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SHORT REPORT

Mindfulness-Based Stress Reduction: pilot study of a treatment group for patients with chronic pain in a primary care setting

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Aim: The study objective was to evaluate an eight-week Mindfulness-Based Stress Reduction (MBSR) treatment group for chronic pain in terms of effects on pain disability, subjective ratings of pain and psychological distress related to pain, and activity level and willingness to experience pain. This pilot study evaluated the impact of two eight-week MBSR treatment groups that were delivered in a clinic in Winnipeg, Manitoba. **Background:** Chronic pain is one of the most common presenting problems in primary care settings. **Methods:** Adult patients with chronic pain were recruited from 20 clinics that are part of a collaborative care programme and outcome measures were administered at baseline and programme completion. **Findings:** Despite a modest attendance rate and the short length of programme, a pre–post evaluation involving 17 patients revealed significant and/or clinically relevant improvements in level of pain disability, psychological distress, engagement in life activities, willingness to experience pain, and subjective rating of current pain.

Key words: mindfulness; pain; primary care

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Chronic pain, which is commonly defined as pain lasting for at least six months, is one of the most common presenting problems in primary care settings (Gureje *et al.*, 2001) and usually has a significant impact on patients' lives. Current estimates suggest that anywhere from 16 to 41% of the population experiences chronic pain (Schopflocher *et al.*, 2011). It is associated with a reduction in daily activities, lower self-ratings of general health, and increased psychological distress (Gureje *et al.*, 1998; Demyttenaere *et al.*, 2007). Treatment typically involves the use of medication such as anti-inflammatory agents and analgesic medications and many patients are involved in some form of non-pharmacological treatment (Moulin *et al.*, 2002). Treatments serving as adjuncts or alternatives to analgesics are essential, as medication is typically of limited effectiveness and involves one or more side-effects. Research has consistently supported cognitive behavioural treatments (CBT) in the management of chronic pain (eg, Morley *et al.*, 1999). A recent review also concluded non-specific benefits of mindfulness-based treatments for pain and depressive symptoms (Chiesa and Serretti, 2011). However, the maintenance of these changes requires further research. Specifically, a more recent review concluded that the only lasting benefit of CBT for the management of pain was to improvements in mood (Williams *et al.*, 2012).

Behavioural treatment usually targets pain, behaviours, and fear and avoidance related to pain, and has been shown to reduce pain-related disability, reduce psychological distress, and increase quality of life. CBT focuses on the above, as well as reducing maladaptive thoughts surrounding pain and learning coping strategies, such as activity pacing, and has demonstrated effectiveness for

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a number of chronic pain conditions. Mindfulness-Based Stress Reduction (MBSR) programmes, which are typically viewed to be under the umbrella of CBT treatments, are increasingly being used to treat a wide range of conditions, including chronic pain. These programmes have been found to improve mental health, reduce anxiety and depressive symptoms, and improve health-related quality of life (Fjorback *et al.*, 2011). In a seminal study of a 10-week MBSR programme, Kabat-Zinn found significant reductions in pain indices and mood disturbance (Kabat-Zinn, 1982). Kabat-Zinn conceptualized this programme as involving the teaching of self-regulation of pain by means of mindfulness meditation skills. The programme provided instruction on different meditation techniques to develop detached observation within the frame of a short-term group setting. Although research supports the use of MBSR in the treatment of chronic pain, similar to CBT more generally, methodological concerns have been raised (eg, patient selection). The current pilot study sought to establish the feasibility and acceptability of an MBSR-based intervention for patients with chronic pain in a 'real-world' primary care setting, with the intent of implementing and studying further such programmes within this setting. As a secondary objective, the study sought to evaluate whether participation in this newly implemented MBSR-based treatment group was associated with reductions in pain disability, subjective ratings of pain, and psychological distress related to pain, and increases in activity level and willingness to experience pain. Improved management of chronic pain in primary care is critical for improving patient care and efficient use of health-care resources.

Methods

Intervention

An eight-week group treatment programme was developed based on MBSR principles and implemented in a primary care clinic in Winnipeg, Manitoba. The clinic is a regionally funded multidisciplinary setting that is part of Shared Mental Health Care, a collaborative care programme consisting of ~20 clinics. Two experienced mental health counsellors trained in MBSR co-delivered the programme across two groups in 2011. These counsellors are integrated into the primary care team. Each weekly 2-h session involved two meditations, each ~30 min in length, and an inquiry process during which time participants were invited to share their experiences, challenges, and growth. Patients were provided with CDs of the meditations and encouraged to practice the meditations on at least five days weekly. Handouts were also provided and patients were encouraged to record their observations on challenges and growth between sessions. Patients attended a 2-h orientation session the week before the programme commenced (or met with a group facilitator at a different time) to determine appropriate fit to the programme, describe the commitment required for participation (ie, regular attendance as defined as a minimum of six sessions, completion of exercises between sessions), and clarify expectations.

