reduction, Mindfulness-Based Cognitive Therapy.*

Fibromyalgia is a chronic illness of unknown aetiology, affecting about 2-4% of the population, and is characterised by musculoskeletal pain and low pain thresholds in various places throughout the body as well as secondary symptoms such as sleep disturbance, fatigue, depression, anxiety, somatic symptoms, morning stiffness, cognitive dysfunction and pain catastrophizing. Typically, those affected by the condition tend to be mostly female in middle age, and increasing in prevalence by age (Brooks et al., 2017; Clauw & Wallace, 2009; Henke & Chur-Hansen, 2104). The classification criteria for fibromyalgia was defined in 1990 and therefore, most of the research has been in the last 30 years (Kozasa et al., 2012).

Mindfulness is commonly defined as 'paying attention in a particular way: on purpose, in the present moment, and non-judgementally' (Kabat-Zinn, 1994, p. 4). On-going mindfulness meditation training is purported to develop the mental capacity to be more fully attentive in the present moment without judgement or reactivity. Accordingly, the main facets apparent when experiencing a mindfulness state have been defined by factor analysis as observing, describing, acting with awareness, non-judging of inner experience and non-reactivity (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006).

Mindfulness-based interventions have been found to have a mediating effect on chronic pain in general (Ball, Sharizan, Franklin, & Rogozinska, 2017), and more specifically on improving well-being in patients with fibromyalgia (Grossman, Tielfenthaler-Gilmer, Raysz, & Kesper, 2007). This literature review aims to evaluate the current research literature on mindfulness and its salutary effects on patients suffering with fibromyalgia to determine its efficacy, especially in reducing pain symptomology and associated psychopathology.

Mindfulness: Background

While mindfulness meditation has its roots in early Buddhist meditation practices (Kabat-Zinn, 2011), mindfulness meditation was adapted as a secular group program by Jon Kabat-Zinn in the 1980s for use in a medical/clinical setting. Kabat-Zinn's mindfulness program originated as an outpatient behavioural program at the University of Massachusetts Medical School for the relief of chronic pain, revealing considerable improvements in pain management and associated psychopathology (Kabat-Zinn, 1982). These research findings were followed up with supporting evidence to establish the early success of the program for pain management and other symptomology (Kabat-Zinn, Lipworth, & Burney, 1985), showing long-term effects (Kabat-Zinn, Lipworth, Burney, & Sellers, 1986). This program

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became known as Mindfulness-based Stress Reduction (MBSR), which has now been widely delivered across a broad range of physical and mental health domains. The MBSR program is typically conducted in a group setting over 8 weeks for 2.5-3.5 hours per week, and includes an all-day silent retreat with weekly homework assignments (Kabat-Zinn, 1990).

Mindfulness-based Cognitive Therapy (MBCT) was later developed in the 1990s as an 8-week program based upon MBSR with the inclusion of cognitive therapy, specifically designed for the treatment of relapse in depression. The cognitive therapy component targets persistent maladaptive thinking patterns that perpetuate depression and is based upon the foundational work of Aaron Beck (1976). MBCT is also conducted in a group setting for 8 weeks with assigned homework, but without an all-day silent retreat (Segal, Williams & Teasdale 2002).

Literature Review: Methodology

The electronic databases were searched to identify relevant research studies using the keywords: Mindfulness AND fibromyalgia. Due to the abundance of research literature in this subject area, the search results were limited to the recent decade of English-language publications within the 2009-2019 date range. The reference lists of the selected research articles were further reviewed to identify any other relevant research pertinent to this review.

Existing Literature Reviews

In the scientific literature, there is an abundance of research literature on mindfulness-based therapies for the treatment of fibromyalgia. Hence, to begin the literature review, a summary of the existing literature reviews within this topic area is discussed.

