

Effects of cognitive behavioral therapy (CBT) and meditation in chronic low back pain

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ABSTRACT

Context: Chronic low back pain (CLBP) is a highly prevalent and often disabling condition among adults. Meditation is a practice which uses a technique like mindfulness, or focusing their mind on a thought, activity to train awareness, achieve a mentally clear and emotionally calm state. Cognitive-behavioral therapy (CBT) is a form of psychotherapy that has been documented to be effective in treating depression, chronic pain, and other mental disorders. **Aim:** To compare the effects of both, CBT, and meditation on pain management in CLBP. **Method:** 27 patients with CLBP between the age group of 36-50 yrs were selected. They were divided into three groups. A 4-week intervention of conventional physiotherapeutic exercises, Meditation and CBT, was given. Oswestry Low Back Pain Disability Questionnaire and Numerical Pain Rating Scale were used as outcome measures. **Results:** Our study shows significant results pre and post all interventions, but no significant difference can be seen when the three interventions are compared to each other (with $p < 0.05$). **Conclusion:** Based on the result obtained, we can say that all three interventions have a positive effect on pain reduction in CLBP. Statistically, no intervention has a better impact on others. But clinically meditation group performed better.

KEYWORDS: Cognitive; Behavioral; Meditation; Chronic low back pain

INTRODUCTION

Chronic low back pain is a highly prevalent and often disabling condition among adults [1]. Prior research has demonstrated strong associations between chronic pain and substantial morbidities, like functional disability and depression [2]. 75-84 % of the general population suffer from low back pain, and among them, it is estimated that 5-10 % of the people experience LBP resulting in severe morbidity, increased health care costs, sick leaves and individual suffering [2]. Given the prevalence of chronic pain, its impact on health (emotional and physical), and its costs (about \$100 billion annually), chronic pain presents a public health issue of major importance [2]. It is also a leading cause of disability among working-age adults. Although analgesic medications are commonly used to treat Chronic Low Back

Pain (CLBP), pharmacological options are often limited given the side-effect profiles of and risks associated with many analgesic agents, including non-steroidal anti-inflammatory and opioid medications. Developing effective non-pharmacologic treatments could possibly provide substantial benefit to people with CLBP [3].

Cognitive-behavioral therapy (CBT) is a form of psychotherapy that has been documented to be effective in treating anxiety, depression, chronic pain, and other mental disorders. It is a potentially effective treatment for reducing pain and improving function in people with CLBP [4]. CBT seeks to enhance a person's ability to cope effectively with pain and its consequences using a variety of cognitive and behavioral methods. The therapy is limited to 4-8 weekly treatment sessions and is administered either individually or in a group format. Prior studies of persons with

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chronic pain have shown that CBT can reduce levels of pain and pain-related disability, as well as enhance a person's ability to self- manage pain [5-7].

Meditation is a practice where an individual uses a technique - such as mindfulness or focusing their mind on an object, thought or activity - to train attention and awareness, and achieve a mentally clear and emotionally calm state. Kabat-Zinn states mindfulness is: "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" [8].

CBT and meditation, both have a positive effect on the reduction of CLBP, but which one is more efficient in the same treatment period is less understood. It would be advantageous if Physical Therapists also included other nonpharmacological treatment methods for the faster and better recovery of their patients. Also, taking into consideration aspects other than physical, i.e. mental, emotional etc. has a strong and holistic effect on the condition of the patient.

MATERIAL AND METHODOLOGY

Ethical approval: Ethical approval was taken from the ethical committee of our college

Study design: Interventional study

Study area: Smt. Kashibai Navale College of Physiotherapy, Pune

Sample size: 27 (17 males, 10 females)

Sampling method: Purposive sampling

Study duration: 6 months

Inclusion Criteria: Subjects of age 36-50 years (middle-aged adults), who have a mechanical type of pain constrained between the lower ribs and the gluteal folds, pain for the duration of more than three months, pain ≥ 4 on the Numerical Pain Rating Scale, and subjects who score ≥ 26 on the Montreal Cognition Assessment (MOCA) [9]

Exclusion Criteria: Subjects with cognitive or perceptual impairments, diagnosed with any psychological/ psychiatric illness, on any other treatment except for pain reduction medications and subjects with previous spine surgeries or severe spinal or neurological pathology.

Methodology

Written consent was taken from subjects who fulfilled the inclusion criteria and who volunteered to participate in the study. A pre-intervention assessment of non-specific low back pain was done using the Oswestry Low Back Pain Disability Questionnaire [10] and Numerical Pain Rating Scale (NPRS) [11]. The 27 subjects were divided into three groups of 9 each.

A 4-week intervention including conventional physiotherapeutic exercises, meditation and CBT was given to the three groups – 45 mins session – twice a week, for four weeks.

Each session included: **Control Group:** 30 minutes of conventional exercises- cat camel pose, back extension exercises, pelvic bridging, superman pose, DLF stretching, Lion's stretch, hip musculature strengthening and hot fomentation (which was advised at home). Each exercise was given for eight reps and then increased to 15 reps according to individual capability.

