ประสิทธิผลของการเจริญสติต่อการลดอาการปวดเรื้อรังในผู้สูงอายุ: การทบทวนวรรณกรรมอย่างเป็นระบบ

The Effectiveness of Mindfulness Meditation in Relieving Chronic Pain in Older Adults: A Systematic Review

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บทคัดย่อ

อาการปวดเรื้อรังเป็นปัญหาสำคัญที่ส่งผลกระทบต่อประชากรสูงอายุ โดยทั่วไปอาการปวดเรื้อรังนี้จะไม่ตอบสนองต่อการรักษาพยาบาล ในปัจจุบันจึงมีการใช้การรักษาแบบแพทย์ทางเลือกหลายวิธี การเจริญสติเป็นการรักษาแบบเพทย์ทางเลือกวิธีหนึ่งที่ได้รับความสนใจเพิ่มขึ้นในปัจจุบัน บทความวิจัยนี้มีวัตถุประสงค์เพื่อทบทวนวรรณกรรมอย่างเป็นระบบ ในการพิจารณาว่าการฝึกเจริญสติสามารถบรรเทาอาการปวดเรื้อรังในผู้สูงอายุได้จริงหรือไม่ การทบทวนวรรณกรรมอย่าง เป็นระบบนี้ใช้แบบจำลองของ PRISMA โดยฐานข้อมูลที่ใช้ในการค้นหาบทความวิจัยได้แก่ MEDLINE, CINAHL, Ovid และ ProQuest คำสำคัญที่ใช้ในการค้นหา คือ การเจริญสติ การฝึกเจริญสติ สมาธิ ความเจ็บปวดเรื้อรัง โรคไขข้ออักเสบ และผู้สูงอายุ การค้นหาบทความวิจัยนี้ได้รวมถึงบทความภาษาอังกฤษที่ตีพิมพ์ระหว่างปี ค.ศ. 2003 ถึง 2018

การทบทวนวรรณกรรมอย่างเป็นระบบในครั้งนี้พบบทความวิจัย 35 เรื่องที่อยู่ในฐานข้อมูลอิเล็คทรอนิค เหลือบทความวิจัย 19 เรื่องหลังจากการคัดบทความที่ซ้ำกันออกไป บทความวิจัย 3 เรื่องถูกเลือกสำหรับการทบทวนวรรณกรรมในปัจจุบัน บทความวิจัย 2 เรื่องเป็นวิจัยเชิงทดลองควบคุมแบบสุ่ม และมีเพียงหนึ่งบทความวิจัยที่เป็นการศึกษาทดลองก่อนและหลังการทดลอง จากการทบทวนวรรณกรรมทั้งหมดแสดงให้เห็นว่าการใช้การฝึกเจริญสติช่วยลดระดับความเจ็บปวดส่งเสริมสมรรถภาพทางกาย ทำให้ระดับคุณภาพชีวิต และความเป็นอยู่ของผู้สูงอายุที่มีอาการปวดเรื้อรังดีขึ้น แต่อย่างไรก็ตาม ยังไม่มีหลักฐานเพียงพอที่จะแสดงให้เห็นว่าเทคนิคการเจริญสติมีประสิทธิภาพมากกว่าการแพทน์ทางเลือกวิธีอื่น ดังนั้นจำเป็นต้องมีการศึกษาวิจัยเพิ่มเติมเพื่อติดตามผลในระยะยาวของการเจริญสติต่อการลดระดับความเจ็บปวดในผู้สูงอายุ

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Abstract

Chronic pain is a common problem that affects older populations. It is a common condition that does not completely respond to medical treatment. Consequently, in recent years many alternative treatments have been suggested. Among them, mindfulness meditation is receiving growing attention. The purpose of this paper is to review studies that has determined whether mindfulness mediation can relieve chronic pain in older adults. The PRISMA model guided a systematic literature search method. A literature search was undertaken using MEDLINE, CINAHL, Ovid, and ProQuest. The search terms were "mindfulness meditation," "mindfulness-based intervention," "meditation," "chronic pain," "arthritis," "older," and "aged or elderly." The search included articles written in English published during the period of 2003 thru 2018.

