

Meditation as a Useful Chance for Chronic Pain Decrease

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Abstract

Study background: The aim of this study was the investigation the role of meditation in a cohort of Italy resident subjects coming from Thailand, following only complementary medicine.

Methods: The cohort of subjects has been examined (60 subjects) by the visual analogue scale (VAS) scale for pain measurement. The subjects have been divided in two groups: experts (>10 years) and Lower experts in meditation (<3 years). All the subjects were affected by chronic pain due to osteoarthritis of the knees and low back pain.

Results: 28 subjects with chronic pain reported a mean basal VAS of 5.1 ± 1.8 . After 5 consecutive days of meditation, the expert in meditation reported a significant pain decreasing ($p < 0.01$) (VAS 3.0 ± 0.5) compared to the basal evaluation, while the lower experts in meditation reported a not significant decreasing of pain.

Conclusions: Meditation is nowadays a practice that should be highly recommended within a non-pharmacological approach for chronic pain therapy. This study it is further evidence that meditation might be a valuable strategy for chronic pain patients.

Keywords: Chronic pain; Complementary medicine; Low back pain; Meditation; Osteoarthritis; Pain

Abbreviations: CP: Chronic Pain; CMed: Complementary Medicine; OA: Osteoarthritis; K.OA: Osteoarthritis of the Knee; LBP: Low Back Pain

Introduction

Over the past 30 years, a great number of studies have been examined the psychological aspects of meditation applied along with chronic pain (CP) treatment, used as complementary treatment [1-7]. The subjective experience of pain is constructed and modulated by complex, multidimensional interactions between sensory, affective, and cognitive factors, making its treatment both challenging and costly. Mindfulness meditation, a cognitive practice based on developing nonjudgmental awareness of arising sensory events, has been shown repeatedly to alleviate pain across experimental and clinical settings.

Mindfulness is a way of paying attention that originated in Eastern meditation practices. It has been described as "bringing one's complete attention to the present experience on a moment-to-moment basis" [8] and as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" [9]. The ability to direct one's attention in this way can be developed through the practice of meditation, which is defined as the intentional self-regulation of attention from moment to moment [10]. The current mindfulness literature describes numerous meditation exercises designed to develop mindfulness skills [11-13]. Many encourage individuals to attend to the internal experiences occurring in each moment, such as bodily sensations, thoughts, and emotions. Others encourage attention to aspects of the environment, such as sights and sounds. All suggest that mindfulness should be practiced with an attitude of non-judgmental acceptance. That is, phenomena that enter the individual's awareness during mindfulness practice, such as perceptions, cognitions, emotions, or sensations, are observed carefully but are not evaluated as good or bad, true or false, healthy or sick, or important or trivial [14]. Thus, mindfulness is the

nonjudgmental observation of the ongoing stream of internal and external stimuli as they arise.

A certain number of studies have been carried out in Rheumatology. A specific study on a number of chronic disorders [15] (osteoarthritis (OA), back pain, and rheumatoid arthritis [16], fibromyalgia (FM) [5,16,17] demonstrated good results on OA, and on FM, while another study has showed that meditation is the third most requested discipline among the practice of Complementary Medicine (CMed) with satisfactory results [3,16-18]. Within the CMed of back pain a number of studies showed as the meditation practices can be beneficial [1-7,16].

In spite of significant methodological flaws, the current literature suggests that mindfulness-based interventions may help to alleviate a variety of mental health problems and improve psychological functioning. These studies also suggest that many patients who enroll in mindfulness-based programs will complete them, in spite of high demands for homework practice, and that a substantial subset will continue to practice mindfulness skills long after the treatment program has ended. Mindfulness-based interventions appear to be conceptually consistent with many other empirically supported treatment approaches and may provide a technology of acceptance to complement the technology of change exemplified by most cognitive-

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behavioral procedures. Thus, it appears that methodologically sound studies of mindfulness-based interventions would be very informative. Randomized clinical trials are needed to clarify whether observed effects are due to mindfulness training or to confounding factors such as placebo effects or passage of time [19].

The aim of the present work is to highlight the importance of a non-pharmacological approach applied to pain therapy through Meditation.

Materials and Methods

A Thai population residing in centre Italy has been observed and examined for this study. All subjects have claimed to be strictly vegetarian and that they were not following any pharmacological therapy (pain therapy, nor for other pathologies – they affirmed to be affected by no diseases) at the moment and during the study. They have also given informed consent for their clinical and personal data to be used for this research. All the subjects have claimed to be following Buddhism since their infancy and, particularly, to follow the Theravada School, often visiting and be hosted in the local Buddhist Monastery in Lazio [20,21].

