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Research Article

Cognitive behavioral therapy (CBT) and meditation in the treatment of persistent low back pain: Interventional Study

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Abstract

Objective: To compare the effect of both CBT and Meditation in chronic lower back pain patients.

Method: Participants fulfilling the exclusion and inclusion criteria and who are between the age group of 35-50 years with CLBP were included. Numerical pain rating scale and Montreal Cognitive Assessment (MOCA) was used for the participant selection. The participants were further divided into three groups and 4-week intervention of conventional physiotherapeutic exercise, meditation and CBT, was given to the participants. Numerical Pain Rating Scale and Oswestry Low Back Pain Disability Questionnaire were used as outcome measures.

Results: 40 chronic back pain patients were enrolled and randomized. All enrolled participants completed baseline tests, providing cross-sectional data for this study. Simple randomization allocated 14 patients to the control group and 13 patients each to Experimental Group 1 and Experimental Group 2. Significant within-group improvements occurred on the Numerical Rating Scale and Oswestry scores between baseline and final visits for all groups. However, the experimental groups showed significantly greater decreases in pain intensity versus controls, evidenced by reduced mean Numerical Rating Scale and Oswestry scores at follow-up. One-way ANOVA and Welch tests revealed significantly reduced Numerical Rating Scale and Oswestry scores after treatment across groups. Both tests yielded statistically significant p-values <0.01.

Conclusion: The findings show that meditation and cognitive behavioural therapy (CBT) are beneficial in reducing pain. As a result, for patients with persistent low back pain, taking into consideration these two treatment techniques is critical.

Keywords: Cognitive Behavioural Therapy, Chronic Pain, Oswestry Questionnaire

INTRODUCTION:

Low back pain (LBP) is generally characterized as pain below the costal margin (ribs) and above the lower gluteal folds (buttock crease). It is the primary driver of years of worldwide impairment and is becoming increasingly and more prevalent [1-3]. Chronic low back pain (CLBP) is considered the most prevalent and costly musculoskeletal condition in modern society and is described as a pain that persists for more than 3 months, or longer than the anticipated healing time [4,5]. Low back pain affects approximately 75 to 84 percent of the general population, and 5-10% of people suffer from low back pain, according to estimates, resulting in significant morbidity, greater health-care expenses, sick days/ leaves, and personal suffering [6,7].

Chronic pain is a substantial public health issue, given its prevalence, health effects (both mental and physical), and financial costs (approximately $100 billion annually)[6]. While analgesic medications are frequently used to treat Chronic Low Back Pain (CLBP), pharmacological treatment options are generally limited due to the adverse effect profiles and consequences associated with many analgesic medications, such as non-steroidal anti-inflammatory and opioid medications. NSAIDs are as effective as other classes of drugs, but they carry the potential for gastrointestinal side effects. Their protection in the sense of hypertension and/or cardiovascular disease for long-term use has been questioned. The treatment of such patients should be supportive, aimed at improving pain and function rather than "cure" the patient's condition. The development of effective non-pharmacological treatments could potentially be of significant benefit to individuals with CLBP [8].

CBT (Cognitive Behavioral Therapy) is a technique that aims to transform the way patients think and respond in order to assist them to manage their challenges. It is not intended to fix particular problems, but rather to assist in their constructive resolution. [9]. CBT is designated as a psychological management to be utilized in the case of chronic pain, according to Monticone

et al., (2013). This is often done in combination with other physical modalities and exercise. CBT's overall idea is to convert a person's emotional pattern and the thought process of the patients suffering from it. The therapy is limited to 4 to 8 weekly therapy sessions & it is offered in a social setting or individually respectively. Previous studies of CBT have demonstrated to reduce pain and pain-related disabilities in people with chronic pain, as well as enhance the person's ability to self-manage pain [10-12].