This systematic literature review search yielded 35 articles through an electronic database search effort. Nineteen articles were evaluated for relevancy after removing duplicates. Three studies were then selected for the present review. Two articles were randomized control trials, and only one article was a pretest-posttest experimental study. All reviewed studies showed that mindfulness meditation interventions led to improvement in pain acceptance, physical functioning, quality of life and well-being in patients with chronic pain. There is not yet sufficient evidence to show that mindfulness meditation techniques are more effective than other non-specific interventions. More research is needed to investigate mindfulness meditation interventions in longer follow ups.

Keywords: "mindfulness meditation", "mindfulness-based intervention", meditation, "chronic pain", "older adults,"

Background

Chronic pain is a common symptom and a significant problem for older adults that contributes to disabilities, falls, depression, sleep disturbances, and social isolation.[1,2,3] In the United States, there is a high prevalence of chronic pain in people aged 65 years and older.[4,5] Between 25% and 50% of older adults living in a sampled community experienced pain within the past month, with 41% reporting distress, discomfort, or excruciating pain.[6] Unfortunately, chronic pain is a common condition that does not completely respond to medical treatments.7,8 As a result, in recent years many alternative treatments have been suggested. It has been found that approximately 1/3 of elderly people used complementary and alternative medicine (CAM) in the previous year.[9,10] Among them, mindfulness meditation is growing in popularity.

Mindfulness meditation as a complementary intervention was first conceived in 1979. The concept of mindfulness meditation techniques had originally been developed from many cultural and philosophical traditions such as Buddhism and Hinduism that had been practiced for centuries. The purposes of mindfulness meditation are to free the mind, know the mind, and to train the mind.[11] There are various meditation techniques that help participants increase awareness of present-moment experiences consisting of emotions, thoughts, and bodily sensations with a gentle and accepting attitude towards individuals.[12,13] It is strongly recommended that mindfulness meditation is beneficial for stress management in those with physiological and psychological illnesses as well as in healthy persons.[14,15,16] Mindfulness meditation techniques do not require medication. These

interventions offer natural and safe treatment options for individuals who want to avoid the side effects from medications. Additionally, it can also be found that mindfulness meditation provides many positive outcomes for reducing pain levels and improving the quality of life of older adults troubled by chronic pain.[13,16] Therefore, the ever increasing research evidence about mindfulness meditation in relieving pain indicates the need for updating understanding of it, and to investigate a systematic synthesis of current data regarding its effectiveness.

An Emerging Phenomenon of Mindfulness Meditation: Mindfulness meditation defined as "the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment."[11] The philosophical root of mindfulness meditation came from Buddhism. In the context, mindfulness meditation is a practice to achieve self-transcendence, enlightenment, and a means to finish suffering.[11] The epistemology and ontological underpinning of mindfulness meditation depend on individual's perception of reality, such as what is a real in now and here? Expressly, greed, fear, hatred are not inherent to a life of love, compassion, and individual's true nature (Buddha nature). Buddhists believe that becoming a human is to suffer and through acceptance this suffering, one could become content with life.[17] Hence, mindfulness meditation can be as a coping strategy for individual to ease suffering by finding purpose and meaning in that suffering. Awareness is an aspect of self-transcendence, can be stimulated by regular meditation practice.[18,19,20] In the last two decades, mindfulness meditation has been proposed as an intervention for many disorders, reporting a good efficacy for many physical and psychological diseases, as well as healthy people that can improve quality of life.[21,22]

According to using mindfulness meditation in research, Kabet-Zin[23] incorporated mindfulness meditation into his stress reduction program at the University of Massachusetts Medical Center. It is well known as Mindfulness-Based Stress Reduction (MBSR). His hypothesized that self-regulation theory supported how people learn to cope with pain after finishing the MBSR 8-week courses. Participants met with the group once a week for 60 minutes for 8 weeks. Mindfulness meditation interventions were taught by a clinical psychologist or a psychiatrist. All trainers had experience at teaching mindfulness meditation interventions to clinical or nonclinical groups for at least 4 years and have used mindfulness meditation techniques for independent home practice for at least 8 years. This mindfulness meditation course taught the following techniques: First, the body scan technique directs participants to assume a lying position and are guided to focus their attention non-judgmentally on their bodies from the toes to the top of the head. Secondly, the sitting meditation technique directs participants to focus on their breathing while sitting on a meditation cushion on the floor or in a chair. Thirdly, the walking meditation technique directs participants to focus their attention on body sensation through movement. Last, participants are to consider everyday life activities and to become more aware of how to apply mindfulness in routine tasks such as washing and eating.[23]