Participants

Patients living with chronic pain (eg, lower back pain, fibromyalgia, arthritis) were referred to the MBSR group by health-care providers from the Shared Mental Health Care programme. The first group included 18 patients (3 joining after week 1) and the second group included 8 patients. Of the 26 patients, 4 were male and 22 were female, all were Caucasian. Patients ranged in age from 33 to 71 years and there was broad socio-economic representation. In all, 17 of the 26 patients completed evaluation measures at the end of programme. Unique to this area of research, all interested patients, regardless of type or severity of chronic pain, were invited to participate in the programme. No patients were excluded.

Measures

Outcome measures were administered during the orientation meeting and at the end of the final programme session. Although administered by the programme facilitators, responses were viewed only by the first author. These measures included the: Kessler Psychological Distress Scale (K10), Pain Disability Index (PDI), Visual Analogue Pain Intensity Scale, and the Chronic Pain Acceptance Questionnaire – Revised (CPAQ-R). The K10 is a 10-item scale that asks respondents to rate the frequency of anxiety and depression symptoms over the past four weeks on a five-point Likert scale (1 = all of the time; 5 = none of the time). The total score was used (range 10–50). The PDI

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asks respondents to rate the degree of impact that pain has across seven life activities: family and home responsibilities, recreation, social activity, occupation, sexual behaviour, self-care, and life-support activities, along an 11-point scale (0 = no disability; 10 = worst disability). Subscale (range 0–10) and total scores (range 0–70) were used. The Visual Analogue Pain Intensity Scale asks respondents to mark their perceived current intensity of pain along an 11 cm horizontal line with ends representing the range from 'no pain' to 'worst possible pain'. This measure is scored by measuring the millimetres from the 'no pain' end of the line (range 0–110). The CPAQ-R includes two factors: activity engagement and pain willingness, as measured on 20 items along a seven-point Likert scale (0 = never true; 6 = always true). The two factor score was used (range 0–60 for each factor). Research has demonstrated these measures to be both reliable and valid (Pollard, 1984; Tait *et al.*, 1990; Chibnall and Tait, 1994; Andrews and Slade, 2001; McCrackena *et al.*, 2004; Kahl and Cleland, 2005).

In addition, the Client Satisfaction Questionnaire (CSQ8), an eight-item measure that evaluates satisfaction along a four-point Likert scale, was administered after the programme. Post programme, participants were also asked to report their level of confidence that the programme helped them manage their chronic pain condition (four-point Likert scale: 1 = very confident; 4 = very unconfident), what they liked best about the programme, and what they would change about the programme to make it better. Attendance data were also collected.

Results

Participant satisfaction

Patients attended on average 5.5 of 8 sessions. Of the 26 patients, 15 completed six or more sessions (58%). When participants were asked to report their level of confidence that the MBSR programme helped them manage their chronic pain condition, all but one participant reported that they were very confident or somewhat confident (ie, 9 out of 17 very and 7 out of 17 somewhat confident).

Using the CSQ8, of the 17 respondents, a high level of satisfaction was reported with this programme (average of 3.49 out of 4 for the eight-item total); only one participant had an average satisfaction level below 3 out of 4. In terms of what participants liked best about this programme, respondents' comments related to four different themes: programme facilitators, group experience, skills gained, and general comments about the programme as a whole. When asked what they would change about the programme to make it better, responses related to five different themes: duration/frequency, timing, offering an ongoing group, group discussion, and nothing.

Patient outcomes

Using SPSS, the first analysis involved independent sample *t*-tests to compare the similarity of the two programme groups at baseline on the dependent measures. A significant difference was found on the PDI self-care category, such that at baseline, Group 1 reported a significantly higher level of disability related to this area (5.56 ± 2.38) as compared with Group 2 (2.63 ± 2.39) ($t(24) = 2.90$, $P = 0.008$). No other differences were found and the remaining analyses combined the two groups.

Next, an attrition analysis investigated for differences in baseline characteristics between the participants who attended six or more sessions (ie, completers) to participants who attended five or fewer sessions (ie, non-completers). The only significant difference was on subjective rating of current pain, with completers reporting a lower baseline level of pain (61.80 ± 25.04 mm) as compared with non-completers (81.64 ± 8.90 mm) ($t(18.48) = 2.83$, $P = 0.011$).