Meditation is the technique of observing your thoughts and feelings from afar without criticizing them. When a person employs mindfulness or focusing their thoughts on a subject, idea, or activity to train attention and awareness and develop a cognitively clear and emotionally relaxed state of mind. Because of the high prevalence and refractory nature of chronic pain, as well as the negative implications of pain drug dependence, there has been a surge in interest in terms of treatment strategies that comprises complementary therapy or pharmacological alternatives [13]. Meditation on mindfulness is one such approach used by patients suffering from pain. Mindfulness encourages an attentive attitude of detached observation, which is based on traditional Eastern meditation practices. 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" [14]. Both CBT and meditation have been shown to alleviate CLBP. However, it is less understood which one is more effective during the same treatment period. The goal of this research is to compile evidence for the treatment of chronic pain in adults. Hence, the effectiveness of cognitive behavioral therapy and meditation therapies was compared.

MATERIALS AND METHODS:

Ethical Approval: Ethical clearance was taken from the institutional ethics committee for the conduct of the study

Study Design: Interventional Study

Study Site: Sanjeevini Specialty Hospital and Heart Care Centre, Hubli

Sample Size: 42 Patients

Sampling Method: Purposive Sampling

Study Duration: 6 Months

Inclusion Criteria: Subjects of middle aged adults (Age group of 35-50 years),who have a mechanical sort of pain between the gluteal folds and lower ribs that has lasted more than two months and subjects with a pain range of ≥4 on a numerical pain scale and score of ≥26 on the Montreal Cognitive Assessment (MOCA).

Exclusion Criteria: Participants who are not willing to sign the consent form. Subjects and subjects with perceptual impairment, diagnosed with any psychiatric/Psychological illness. Subjects who are taking any additional medications besides pain relievers. Those who have undergone spinal surgery or who have severe spinal or neurological pathology.

Methodology:

Written consent was taken from the subjects, who volunteered to participate in the study and who fulfilled inclusion and exclusion criteria. A pre-intervention assessment of non-specific low back pain was done using numerical pain rating scale and Oswestry low back pain disability Questionnaire. The 42 subjects were included in the study and are divided into three groups of 14 each.

The three groups received a four-week intervention consisting of traditional Physiotherapeutic exercises, meditation, and CBT delivered in 30-minute sessions three times a week for four weeks. Each session consisted of the following:

Control Group: The participants were subjected to Back extension, pelvic bridging, superman posture, Lion's Stretch, Cat camel stance, hip musculature strengthening, and heat fomentation were among the traditional exercises for 30 minutes (which was advised at home). Each exercise was performed for eight times and subsequently increased to 12 reps based on the participants' abilities.

Experimental group 1: The subjects were given 30 minutes of meditation and 30 minutes of traditional exercise, which comprised body scan meditation, walking meditation, and breathing concentration.

Experimental Group 2:

The subjects were given 15 minutes of cognitive behavioral therapy (CBT), during which they were instructed to complete a Thought Record Sheet, followed by 30 minutes of traditional exercise. The outcome measurements were taken again after four weeks.

All the collected data were entered onto MS Excel. Data cleaning and data validation were performed before execution of statistical tests. The baseline and final visit scores pertaining to numerical scale and Oswestry questionnaire of the study participants were compared using the paired-samples t test. The inter-group comparisons were performed by One-way ANOVA followed by the Welch test separately for the numerical scale and Oswestry scores of base-line visit and final visit of all the three groups. Considering the robustness and advantages, the Welch test was also applied for the data following the ANOVA test. All statistical analyses were performed with SPSS Version 16.0. 'p' value of 0.05 was considered statistically significant. Two participants dropped out (One from experimental group 1 and Experimental group 2 each - unwilling to continue and unavailability).

RESULTS:

The flow of participants in the study is represented in Figure 1. 40 people were enrolled and randomized out of 141 who showed interest in the study and were screened for eligibility. The baseline tests were performed by all enrolled participants (N=41), providing information for this cross-sectional study. A total of 40 chronic back pain patients participated and completed the research study. Each patient agreed to provide voluntary consent to participate in the study and provide the responses related to their back pain with the help of 2 study measures, i.e, Numerical scale & Oswestry scale. The patients were subjected to a simple randomization technique and 14 patients were recruited into the control group and 13 patients were recruited into the Experimental group-1 and 2 respectively.