There are four components regarding the mechanism to relieve pain of mindfulness meditation, including body awareness, attention regulation, emotion regulation, and change in perspective on the self.[17,24] Brown and John reported that mindfulness meditation declined pain anticipation in the mid-cingulate cortex and right parietal cortex. In addition, it can increase the activity of the dorsal medial prefrontal cortex (MPFC) and rostral anterior

cingulate cortex (ACC) in brain. Since the activation of MPFC increasing, it can inhibit emotional responses to stimuli, hence anticipation to pain will be decreased by cognitive and emotional control.[25]

Objective

The purpose of this paper is to review studies investigating whether mindfulness meditation can relieve chronic pain in older adults and to provide direction for researchers in future studies.

Methods

This method paper will follow PRISMA guidelines[26] (Figure 1) and the PICO process which will be organized in the following manner: Problem: older adults with chronic pain; Intervention: a mindfulness meditation program; Comparison: compare evidence in the literature review; and Outcome: mindfulness meditation can relieve chronic pain.

Data Sources

A literature search will be undertaken using Medline, Cumulative Index to Nursing and Allied Health Literature (CINAHL), ProQuest Nursing and Allied Health sources, and Ovid. The search will include articles written in English published during the period of 2003-2018. The key search terms will be "mindfulness meditation," "mindfulness-based intervention," "meditation," "chronic pain," "arthritis," "older," and "aged or elderly." Additionally, a hand search focusing on the bibliographies of identified original articles will also be done.

Eligibility Criteria

The inclusion criteria are limited to experimental studies that examined the use of mindfulness meditation programs as a primary intervention. Usual care and no treatment ("wait list") are acceptable as control interventions. Additionally, all patients had experienced chronic pain as established by medical history (e.g. lower back or joint pain, neck pain, headaches, arthritis, and fibromyalgia), were a particular age group (at least half of participants ≥ 65 years old), and research studies were published in English between 2003 and 2018.

The exclusion criteria for the studies selected included any articles published in a non-English language, involved the use other mind and body interventions (not mindfulness meditation) used as a primary interventions, articles that focused on mindfulness meditation for other chronic conditions, (e.g. hypertension and diabetes) and any articles that dealt with mental health concerns as a primary focus. Also, articles without quantitative or qualitative data analysis were excluded.

Literature Search

This systematic literature review search yielded 35 articles through electronic database searching. Nineteen articles were evaluated for relevancy after removing duplicates. The full text articles were screened for eligibility and sixteen articles were then excluded because these articles did not meet the inclusion criteria. Reasons for elimination after the entire text had been reviewed were based on the following: other mind and body interventions were used as a primary intervention; it proposed a theory without the use of data analysis and involved studies that were unrelated to chronic pain. Finally, three studies fit the criteria and were considered for the present review (Figure 1).[27,28,29] Of the included studies, two of the articles were randomized controlled trials (RCTs)[27,28,] and only one article was a pretest-posttest experimental study.[29] Table 1 in the appendix shows all included studies that met the criteria and were discussed in this systematic review.

Setting and Characteristics of the Populations

All three studies were conducted in the United States. Participants were recruited from a multidisciplinary spine and rehabilitation center[27] and an adult pain clinic.[28] Other participants were those who had responded to posted flyers and newspaper advertisements [27,28] and through provider referrals.[29] Participants in 2 RCTs were people aged ≥ 65 years old.[27,28] One pretest-posttest experimental design studied adults older than 50 years old, but the mean age of all participants in this study was 74.6 years old.[29] On average, most of the populations in all articles were Caucasian and female, and were mostly middle-class and well educated.