Experimental Group 1: 15 minutes of meditation, which included body scan meditation, breathing focus and walking meditation; and 30 minutes of conventional exercises.

Experimental Group 2: 15 minutes of CBT in which they had to fill a Thought Record Sheet and 30 minutes of conventional exercises.

After four weeks, the outcome measures were again recorded.

Statistical analysis: The data was analyzed using SPSS version 24 Software with a level of significance of $p < 0.05$. Shapiro Wilk test was used to check normality. Paired t-test was used for within-group comparison, and one-way ANOVA test was used for between-group comparison. one participant dropped out (from experimental group 2-unwilling to continue)

RESULTS

WITHIN GROUP COMPARISON

Table 1. Oswestry Low Back Pain Disability Questionnaire - Paired t-test

Group		N	Mean	P-value
Control	Pre	9	60.4±4.9	0.00
	Post	9	39.8±6.4	
Group 1 (Meditation+ Conventional)	Pre	9	56.4±8.1	0.00
	Post	9	28.2±7.6	
Group 2 (CBT + Conventional)	Pre	9	57.5±6.8	0.00
	Post	8	35.3±8.7	

Table 2. Numerical Pain Rating Scale - Paired t-test

Group		N	Mean	P-value
Control	Pre	9	7.56±1	0.00
	Post	9	4.11±0.9	
Group 1 (Meditation+ Conventional)	Pre	9	6.56±1.3	0.00
	Post	9	2.56±1.3	
Group 2 (CBT + Conventional)	Pre	9	7±1.2	0.00
	Post	8	4±1.5	

BETWEEN GROUP COMPARISON**Table 3. Oswestry Low Back Pain Disability Questionnaire - ANOVA Test**

Group	N	Mean±SD	F value	P-value
Control	9	20.67±5.5	2.914	0.074
Meditation	9	28.22±5.8		
CBT	8	22.25±9.3		

Table 4. Numerical Pain Rating Scale - ANOVA Test

Group	N	Mean	F value	P-value
Control	9	3±1.4	1.743	0.197
Meditation	9	4±1.1		
CBT	8	3.4±0.7		

The given tables show that there was a reduction in pain (NPRS) and also a lower score was seen on the Oswestry Low Back Pain Disability Questionnaire after all three interventions. No intervention seemed to have a better effect on the other by a significant value.

DISCUSSION

The study shows that a four weeks protocol of conventional physiotherapeutic exercises; meditation and CBT have a significant reduction in pain and improvement in function in patients with chronic low back pain in the age group 36-50 years.

These treatments affect both ascending and descending aspects of pain processing and act through brain mechanisms that involve sensorimotor areas as well as those engaged in affective- motivational and cognitive-evaluative phenomena.

Meditation has been described as a “non-elaborative, non-judgemental awareness” of the present-moment experience. Pain is a complex and subjective experience constructed and modulated by a constellation of sensory, cognitive, and affective factors, including mood, psychological disposition, meaning-related cognitions, learning, desires, and pre-pain cognitive states to provide a continually changing experience. Nociceptive sensory events are first registered by peripheral primary afferents (A-delta fibers, C fibers) at the site of tissue damage, which then relays this nociceptive information to the dorsal horn of the spinal cord. From the spinal cord, this information ascends contralateral to the site of pain to the brain, largely through the spinothalamic pathway. This input is then processed through the lower-level sensory regions. Contextual meaning is then facilitated through activation of higher-order brain regions. Yet, the subjective experience of pain remains to be highly influenced by the context in which it occurs. That is, previous experiences, expectations, mood, conditioning, desires and other cognitive factors can

dramatically amplify and/or attenuate pain [12].

The aim of CBT was to help patients adapt and make desirable changes in the present rather than to deal with issues in the distant past. The goal for long-lasting successful outcomes is for the patient to develop an internal locus of control.

Four components summarize the theoretical background of CBT in the management of LBP: The patient’s knowledge and understanding about the pain and pain perception, the use of active coping skills, the maintenance of behavioural pain-coping strategies and problem-solving methods that enable patients to analyze and develop plans for dealing with pain or other challenging situations [13].

Patients with an external locus of control have difficulty coping with their symptoms. CBT interventions have the scope to address a patient’s health locus of control perception and coping skills. Adaptive coping, as a personality trait, is associated with better pain-related functioning, and CBT as part of rehabilitation can encourage such beneficial pain-coping behaviour by altering patients’ pain perception, thereby reducing the adverse effects of pain. Therefore, the modification of patients’ beliefs about the nature and treatment of their pain may be associated with improvements in patients’ perceptions of the level of their disability [13]. It also helps in finding out the thought distortions and correcting them. The goal is to enable patients to become their own therapists; hence, the therapeutic relationship between the CBT therapist and the patient is collaborative and supportive.

When comparing within-group data, statistically significant improvement in both outcome measures was found. The between-group data comparison showed no statistically significant improvement using the one-way ANOVA test.

CONCLUSION

All three interventions, i.e. conventional physiotherapeutic exercises, meditation and CBT, have a positive effect on pain reduction in CLBP, no intervention has a better effect than the other. Clinically meditation group performed better over other groups.

Conflict of interest : Nil

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