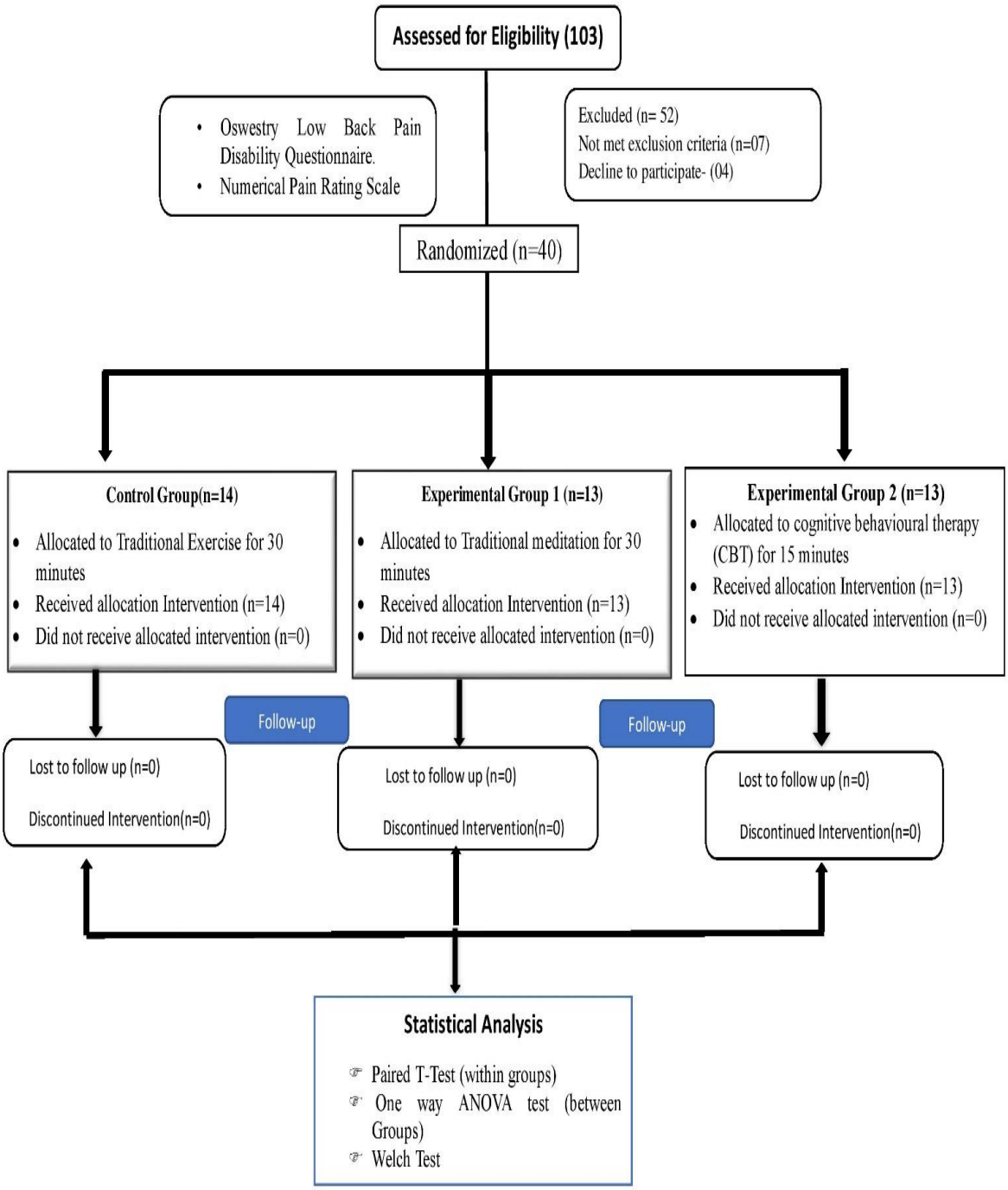

Figure 1: Consort Diagram

Table 1 shows the participants' socioeconomic characteristics. Participants with mean age of 42.6 (±4.8) years, and were female (56.09%) and 43.9% were male. The average pain bothersomeness rating (6.87) suggested moderate levels of severity, and 78%of individuals reported at least one year without back discomfort since a week. 14% of participants stated they used opioids to alleviate pain in the previous week. At baseline, the meditation-CBT group endorsed more severe pain 7.69(2.05), a higher degree of mindfulness, and lower perceived stress than control.