The most common chronic pain conditions reviewed were chronic lower back pain (duration ≥ 3 months).[27,28] One of the two RCTs did not define minimal pain intensity[27], whereas in another RCT pain was to be at least moderate in intensity based on the "pain thermometer."[28] Only one article in the pretest-posttest experimental study examined patients with diabetic peripheral neuropathy (DNP) and had DNP symptoms of pain and/ or numbness ≥ 6 months.[29]

Outcome Measures

The primary outcomes in all articles were the reduction of pain and coping with pain. All studies assessed pain intensity after interventions using the McGill Pain Questionnaire (MPQ) total score [27,28] or the MPQ current pain score[28], and Neuropathic Pain Scale.[29] The secondary outcome measures in all studies were the improvement of physical function, quality of life, sleep disturbance, and psychological health related to mindfulness meditation interventions. Quality of life was assessed post-intervention in all three studies. Two RCTs used the Medical Outcomes Study 36-item short-form survey (SF-36) [27,28] and one pretest-posttest experimental study used Neuropathy-Specific Quality of Life Tool (NeuroQoL).[29] Disability was assessed using the Roland Morris Disability Questionnaire (RMDQ) [27,28,] Short Physical Performance Battery (SPPB), and Physical Functioning Scale of the Short-Form (SF) 36.27 One RCT assessed self-efficacy using the Chronic Pain Self-Efficacy Scale (CPSS)[28] and mindfulness using the Mindful Attention Awareness Scale (MAAS).[28] Only a pretest-posttest experimental study assessed sleep quality using the Pittsburgh Sleep Quality Index (PSQI).[29] Only one RCT study showed the results using group comparison at longer-term follow-up.[28] Each measurement in all studies had good reliability and validity in assessing community dwelling older adults experiencing pain.[27,28,29]

Ethical Considerations

This study aimed to conduct a systematic review. Ethical considerations of conducting systematic reviews in research were not typically discussed explicitly. However, systematic reviewers paid careful attention to how perspectives of authors and research participants of original studies were represented in a way that makes the missing perspectives visible.

The Institutional Review Board (IRB) approval number is BCNCT 14/2563 that received from Boromarajonani College of Nursing Chiang Mai on 30 October 2019.

Statistical Analysis

All three studies used descriptive statistics to summarize demographic characteristics of all participants.[27,28,29] Two RCTs used the t-test for the continuous variables and the Fisher's exact test for categorical variables, and the chi-square test for dichotomous variables to detect the differences between the intervention and control groups.[27,28] One pretest-posttest experimental study design used an analysis of covariance (ANCOVA) to determine the difference between the intervention and control groups.29 Data analysis was done by Stata statistical software, version 8 (Stata Corp., College Station, TX) and SAS 9.1.3 (SAS Institute Inc., Cary, NC).[29] The level of significance for all three studies was at 0.05.[27,28,29]

Results

Mindfulness Meditation Interventions

All studies reviewed used mindfulness meditation interventions that were developed by Jon Kabat-Zinn at the Stress Reduction Clinic at the University of Massachusetts Medical Center.[23] Two RCTs used 8-week meditation programs having 1.5-hour weekly sessions. These programs in RCTs studies did not include other mind and body interventions such as yoga. Half of each session covered mindfulness meditation techniques such as body scan, sitting, lying, and walking meditation. The other half session was dedicated to discussion and education.[27,28] In addition, these two RCTs studies provided daily homework of an audiotaped 45-minute meditation to be viewed 6 days a week. Mindfulness meditation interventions in 2 RCTs were taught by two trainers who had completed the Mindfulness-Based Stress Reduction (MBSR) instructor training and had a long-standing practice in meditation.[27,28]

Participants in the pretest-posttest experimental study participated in a 60-minute one-time formal session in a mindfulness meditation program, and then received instruction by listening to a guided compact disc about 5 days per week over a 4-week period in their homes. Physical investigators who had been trained and were experienced in both mindfulness meditation and diabetes education conducted all the classes.[29]