Subsequently, the effectiveness of the MBSR programme on the outcomes of interest were assessed through 12 paired samples' *t*-tests. To avoid α inflation owing to multiple *t*-tests, a *P*-value of 0.01 was used to determine significant improvement; with this more stringent criterion, five *t*-tests were significant. Specifically, significant improvements were found for level of pain disability related to recreation and overall total disability, level of psychological distress, level of engagement in life activities, and willingness to experience pain. When considering effect sizes for this programme, the following changes from baseline to post programme were associated with large effect sizes (ie, $r \geqslant 0.50$): level of pain disability related to family/home responsibilities, recreation, occupation, and overall

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Table 1 Paired samples *t*-tests: comparison of scores before and after programme

	n	Time 1 mean (SD)	Time 2 mean (SD)	*t*	df	*P*	Effect size (*r*)
PDI total	17	41.18 (15.30)	32.06 (17.57)	2.76	16	0.014*	0.57
PDI family/home	17	6.24 (2.20)	5.00 (2.60)	2.57	16	0.021	0.54
PDI recreation	17	7.00 (2.18)	5.29 (2.69)	2.85	16	0.012*	0.58
PDI social activity	17	6.12 (2.52)	5.12 (2.83)	1.47	16	0.161	0.34
PDI occupation	16	6.75 (2.32)	4.94 (3.19)	2.67	15	0.017	0.57
PDI self-care	16	4.19 (2.61)	3.69 (2.70)	1.00	15	0.333	0.25
PDI sexual behaviour	13	7.08 (3.12)	6.62 (2.87)	0.50	12	0.624	0.14
PDI life-support activity	16	4.69 (3.32)	3.69 (2.73)	1.32	15	0.207	0.32
Engagement in activities	16	29.44 (11.33)	38.25 (13.14)	−3.29	15	0.005*	0.65
Willingness to experience pain	15	16.47 (7.17)	24.87 (12.03)	−3.11	14	0.008*	0.64
Subjective pain rating	16	66.81 (25.10)	50.19 (26.61)	2.63	15	0.019	0.56
Level of distress (K10 total)	16	30.13 (7.25)	20.75 (7.05)	7.07	15	0.000*	0.88

PDI = Pain Disability Index.
* Significant at the *P*-value of 0.01.

total disability score; participants' subjective rating of current pain; level of psychological distress; level of engagement in life activities; and willingness to experience pain (see Table 1 for statistics).

Discussion

This pilot study demonstrated a brief MBSR-based treatment programme to be both feasible and acceptable for patients with chronic pain in a primary care setting. The findings also suggest that this treatment approach led to benefits for patients. Despite the modest attendance rate and short length of programme, participation was associated with significant and/or clinically relevant improvements (as defined by a *P*-value of 0.01 and/or large effect sizes) in level of pain disability, psychological distress, engagement in life activities, willingness to experience pain, and subjective rating of current pain.

Limitations of this pilot study include the non-experimental design, small sample size, predominant female sample, higher than ideal attrition rate, self-report nature of the findings, and lack of follow-up data. In addition, it would have been useful to collect more information about the participants and implementation of the programme (eg, fidelity of programme delivery, number of patients referred versus started in programme). An absence of a control group prevents us from concluding that it was the intervention, and more specifically, mindfulness skills, that resulted in improved outcomes for participants, rather than regression to the mean, placebo, or some other effect. Notwithstanding this significant limitation, the magnitude and pattern of changes suggest that the intervention did contribute to participant improvements. Research generally demonstrates larger impacts for patients with greater symptoms. Although patients with lower levels of pain at baseline were more likely to complete the treatment in this study, clinically important changes were still found. Prior research has demonstrated the benefits of this type of approach in other contexts, yet to our knowledge, this study contributes further to the literature by demonstrating the feasibility and likely utility of this treatment approach for a heterogeneous group of patients with chronic pain within the primary care context. Further strengths of this study are the naturalistic nature of the study design and the use of an external evaluator.

In addition to confirming the benefits of this programme in a more rigorous study design, it would be worthwhile for future research to explore the cost-effectiveness of this type of programme within a primary care setting, such as the potential for this treatment programme to reduce physician and other health-care visits. Future research on the acceptability and feasibility of such treatment programmes from the primary care provider perspective is also warranted. Finally, it would be valuable to pursue implementation research exploring how MBSR or mindfulness programmes can be adapted and delivered within shorter time

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frames for diverse groups of patients within the primary care context.

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