Subjects

Our whole sample population included 78 subjects (35 males, 43 females; mean age 45.2 ± 17.6 years), but only the subjects aged 30 and over have been included in the study, as these symptoms arise from this age: 60 subjects (27 males, 33 females; mean age 54.1 ± 10.4 years). Of the 60 observed subjects, 28 subjects reported they suffered of CP (12 males, 16 females; mean age 53.2 ± 8.6 years); of which, 16 reported to have suffered of chronic low back pain (CLBP, mean 10.2 ± 2.4 years) and 12 have reported to suffer from OA of the knee (K.OA, mean 13.7 ± 4.5 years) (Table 1).

Subjects' evaluation

All patients were showed how to understand the visual analogue scale (VAS) with the aim of evaluating CP. They were recommended to stop Meditation sessions during 15 consecutive days, as a sort of "washout" period. Moreover, they were recommended to fill in the VAS form before and after at least 5 meditation sessions performed during 5 days in a row (recorded data represent the survey's average).

Level of meditative ability and experience

The subjects with CP have been separated in 2 groups: Experts in Meditation (EM with an experience of over 10 years, able to meditate for a time lapse spanning 60 minutes, for each meditation session); non-Experts in Meditation (NEM, with an experience of less of 3 years, able to meditate for 20 minutes to session). All subjects affirmed they have adopted the vipassana method [20,21].

Statistics

In order to evaluate the statistical significance for confrontation, we have applied the Student's "t"-test for paired and unpaired data; a further evaluation for significance and confrontation has been performed using the χ^2 test. Statistical significance was considered for $p \leq 0.05$. Data were analyzed using the GRAF-PAD Prism software for Windows (Microsoft, USA).

Results

Among 78 subjects in a population of Thai citizens residing in Italy, Buddhist following the Theravada Method and strictly vegetarian, we have selected 60 subjects. Among these, 28 subjects reported CP deriving from LBP 16 subjects and from K.OA 12 subjects (Table 2). CP lasted 12.3 ± 3.6 years (LBP mean 10.2 ± 2.4 years; K.OA mean 13.7 ± 4.5 years). None of the subjects were administered (nor told to have taken in the past) any analgesic therapy, in reason of their religious faith, specifically experiential and existential. CP has been evaluated following the VAS scale. Within the totality of 28 subjects affected by CP, the average evaluation has been resulted as 5.1 ± 1.8 . It has been assessed and evaluation of basal CP (recorded after 15 days of non-meditation practice) and after a series of 5 consecutive meditation sessions taken in successively 5 days. The basal VAS for the 28 subjects with CP was of 5.1 ± 1.8 . After 5 days, the EM reported a significant pain diminution ($p < 0.01$) (VAS 3.0 ± 0.5) compared to the basal evaluation, while the NEM reported only a diminution of pain of only VAS 4.4 ± 0.4 , which has not been considered relevant. The comparison between the 2 groups has not matched the significance (Figure 1).

Discussion

Interesting results have emerged from the present study. The basal mean of pain reported by the 28 subjects with CP (in 16 subjects due to LBP and in 12 others due to K.OA), measured through the visual analogue scale (VAS), is of 5.1 ± 1.8 and it has been measured after 15 days of non-meditative practice. This value has decreased in both groups, divided according to their ability and experience in the Meditation practice.

In the NEM group (10 subjects), after 5 consecutive days of meditation for about 20 minutes a day, the VAS has decreased to 4.4 ± 0.4 , meaning that, even in the NEM meditation from less than 3 years and for a time lapse of ≤ 20 /session, it is anyway relevant the role that this methodology plays in contributing to reduce the perception of pain in pathologies like LBP and K.OA, even without a statistical relevant result in relation to the totality of 28 subjects with CP. Even more significant are the results obtained among the EM (18 subjects) that have had the VAS reduced down to 3.0 ± 0.5 . This time a statistical significant result has been compared to the whole group. Among the EM

Subjects > 30 years (n 60)				
27m / 33 f; mean age 54.1 ± 10.4 years, range 31-72				
Chronic Pain	CLBP	K.OA	EM (n.)	NEM (n.)
n. (%) duration (years)	n. (%) duration (years)	n. (%) duration (years)	[≥ 10 years]	[≤ 3 years]
28 (46.6)	16 (26.6)	12 (20.0)	18	10
12.3 ± 3.6	10.2 ± 2.4	13.7 ± 4.5		