Linda Carlson's (2012) paper on mindfulness and physical conditions reviewed seven research studies specifically related to mindfulness and fibromyalgia, revealing improvements in pain, sleep, fatigue and coping, although the level of evidence[i] was found to be weak at a level 2 evidence. A further review found that most of the extant research was methodically poor with only two research studies specifically related to mindfulness meditation and fibromyalgia achieving a regular methodological quality. Another seven studies were also identified, although these were not randomised or controlled. The authors concluded that while most of the studies demonstrate an improvement in symptoms, MBSR appears to be the most promising mindfulness-based intervention for fibromyalgia (Kozasa et al., 2012).

However, a further systematic review and meta-analysis of six research studies, involving a total of 674 patients with fibromyalgia found small effects on short-term improvements (for quality of life and pain) for MBSR, when compared to controls. Although, the number of research studies were minimal and more robust randomised-controlled trails were recommended (Lauche et al., 2013). Another systematic review of ten research studies on mindfulness-based interventions for patients with fibromyalgia found evidence for the relief of a range of physical symptoms and reduced outcome measures for depression, anxiety and psychological distress. However, the number of studies were small with a variety of outcome measures used in the research and more robust randomized-controlled trials with consistent follow-ups are still recommended (Henke & Chur-Hansen, 2104).

In a more recent literature review, Adler-Neal and Zeidan (2017) concluded that mindfulness meditation could mitigate the pain experience for patients suffering with fibromyalgia by altering the cognitions relating to their pain and improving the emotional response by the mindful attitude of non-judgment and non-reactivity. They theorised that the most effective mechanisms in a mindfulness-based intervention to attenuate pain and the associated psychopathology in fibromyalgia was: a) an acceptance of the pain, b) a non-judgmental awareness of physical sensations, and c) a non-attachment to conceptual self-relating, the symptoms and the contextual environment. However, a customised mindfulness meditation intervention that is more accessible, shorter in length and specifically targets the mechanisms found to improve the fibromyalgia symptoms is still required (Adler-Neal & Zeidan 2017).

Mindfulness and Pain Management

A marked feature of fibromyalgia is hypervigilance to pain and pain catastrophizing compared to other forms of chronic pain (Crombez, Eccleston, Van den Broeck, Goubert, & Van Houdenhove, 2004). While mindfulness was not found to specifically reduce pain in itself, a randomised trial of MBSR (compared to controls) found improvements in some of the symptoms of fibromyalgia, such as less perceived stress, better sleep and an overall reduction in the severity of the symptoms (Cash et al., 2015). This research study reveals the need to determine the mechanisms of action required to address the broad and varied symptomology found in fibromyalgia so that a more innovative and tailored mindfulness program may be developed (Davis, 2105).

However, the results are inconsistent. For example, in a 3-armed trial, 177 female patients with fibromyalgia were randomly allocated to either a MBSR program, an active control or wait list. The research findings did not support the effectiveness of MBSR for fibromyalgia for quality of life compared to the active control, revealing only small effects on the health-related quality of life (HRQoL) outcome measure. Although, the authors acknowledged the additional burden of completing the self-report questionnaire by the patients at a time when they were fatigued (Schmidt et al., 2011).

The Mechanisms of Mindfulness in Pain Management

The chronic pain experienced in fibromyalgia often stimulates negative thought patterns that precipitates pain catastrophizing and magnifies the pain experience. However, the mindfulness facets of observing, acting with awareness and non-judgment appear to moderate the intensity of the pain and associated catastrophic thinking (Dorado et al., 2018).

Mindfulness meditation training is posited to mediate pain in fibromyalgia by the mechanism of selective attention; that is by the non-avoidance of the pain at the preliminary stages through increased attention, so that the pain at the later stages can be more easily disengaged from, when compared to a control group (Vago & Nakamura, 2011). It is proposed that the action of the mindfulness practice allows one to decenter from the painful sensations by realising that one's "awareness of sensations, thoughts, and feelings is different from the sensations, the thoughts and the feelings themselves" (Kabat-Zinn, 1990, p. 297). Thus, the ability to be able to pull back from the intensity of the sensory experience by mindfulness practice allows for an

alteration in the perception of that experience, thereby mediating the direct relationship to the pain. Moreover, by the action of exposure, the distress and the reactivity associated with the pain may be gradually reduced by desensitisation, through the on-going, non-judgemental observation of the painful sensations as well as the adoption of a non-judgement attitude towards any cognitions about the pain (Baer 2003).