Table 1: Baseline Characteristics of Participants by Treatment Group

	All (n=41)	Control Group (n=14)	Experimental group 1 (n=13)	Experimental group 2 (n=13)
Sociodemographic characteristics				
Age, mean (SD), y	42.6(4.8)	43.6(4.7)	43.07(4.05)	40.84(5.15)
Female	23(56.09)	08(57.14)	07(53.84)	08(61.53)
Male	18(43.9)	06(42.85)	06(46.15)	05(38.46)
Education				
High school or less	24(58.53)	09(64.28)	07(53.84)	08(61.53)
Some college or vocational school	13(31.70)	03(21.42)	05(38.46)	03(23.07)
College graduate	05(12.19)	02(14.28)	01(7.69)	02(15.38)
Employed	26(63.41)	10(71.42)	09(69.23)	07(53.84)
Married or living as married	30(73.14)	09(64.28)	10(76.92)	11(84.6)
Back pain history and expectations				
At least one year since one week without LBP	32(78.04)	11(78.57)	10(76.92)	11(84.61)
Have had spinal injection for LBP	04(9.75)	01(7.14)	02(15.38)	01(7.69)
"A lot of pain" currently in body site other than back	05(12.19)	01(7.14)	02(15.38)	02(15.38)
Expect LBP to be much better or gone in 1 year	14(34.14)	04(28.57)	06(46.15)	04(30.76)
Primary Outcomes				
MOCA (score ≥26 is considered for the study), mean (SD)	28.02(1.28)	27.92(1.27)	27.85(1.35)	28.28(1.16)
Pain bothersomeness rating (0–10; higher scores indicate greater pain), mean (SD)	6.87(2.02)	6(1.55)	7(2.07)	7.69(2.05)
Medication use for LBP in past week				
Any medication	24	05	09	10
Opioids	14	03	05	06
Back-specific exercise, at least 3 days in past week	19	04	08	07
General exercise, at least 3 days in past week	23	09	07	07

The primary outcome was analyzed using MOCA scale and subject's score ≥26 is considered for the study and the mean score was found to be 28.02(±1.28). Significant improvements were observed with respect to the Numerical scale scores & Oswestry scores during the baseline visit and final visit in all the three groups. However, compared to the control group, the experimental groups demonstrated significant decrease in pain intensity, which was evident in the decreased mean-numerical scale scores and Oswestry scores at the final follow up.

Table 2: Numerical scale paired samples t-test

Group		Number	Mean Standard Deviation	t	df	*p* value
Control	Pre-Test	14	6.00±1.61	3.63	13	0.003*
	Post-Test	14	4.78±1.52			
Experimental Group 1	Pre-Intervention	13	7.00±2.16	5.927	12	0.000*
	Post-Intervention	13	3.15±1.72			
Experimental Group 2	Pre-Intervention	13	7.69±2.13	7.258	12	0.000*
	Post-Intervention	13	3.07±1.32			

Table 3: Oswestry score paired samples t-test

Group		Number	Mean Standard Deviation	t	df	*p* value
Control	Pre-Test	14	46.71±1.68	22.035	13	0.000*
	Post-Test	14	28.50±2.50			
Experimental Group 1	Pre-Intervention	13	44.07±3.22	18.338	12	0.000*
	Post-Intervention	13	16.23±3.63			
Experimental Group 2	Pre-Intervention	13	41.92±1.70	27.453	12	0.000*
	Post-Intervention	13	17.53±3.15			

The detailed comparison of results during the baseline and the final visit scores are given in Table-2 & Table-3. The inter-group comparison between the three groups was performed using One-way ANOVA followed by a Welch test post final visit.