Control Group Designs

One RCT study compared MBSR group to a wait list control group.[27] Participants in a wait list control group did not receive any treatment during the study but got the mindfulness meditation intervention after post-treatment assessment. Another one of the RCTs compared MBSR group to a health education intervention that controlled for group size, time, and homework.[28] An 8-week Health Education program provided 90 minutes of instruction that involved lectures and group discussions about health-related topics. Particular focus was on back pain related topics such as types of back pain, pain medications, complementary techniques for back pain, eating and health, and Alzheimer's and mental exercise. Participants were given the "Brian Age" game as daily homework. Participants in the control group in a pretest-posttest experimental study were given a 60-minute class on nutrition and were asked to record food daily intake for one month.[29]

Compare Mindfulness Meditation Intervention Group with Control Group

One RCT reported that there was no significance difference between MBSR and health education on pain intensity that was assessed by the MPQ and disability.[28] However, at a short-term follow-up, there was significant difference between MBSR and health education on emotional role functioning on the SF-36, but not for mindfulness on the FFMQ or the MAAS, self-efficacy on the CPSS, and bodily pain on the SF-36. At 4-month follow-up, it was found that there was no group difference in pain intensity, disability, self-efficacy, quality of life, and mindfulness.[28]

Results from a pretest-posttest experimental study showed no significant differences between MBSR and health education in pain intensity on the NPS and quality of life on the Neuro QoL. Nevertheless, this study reported higher scores for pain on the NeuroQoL correlated with higher scores of sleep quality on PSQI ($p<0.05$). This indicates that rising levels of pain was associated with decreased sleep quality.

When compared intervention group with a wait list control group, it was found that one RCT did not find any differences on pain intensity that was assessed using the MPQ and disability using the RMDQ and the SPBB between MBSR group and a wait list

control group.[27] However, pain acceptance on the CPAQ was significantly higher in MBSR group compared to control group. In addition, disability that was assessed using the SF36-Physical Functioning Scale improved in the MBSR group. This RCT study showed that MBSR was superior to control in promoting physical functioning, but showed no advantage in the physical health composite, global health composite, bodily pain, and mental health composite on the SF-36. After treatment and a 4-week follow-up assessment, there was no difference in any outcomes within the intervention group.[27]

Adverse Events

There were no serious adverse events noted in all three studies.[27,28,29] However, three participants in one of the RCTs dropped out from the treatment group because of unexpected health concerns.[27] Another RCT showed that there were no drop-outs due to health obligations and no adverse events occurred during the study.[27] In addition, a pretest-posttest experimental study reported that one participant from a treatment group dropped out after week 2 due to loss of interest, and a second participant from a control group dropped out because of declining health just prior to the initial class. However, no adverse effects were reported from this study.[29]

Levels of Evidence

The method of a review uses a well-defined research question and follows PRISMA guidelines. Two articles reviewed were Randomized Controlled Trial (RCTs) that had a level of evidence of I.[27,28] One article was a pretest-posttest experimental study that had a level of evidence of II (Table 2).[29,30] RCTs are accepted as the most reliable evidence of whether a treatment or an intervention is effective. Two RCTs evaluated the effect of mindfulness meditation by comparing two groups. For this comparison, participants in both two groups were similar at baseline, received the same care apart from the treatment under study, and be assessed in the same way at the end of study. Thus, these studies have the highest internal validity because they require the fewest assumptions to attain unbiased estimate of treatment effects.

Discussion

The aim of this study was to review studies investigating the effectiveness of mindfulness meditation for the reduction of chronic pain in older adults. By following the PRISMA process, it was determined that there is limited evidence at present with only three articles available for review that had examined the effectiveness of mindfulness meditation in older populations with chronic pain. This meta-analysis showed three main findings. First, three studies suggested that mindfulness meditation interventions may have nonspecific effects that can relieve pain intensity in older adults with low back pain, rheumatoid arthritis, and fibromyalgia. One RCT study reported no differences in outcome between the mindfulness meditation group and a wait list control group in pain intensity after the end of program and after a one-month follow-up.[27] Additionally, when compared to MBSR groups with health education groups, there were no significant differences noted for reducing pain intensity.[28,29] Clearly, it could not be predicted whether the nonspecific control groups used to control nonspecific effects of mindfulness meditation interventions has specific benefits for reduction of pain as well, thus this hypothesis should be tested through experimental studies.