The symptoms of fibromyalgia are known to be exacerbated by stress (Henke & Chur-Hansen, 2014; Lush et al., 2009), and therefore, increase the sensitivity to the pain (Adler-Neal & Zeidan, 2017). It has been well-established that chronic stress suppresses immune function and increases inflammation in the body (McEwen, 2008). To-date, there exists a substantial body of research literature to support the assertion that MBSR can significantly reduce levels of stress (Creswell, Pacilio, Lindsay, & Brown, 2014; Khoury et al., 2013; Hölzel et al., 2010), with subsequent decreases in the inflammation response (Davidson et al., 2003; Rosenkranz et al., 2013). Therefore, it is reasonable to propose that a mindfulness-based intervention by its stress-reducing result, may in turn alleviate the inflammatory symptomology that typically present in fibromyalgia (Adler-Neal & Zeidan, 2017). Moreover, the body awareness practices incorporated within the mindfulness program (such as the body scan and the mindfulness of the body practice in sitting and walking meditations) have been found to be effective in the management and relief of pain, in general (Zeidan & Vago, 2016).

Mindfulness and the Treatment of Psychopathology

Depression has been found to be commonly associated with fibromyalgia, which is frequently exacerbated by the chronic and painful symptoms of the illness (Brooks et al. 2017). Mindfulness practice has been generally found to have an ameliorating effect on depressive symptoms (Segal, Williams, & Teasdale, 2002), and more specifically for patients with fibromyalgia. For instance, in a randomized trial of 51 participants, MBSR was found to be significantly effective in the reduction of depressive symptomology, when compared to a wait-list control group (Sephton et al., 2007).

These results have been further corroborated by more recent research. A study using MBCT on a small sample of 17 females found a significant improvement on the impact caused by fibromyalgia as well as reduced depressive symptoms, when compared to a control group, and these results were maintained after a 3-month follow-up (Parra-Delgado & Latorre-Postigo, 2013). A more recent study of 117 participants with fibromyalgia found mindfulness significantly reduced the symptoms of depression as well as reduced perceived stress, activity interference and pain catastrophizing. Activity interference is the impact on the person's everyday function because of the debilitating nature of the illness. Further, a direct relationship was found between mindfulness and perceived stress and the depressive symptoms, with an indirect association between mindfulness and activity interference through perceived stress, as well as an indirect association between mindfulness and pain catastrophizing via perceived stress and activity interference. A strong indirect association between mindfulness and depression was also found through strong direct associations with perceived stress, activity interference and pain catastrophizing (Brooks et al., 2017). These findings suggest that higher levels of mindfulness significantly reduce the symptoms of depression by directly reducing the perception of stress, thereby increasing everyday function and decreasing the propensity to engage in pain catastrophizing.

Further, a research study with a sample of 24 fibromyalgia patients found that an 8-week MBSR intervention significantly reduced basal sympathetic (SNS) activation on psychophysiological measures but not the anxiety or depressive symptoms, although the sample size was small and their pre-treatment scores were low and mild, respectively (Lush et al., 2009). Previous research has indicated increased sympathetic basal tone amongst patients with fibromyalgia (Cohen et al., 2000). The authors concluded that the reduction in sympathetic activity by participating in a mindfulness program could produce positive health benefits and help alleviate anxiety (Lush et al., 2009). Further, mindfulness interventions delivered online for patients with fibromyalgia reported improvements in pain management, mood, anxiety and social engagement, highlighting the benefit of providing a low-cost online intervention (Davis & Zautra, 2013; Garrido-Torres et al., 2016).

Moreover, a 7-week mindfulness intervention program specifically targeting anger, anxiety and depression in 32 women with fibromyalgia reported significant effectiveness in reducing state anger, internal anger, state anxiety and depression as well as improving internal anger control, when compared to a waitlist control, and with sustained improvements after a 3-month follow-up (Amutio, Franco, de Carmen Pérez-Fuentes, Gázquez, & Mercader, 2015). These results suggest that a mindfulness program specifically designed for fibromyalgia would benefit from teaching anger management skills as well as targeting depression and anxiety-related symptoms. Overall, the results from these research studies suggest that mindfulness can provide considerable benefit for patients with fibromyalgia by reducing their depressive symptoms.