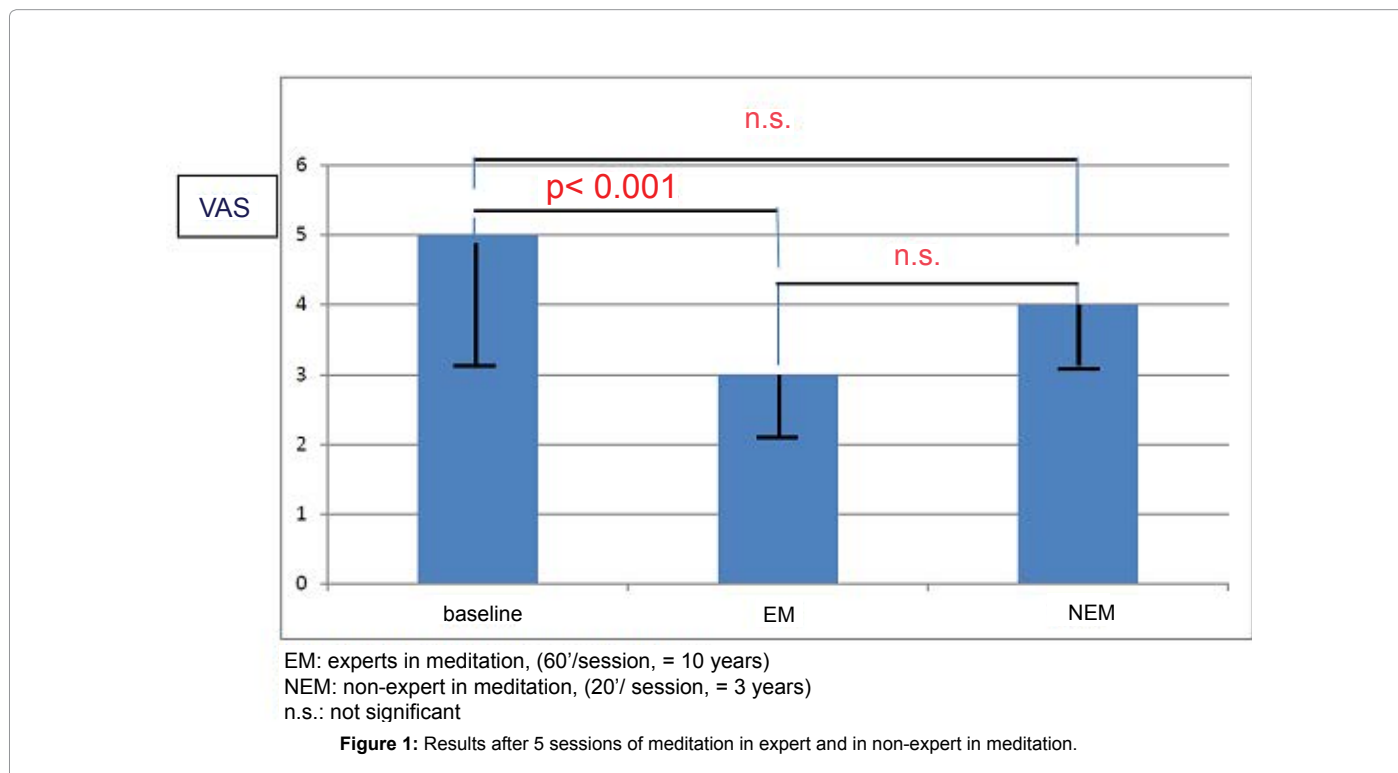
CLBP: chronic low back pain; K.OA: chronic osteoarthritis of the knees; EM: experts in meditation, (60'/session, ≥10 years); NEM: non-experts in meditation, (20'/session, ≤3 years)

Table 1: Subjects studied.

VAS, baseline (all)	VAS after 5 med. Sessions EM (n. 18)	VAS after 5 med. Sessions NEM (n. 10)	
5.1 ± 1.8	3.0 ± 0.5 (*)	4.4 ± 0.4 (**)	*p<0.01 vs baseline °n.s. vs EM **n.s. vs baseline

EM: experts in meditation, (60'/session, ≥ 10 years); NEM: non-experts in meditation, (20'/session, ≤ 3 years); n.s.: not significant

Table 2: Pain (VAS, 0-10) in Experts and in non-Experts in Meditation.



such a reduction is to refer to the fact that they have more than 10 years of experience and therefore have acquired an ability to meditate better. The result obtained by the comparison of the 2 groups is not statistically relevant and this can be due to the fact that a certain decrease has been observed also within the non-expert meditators and that the sample is low in number (Figure 1).

