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Comparative study of cognitive functional therapy with core muscle training on function and disability on patients with chronic nonspecific low backpain among middle aged individuals

Prabha Mohan Kumar, J Mohana Krishnan and Jimshad Tu

Abstract

Background: Cognitive functional therapy is an integrated, patient-centered, goal-orientated management approach for chronic non specific low back pain (CNLBP). Core stability training has gained wide acceptance for injury prevention and rehabilitation of musculoskeletal conditions. Objective: To compare effectiveness of cognitive functional therapy with core muscle training on function and disability in subjects with chronic low back pain Design: Quasi Experimental design. Method: Total of 40 subjects with chronic low back pain, aged between 18-40 years was recruited for the study. All subjects were divided into group A and group B, the group A had 20 subjects, who received cognitive functional therapy while the group B had 20 subjects, who received core muscle training. Both the groups underwent treatment for 3 months. The outcome parameter was pain (VAS), functional outcome (STarT back screening tool), Disability (Quebec back pain disability scale tool) which were analyzed statistically. Results: Significant changes in the outcomes were found in both, within and between the groups. The post treatment values were: VAS in group A was 1.79 and in group B was 2.68 (clinically significant with $p < .004$); STarT back screening tool in group A was 1.95 and in group B was 2.74 (statistically significant $p < .001$); Quebec back pain disability scale tool score in group A was 11.97 and in group B was 16.79 (statistically significant $p < .25$). Conclusion: Both cognitive functional training and core muscle training improves function and reduce disability in individuals with CNLBP, however cognitive functional training gives better outcome.

Keywords: Chronic non-specific low back pain, cognitive functional therapy, core muscle training

1. Introduction

Chronic nonspecific low back pain is a clinical, social, economic and a public health problem affecting the global population indiscriminately [1]. It is a common problem that most of us experience at some point in our life with the episode remission at one year ranges from 54% to 90% [2, 3]. Low back pain is ranked the highest in terms of disability and sixth in terms of overall burden. Low back pain is defined as pain in the area on the posterior aspect of the body from the lower margin of the twelfth ribs to the lower gluteal folds with or without pain referred into one or both lower limbs that lasts for at least one day it has many etiologies with many definitions affecting many groups of the population globally [4].

Low Back Pain prevalence in India has been found to range from 6.2% to 92%. Low socioeconomic status, poor education, previous history of low back pain, physical factors such as lifting heavy loads, repetitive job, prolonged static posture and awkward posture, psychosocial factors such as anxiety, depression, job dissatisfaction, and mental stress, long working hours and obesity have been found to be associated with CNLBP [5]. In southern India studies showed 28.4% and 52.9% respectively were having low back pain [6]. Acute Mechanical low backache is that it varies with physical activity (bending forward, prolonged sitting) and with time. The pain is located in the lumbosacral region, buttock and thighs with no radiation to foot or toes. Acute typically means duration of less than 2 to 4 weeks. Sub-acute is up to 12 weeks and chronic is more than 12 weeks [7].

Physiotherapy is the first line treatment for chronic non-specific low back pain. The physiotherapy treatment for chronic non-specific low back pain often involves a wide range

techniques including heat-therapy, ultrasound therapy, mobilization, exercise and education about posture and body mechanics [8]. Stabilization and strengthening of the lumbar spine through stabilization program is an important part of rehabilitation program for the low back pain subjects [9].

Cognitive functional therapy (CFT) is an integrated, person-centered, goal-orientated management approach for CNLBP. The focus of this process is directed by the findings taken from the multidimensional examination, with regard to the indicated primary contributing factors across the different domains linked to the patient’s disorder. Developing a strong clinical alliance, utilizing motivational interview techniques, underpins this process. A recent randomized controlled trial has shown that CFT resulted in superior long-term outcomes of reduced disability, pain intensity and episodes, fear, improved mood, reduced need for ongoing care and sick leave, when compared to physiotherapy-led manual therapy and stabilizing exercises [10-12]