Table 4: Numerical scale comparisons between the groups (One way ANOVA & Welch test)

Group	Sample size	Mean± Standard Deviation	One Way ANOVA				Welch Test	
			df	Mean Square	F	*p* value	Statistic	*p* value
Control	**14**	4.78±1.52	2	12.714	5.409	0.009*	5.47	0.01*
Experimental Group 1	**13**	3.15±1.72						
Experimental Group 2	**13**	3.07±1.32						

Table-5: Oswestry scale comparisons between the groups (One way ANOVA & Welch test)

Group	Sample size	Mean± Standard Deviation	One Way ANOVA				Welch Test	
			df	Mean Square	F	*p* value	Statistic	*p* value
Control	**14**	28.50±2.50	2	619.431	63.834	0.000*	73.53	0.000*
Experimental Group 1	**13**	16.23±3.63						
Experimental Group 2	**13**	17.53±3.15						

Results revealed significant reduction in the numerical scale and Oswestry scores at the end of the final visit. Both the tests, i.e., One way ANOVA and Welch test demonstrated a statistically significant result with *p* values less than <0.01. The detailed results of the inter-group comparison are given in Table-4 and Table-5 respectively.

DISCUSSION:

Chronic Low Back Pain is debilitating condition which often needs to be intervened with Analgesics & conventional therapy, However, the conventional therapies have their own limitations, which leads to the scope for the development of more effective holistic approach to improve the patient's condition which not only alleviates the pain and suffering but also uplifts the patient's overall health. CBT (cognitive behavioral therapy) is a kind of psychotherapy which is widely being considered for the treatment of anxiety, insomnia, depression, wide range of addictions, and other psychological illnesses [15-19], where it helps in altering the patient's perception towards their illnesses, it is believed that chronic pain are often linked emotional stress & low self-esteem, which may lead to disease progression. Based on the study conducted by Hoffman et al. where the authors contributed with a comprehensive meta-analysis that revealed the significance of the psychological treatments and their therapeutic impact in the treatment of CLBP, which promotes the scope to consider CBT as a remarkably effective therapy [20]. Our results agree with a previous study, advocating CBT in CLBP, where primary outcome was analyzed using MOCA scale and subject's score ≥26 was considered for the study and the mean score was found to be 28.02(±1.28). Significant improvements were observed with respect to the Numerical scale scores & Oswestry scores during the baseline visit and final visit in all the three groups. When compared to the control group, the experimental groups demonstrated significant decrease in pain intensity, further substantiating the claims that CBT can be a promising technique to treat chronic debilitating pain. Whereas meditation on the other hand mindfulness meditation was first used as a therapeutic treatment for problems including chronic pain and anxiety in 1979 [21]. Mindfulness meditation (often known as "meditation") is a popular and safe supplementary mind-body technique that trains the mind to pay nonjudgmental attention to present-moment experiences and has a great deal of potential as a CLBP therapy [22]. Traditional behavioral therapies, such as cognitive behavioral therapy (CBT), which is part of evidence-based, standard-of-care treatments for CLBP, can be supplemented with meditation-learned skills [23]. Symptomatology and mental health indicators improved much more in participants in both intervention groups, despite no significant differences between them. Our findings support the findings of a comprehensive analysis published in 2011 [24], which found that "acceptance-based" treatments like MBSR offer similar benefits to CBT for individuals with chronic pain.

The limitations of this study must be acknowledged, the study's primary limitations were its limited sample size and the fact that the participants were a homogeneous group (from the same health group and well educated). Furthermore, several intervention group participants were lost to follow-up, limiting findings. More research is needed to identify moderators and mediators of MBSR's effects on function and pain, as well as to assess the benefits of MBSR beyond a year and show its cost-effectiveness. There is also a need for research to establish the minimum number of sessions necessary, as well as to discover causes for session non-attendance and strategies to enhance participation.

CONCLUSION:

The results of this study demonstrate that both treatments are effective in treating the symptoms of persistent low back pain. Given the overall improvement in symptomatology for chronic low back pain, doctors might suggest both meditation and cognitive behavioral therapy (CBT) for this condition. This illustrates that even a few Meditation or CBT sessions can help with back pain, or that the results of non-attenders were obscured by significant improvements in those who attended all sessions.

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