Nevertheless, it seems that more time is devoted to meditation and more significant would be the results. However some improvement is also observed in subjects that have just had started with Meditation and have experienced their very first sessions. It might seem that Meditation would allow new circuits to be created in the brain, while the circuits already present will be at that point modified, like in the case of chronic pain perception [22-24]. This is a type of pain that has left the usual routes of acute physiological pain and has become a more complex pain with an emotional negative connotation. Meditation and pain both alter sensory, cognitive, and affective dimensions of our subjective experience [25]. Given that mindfulness meditation can attenuate the subjective experience of pain [26-29], brain regions involved in meditation must somehow interact with those involved in nociceptive processing, yet the specific brain mechanisms associated with mindfulness meditation remain poorly characterized. In addition, how these brain mechanisms could potentially influence pain-related brain activity remains unknown [26]. Using an emerging functional magnetic resonance imaging (fMRI) technique, pulsed arterial spin

labeled (PASL) MRI, we investigated how meditation affects pain-related brain processes. PASL MRI is appropriate for imaging steady cognitive states such as meditation because it is less susceptible to slow drifts in signal intensity than conventional blood oxygen level-dependent (BOLD) fMRI [30-32]. Moreover, this technique provides a fully quantitative measure of cerebral blood flow (CBF) and allows global CBF changes such as those produced by respiratory confounds to be assessed. In addition, PASL MRI can assess activation in the orbitofrontal cortex (OFC), an area contributing to affective regulation processes, more effectively than BOLD [33,34]. Meditation likely modulates pain through several mechanisms. First, brain areas not directly related to meditation exhibited altered responses to noxious thermal stimuli. Notably, meditation significantly reduced pain-related afferent processing in SI, a region long associated with sensory-discriminative processing of nociceptive information [35]. Executive-level brain regions (ACC, AI, OFC) are thought to influence SI activity via anatomical pathways traversing the SII, insular, and posterior parietal cortex [36-38]. However, because meditation-induced changes in SI were not specifically correlated with reductions in either pain intensity or unpleasantness, this remote tuning may take place at a processing level before the differentiation of nociceptive information into subjective sensory experience. Second, the magnitude of decreased pain intensity ratings was associated with ACC and right AI activation. Activation in the mid-cingulate and AI overlapped between meditation and pain, indicating a likely substrate for pain modulation.

Converging lines of evidence suggest that these regions play a major role in the evaluation of pain intensity and fine-tuning afferent processing in a context-relevant manner [39]. Such roles are consistent with the aspect of mindfulness meditation that involves reducing appraisals that normally impart significance to salient sensory events. Third, OFC activation was associated with decreases in pain unpleasantness ratings. The OFC has been implicated in regulating affective responses by manipulating the contextual evaluation of sensory events and processing reward value in the cognitive modulation of pain [40-42]. Meditation directly improves mood, and positive mood induction reduces pain ratings [43]. Therefore, meditation-related OFC activation may reflect altered executive-level reappraisals to consciously process reward and hedonic experiences (e.g., immediate pain relief, positive mood) [44].

Concepts like brains and body/mind are flexible and it seems that a powerful way for them to be transformed, since thousands of years, would be precisely Meditation. Which does not necessarily requires to be holding a religious faith, but simply acquiring an ability and a useful practice [1]. Other studies, in fact, have showed as subjects with no particular meditation abilities can start to have important results with only 8 weeks of exercise, reporting of having experienced a certain peace of mind and having become able to bear the anxiety specifically linked to pain. These subjects said they were able to experience an increased status of wellness and serenity [2-4].

Conclusions

Meditation is nowadays a practice that should be highly recommended within a non-pharmacological approach for CP therapy. The fact that this discipline needs a certain continuity of exercise cannot be discouraging and preventing from practice it, as there are many studies that clearly show its real efficacy [1-8,16-18]. In the multimodal and CMed approach to the antalgic therapy, other than a prompt start of the pharmacological therapy (in order to impede from start the modality of complex pain that is chronic pain) and a deeper study on its nature, it could be the case of taking into consideration the therapeutic opportunity offered by the ancient discipline of Meditation, together with its benefits for body and mind, especially in the patients with CP.

However since Thai population might be culturally different from the average CP patient, the results might not be generalizable.

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