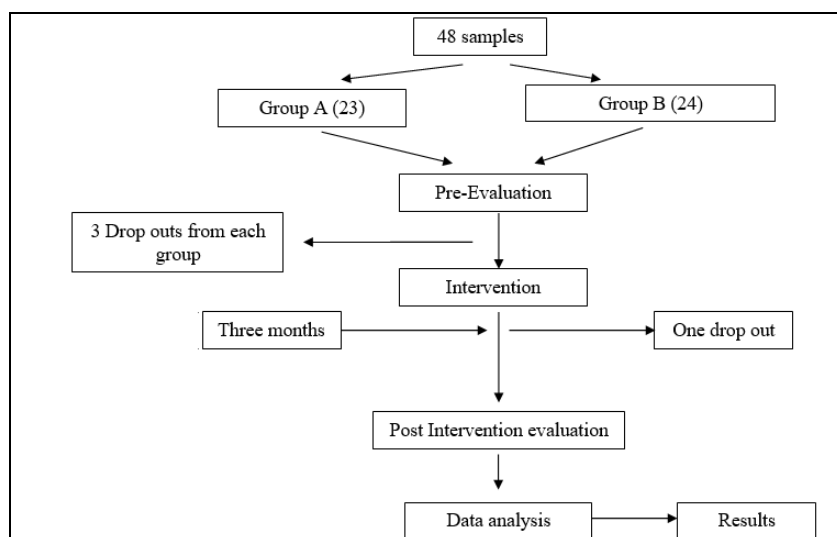
Core stability is the name given to the strengthening of the corset of muscles surrounding the back and abdomen. These muscle are also known as the ‘core’ or ‘Power house’ muscles and provide a solid base upon which all other muscles can work upon to initiate movement. A Comprehensive

Strengthening Program of these core muscles can be used for injury prevention, Rehabilitation and performance-enhancement [9]. This study is to prove the efficacy of cognitive functional Therapy in middleaged individuals with chronic nonspecific low back pain (CNLBP) when compared with core muscle training

2. Materials and Methods

40 individuals with CNLBP were recruited between 18-40 years of age for the study by using convenience sampling. Pre and post measurement was assessed by using visual analogue scale (VAS), Oswestry Disability scoreindex (ODI) and start backscreening tool. Criteria for selection to this study was (i) pain (>7 in visual analog score), (ii) chronic non-specific low back pain for 3months, (iii) to fill in questionnaires in English.

Exclusion criteria were post traumatic cases, other specific low backpain, disc pathologies, post-surgical conditions, inflammatory rheumatologic diseases and pregnancy. All selected subjects were randomly allocated in to group A (n = 20) and group B (n = 20), group A underwent cognitive functional therapy and group B under wentcore muscle strengthening.



Procedure

Group A: (Cognitive functional therapy)

Level	Procedure
I	Personal modifiable factors, spine loading, pain perception and underlying factors of LBP were clearly explained
II	i) Regain postural control over symptomatic lumbo-pelvic region ii) Instructing and learning the subject to rotate pelvis, till pelvic tilts are normalized, till the patient understands the movement, without excessive movement of lumbar spine. iii) Visual bio-feed backs maybe administered for better understanding of movement for the patient.
III	Subject was taught to control tilting of pelvis in different positions. Diaphragmatic breathing and relaxation exercise were taught as home treatment. Clear instructions on exercises were provided [13].

Patient treated for 2 alternate days a week for 3 months

Group B: (core muscle strengthening)

Level	Procedure
I	Short aerobic program stretches Short ranges between lumbar flexion and extension
II	Patient in supine, standing or sitting posture. Asked to feel the muscle with hands on abdomen. Contract and Hold the muscle for 10 seconds and relax. Continue for 10 repetitions Alternate arm/leg raises can be given alongside
III	Unstable surfaces like balance board, rocker board, used to challenge balance and motor control (should be done without tilting pelvis) [14]

Patient treated for 2 alternate days a week for 3 months

2.1 Data Analysis

SPSS software (version 17) was used for statistical analysis, Chi Square test was used for the demographic data analysis. Descriptive statistics was used to find out mean, standard deviation for demographic and out come variable. Wilcoxon test was used to find out baseline and significance differences for out come variable with in the group. Mann Whitney U test was used to find out the difference in outcome variable between the groups.

3. Results and Discussion

40 subjects were included whose data were shown in the table 1 Mean age of group A was 33.31 and group B was 36.73 which was not statistically significant ($p > 0.845$). In group A gender distribution of 11 males and 9 females respectively in Group B, 12 males and 8 females which was not statistically significant ($p > 0.744$). BMI distribution between the two group was not statistically significant with the p -value of (>0.112).

Table 1: Baseline data of the study subjects (n=30)

Variable	Group A	Group B	P value
Age	33.31± 10.69	36.73± 11.27	0.845
Gender (M/F)	11/9	12/8	0.744

Table 2 show that baseline data for outcome variable, in group A pre DCI score of 58.42 and in Group B 60.53 which was not statistically significant ($p > 0.693$). In group A pre star back score of 6.89 and in Group B 7.16 which was not statistically significant ($p > 0.397$) In group A pre VAS score of 7.84 and in Group B 8 which was not statistically significant ($p > 0.434$).