Second, even though the use of pain intensity as a primary outcome measures in all studies, pain relief is not the main objective for mindfulness-based stress reduction. Instead, participants accepted all

experiences regardless of how satisfied they were with them, without judgment.[23,31] In accordance with this intervention, Morone and colleagues[27] reported pain acceptance was increased after MBSR interventions. Pain acceptance illustrate participants' attempt to preserve their functioning despite the level of pain.[32] High pain acceptance could be related to lower pain intensity and lower physical disability.[32,33] Nevertheless, whether or not pain acceptance is one mechanism by which mindfulness meditation interventions decreases pain levels in older adults with chronic pain was not considered since it is beyond the scope of this study. Currently, there is no evidence regarding the effects of MBSR interventions in longer-term (> 6 months). Thus, more experimental studies with longer follow-ups are needed.

Last, the secondary outcomes of mindfulness meditation interventions can also provide benefits for reducing depressive symptoms that are related to chronic pain. Moreover, practicing continuous meditation can reduce the level of blood sugar,[34] and mindfulness meditation was very useful for solving problems appropriately in their life.[35] Interestingly, results have shown that participants who were in an MBSR group reported improved pain acceptance as well as improvement in their emotional state and quality of life. A single RCT study showed the effectiveness of mindfulness meditation on physical and psychological well-being in the short term after treatment.[28] It should be noted that more studies with longer follow-ups are needed. Grossman and colleagues[36] studied the benefits of MBSR in patients with fibromyalgia who were still involved in MBSR practice at a 3-year follow-up. Even though no comparisons were made in this study, this longitudinal study showed spontaneous improvements in stress level reduction and improved quality of life. Therefore, it can be hypothesized that although mindfulness does not modify pain perception, it does have benefits by modifying the relationship between the patient and the pain[29,37] they are experiencing, increases acceptance, and decreases depressive symptoms. The aim of MBSR is not directed at reducing patient's symptoms, but toward altering how mental processes operate leading toward greater acceptance, awareness, and tolerance of the unavoidable experiences of life.[23]

Limitations

Although all studies have suggested mindfulness meditation can relieve chronic pain, there are particular limitations to consider. The first limitation in all studies reviewed is methodology. It was found that most studies had a small sample size. Sample sizes affects statistical power and the reliability of the studies. Therefore, the results may not be generalizable to a wider sample population. In addition, there was a lack of randomization of the samples. Hence, large randomized control trials are needed to investigate the effectiveness of mindfulness meditation interventions to reduce the risk of bias.[29] The second limitation is the use of self-reported questionnaires in the process of collecting data in all studies which can lead to subject bias. The participants may answer the questions in a way that reduces embarrassment to them so responses may not be entirely truthful. The third limitation is that there was a lack of heterogeneity of disease. There were no studies which included specific chronic pain other than chronic lower back pain, fibromyalgia, and headaches. Specifically, arthritis, the third major cause of chronic pain in the USA, is a source of pain that was not considered in the meditation studies. Therefore, common pain syndromes such as osteoarthritis should also be explored to determine the benefits of mindfulness meditation for these ailments. Moreover, patients with chronic pain often have comorbid conditions such as heart disease and

depression. Hence, researchers should be careful when reviewing medical histories to avoid overlaps with symptoms and diagnoses of chronic pain. The fourth limitation is that the samples of all studies were typically women, who were white and who resided in Western countries. Therefore, these are limitations to the generalizability to males and patients in non-Western countries.

Conclusions

Although the studies reviewed do not overwhelmingly demonstrate whether mindfulness meditation could be more effective than non-specific interventions such as support and educational control groups in relieving chronic pain, researchers strongly suggest multiple beneficial effects can occur which have no harmful implications. However, mindfulness meditation interventions may not be beneficial for all individuals. For some, the time commitment required to obtain the results may be an obstacle. Future research should investigate the effects of intervention over the long term. In addition, studies are needed in order to extend current findings, to allow greater comparability across the various interventions. Further investigations about mindfulness meditation interventions for particular conditions such as fibromyalgia and post-surgical rehabilitation would also be useful.

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