The Mechanisms of Mindfulness for Depression

In general, mindfulness meditation practice has been shown to have a remedial effect on depression by developing the capacity to be able to decenter[ii] from negative cognitions (Teasdale et al., 2002), lessen self-judgements by engaging in self-compassion (Rude, Maestas, & Neff, 2007), reduce the propensity to engage in rumination (Fresco, Segal, Buis, & Kennedy, 2007), and to be able to let go of negative thoughts more easily (Frewen, Evans, Maraj, Dozois, & Partridge, 2008). Overall, mindfulness has been found to support emotion regulation (Chambers, Gullone, & Allen, 2009), and promote mental health by reducing anxiety and negative emotions (Gratz & Tull, 2010; Khoury et al., 2013). The main mechanisms of mindfulness briefly outlined here may be beneficial for sufferers of fibromyalgia who can experience depressive symptoms as part of their chronic health condition.

Some Limitations in the Research

To date, there are some limitations in the research which make definitive conclusions about the efficacy of mindfulness for fibromyalgia problematic. Firstly, the minimal number of robust randomised-controlled trails in this area of research has hindered efforts to prove its effectiveness on measurable outcomes (Henke & Chur-Hansen, 2014; Kozasa et al., 2012; Lauche, Cramer,

Dobos, Langhorst, & Schmidt, 2013). Small sample sizes, high attrition rates, lack of a control group, the use of subjective self-report measures and inconsistencies in follow-ups are consistent limitations found in the current research literature (Adler-Neal & Zeidan, 207; Henke & Chur-Hansen, 2014).

Further, there is an inherent selection bias in the research samples due to the prevalence of the sufferers of fibromyalgia being mostly women in middle-age or older (Henke & Chur-Hansen, 2014). Moreover, the various and non-specific nature of the fibromyalgia condition (Clauw & Wallace, 2009), produces a broad heterogeneity amongst the samples and therefore, wide variations in the outcome measures, causing confounding variables that are difficult to control, especially when compared against a control group (Davis, 2015; Henke & Chur-Hansen, 2014). Patients with fibromyalgia also tend to suffer from fatigue which may make sustaining a mindfulness practice difficult for them (Adler-Neal & Zeidan, 2017).

In addition, in mindfulness-related research it is generally acknowledged that there are certain limitations with the psychometric measures frequently used to measure mindfulness and that these issues are difficult to rectify, especially related to biases and differences in understanding when self-reporting (Baer, 2019). Moreover, the effectiveness of the mindfulness program depends upon the standardisation and consistency of the program, the expertise of the mindfulness facilitator and the individual commitment of the participants to their own mindfulness meditation practice (Baer, Crane, Miller, & Kuyken, 2019).

Conclusion

Overall, the results of the research studies on the efficacy of mindfulness for fibromyalgia have been inconsistent. In general, mindfulness meditation training has been found to help manage pain and reduce pain catastrophizing as well as alleviate the associated depression and anxiety symptoms. However, it is difficult to make definitive conclusions about the effectiveness of mindfulness for this specific population due to the inherent heterogeneity of the illness, the variations in research methodology, including issues such as selection bias, sample sizes, drop-outs, the outcome measures, lack of controls, as well as general inconsistencies in the mindfulness meditation programs. In the future, more robust research studies are required with a final meta-analysis to ascertain the overall effectiveness of mindfulness-based therapy for patients with fibromyalgia. It is also recommended that a standardised mindfulness meditation program that is specifically tailored for fibromyalgia be developed for further research.

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Footnotes

[i]Levels of evidence (LoE) are a medical ranking system used in clinical trials or research studies to define the strength of the results.

[ii]Decentering is the ability to objectively observe thoughts, feelings, and bodily sensations with awareness and non-judgement (Segal, Williams, & Teasdale, 2002).