Table 2: Baseline data of out come variables

Variable	Group A	Group B	P value
DCI	58.42±17.952	60.53±17.964	0.693
StarBack	6.89±.809	7.16±.958	0.397
VAS	7.84±.834	8.00±.882	0.434

Table 3 shows pre- post difference within the group A, Pre DCI score of 58.42 reduced to post score of 11.97 which was statistically significant with ($p < 0.001$), Pre starback score of 6.89 reduced to post score of 1.95 which was statistically significant with ($p < 0.001$) Pre VAS score of 7.84 reduced to post score of 1.79 which was statistically significant with ($p < 0.001$).

Table 3: Pre-post differences for out come with in group A

Variable	Pre score	Post score	P value
DCI	58.42±17.952	11.97±7.563	0.001
Star Back	6.89±.809	1.95±.621	0.001
VAS	7.84±.834	1.79±.787	0.001

Table 4 shows pre- post difference within the group B, Pre DCI score of 60.53 reduced to post score of 16.79 which was statistically significant with ($p < 0.001$), Pre star back score of 7.16 reduced to post score of 2.74 which was statistically significant with ($p < 0.001$) Pre VAS score of 8 reduced to post score of 2.68 which was statistically significant with ($p < 0.001$).

Table 4: Pre-post differences for out come with in group B

Variable	Pre score	Post score	P value
DCI	60.53±17.964	16.79±5.303	0.001
StarBack	7.16±.958	2.74±.653	0.001
VAS	8.00±.882	2.68±.885	0.001

Table 5 shows between the group comparison post treatment in group A post DCI score of 11.97 and in Group B 16.79 which was statistically significant ($p < 0.25$). In group A post star back score of 1.95 and in Group B 2.74 which was statistically significant ($p < 0.001$) In group A post VAS score of 1.79 and in Group B 2.68 which was statistically significant ($p < .004$).

Table 5: between the group comparisons for post treatment effect

Variable	Group A	Group B	P value
DCI	11.97±7.563	16.79±5.303	.025
StarBack	1.95±.621	2.74±.653	.001
VAS	1.79±.787	2.68±.885	.004

4. Discussion

Purpose of this study was to compare effectiveness of cognitive functional therapy with core muscle training on function and disability in subjects with chronic low back pain. Both the groups had reduction of disability and pain but the experimental group showed a significant difference when compared to control group, with a "p" value of 0.025 for disability and 0.004 for pain respectively. Core muscle training alone may not be sufficient for treating CNLBP (Eyal Lederman 2009). Awareness of activity and patient participation plays an important role in subjective pain relief and normalizing activity of a patient (Peter O'Sullivan 2007). The efficiency of cognitive functional therapy in postural control depends on how patient participation in cognitive functional therapy desensitizes central sensitization changes. Pain generated by the forebrain is less amplified to CNS (ongoing peripheral nociceptor input from intervertebral disc) (Peter O'Sullivan Physical Therapy, 2018) [13]

In this study both core muscle training group and cognitive functional therapy showed improvement in outcome. As shown in result, group which performed core muscle training, pain and function improved this could be due to biomechanical correction and kinetic factor, core stability exercise is more effective in decreasing pain and may improve physical function in patients with chronic LBP in the short term [8]. However, no significant long-term differences in pain severity were observed between patients who engaged in core stability exercise versus those who engaged in general exercise. In the experimental group more of cognitive therapy helped to improve symptoms. Cognitive factors reflect the thoughts that individuals have about their pain or other aspects of their life. These may include negative explicit and implicit beliefs about disabling LBP, its meaning, and future consequences for some; disabling LBP is associated with catastrophic thoughts, characterized by a fixation on pain that can take the form of hypervigilance and rumination, magnification of its threat, and adoption of an outlook of helplessness. Low levels of self-efficacy (lack of confidence in performing pain-provoking or threatening activities) are often linked to these negative cognitions. Much negative cognition originates from encounters with health care practitioners. They may also be associated with an underlying negative emotional response linked to behavioral conditioning and unhelpful parental responses to pain, as well as cultural and societal attitudes.

Limitations of this study are relative smaller size of the samples, measurement bias, extraneous variables were not well monitored and we recommend future studies to be carried out in a varied strata. Multiple intervention may be incorporated to prove the efficacy of the behavioral therapy

4. Conclusion

It may be concluded that inclusion of cognitive functional therapy along with the standard exercise protocol may yield a better results in CNLBP individuals. Cognitive functional therapy also imparts a positive health status and reduces pain and disability.

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