

EFFECTIVENESS OF CORE STABILITY EXERCISES AND GENERAL EXERCISES IN THE MANAGEMENT OF CHRONIC LOW BACK PAIN: A RANDOMIZED CONTROLLED TRIAL

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Abstract

AIM: The aim of clinical trial was to determine the effectiveness of core stability exercises and general exercises in the management of chronic low back pain.

METHODOLOGY: A total of 60 patients (including both male and female), aged 20-60 years, diagnosed with chronic low back pain were randomly allocated to core stability exercise and general exercise groups. Patients were recruited through consecutive sampling technique. Baseline assessment of all the patients was done before assigning to the patients to either of the groups. Patients in both groups were assessed after 4 weeks on tools assessing pain and physical activity level for comparing the final outcomes of both exercises regimes.

RESULTS: There were no differences amongst the outcome of both groups in pain intensity and disability. The effectiveness of both core stability exercises and general exercises showed a significant reduction in pain intensity ($p=0.000$) for the patients in both groups. Similarly, means of functional disability was also decreased significantly in both core stability group and general group ($p=0.000$).

CONCLUSION: Both physical therapy regimes produced a clinically important improvement in pain and disability index, so the selection of technique for the management of CLBP can be based on the individual needs.

KEYWORDS: CLBP, Core Stability Exercises, General Exercises

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INTRODUCTION

Low back pain (LBP) is one of the commonest musculoskeletal disorders reported worldwide¹. A big proportion as more than 50% of the general population has been reported to suffer from this problem. About 70% of adult population has at least one episode of LBP throughout their lives² exposing some of them (approximately 15%) to face a chronic back pain³. Although LBP affects people with all age, nevertheless, people between 35-55 years are reported more prone to it⁴. The 2010 Global Burden of Disease Study

predicted that LBP was among the top 10 medical conditions accounting for the highest number of DALY's (Disability adjusted life year) worldwide⁵. Backache is the second most usual source for long term sickness in UK. It is the number one reason in labors and the most common reasons for medical consultation. It is the third most expansive health problem after cancer and heart diseases.⁶

It is sometimes hard to make a specific diagnosis on the basis of patho-anatomical causes, and 85-95% of the cases are diagnosed as non-specific low back pains

(NSLBP)⁷. A specific etiology of back pain can be diagnosed in only about 15% of patients⁸. A variety of factor has been associated with LBP included problems associated with joint capsules, ligaments, tendons and muscles of the back⁹. Research has implicated pain sensitive vertebral structures such as the intervertebral disc and the zygoapophyseal joints as potential causes of low back pain. It has been shown that muscles are adversely affected secondary to low back pain². The risk factors for LBP are weakness of superficial muscles of the trunk and abdomen.

A variety of physical therapy treatments have been suggested in treating problems associated with LBP. The latter treatment options included applying modalities, exercise therapy and manual therapy to the patient with LBP. It is has been

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reported that patient condition may vary the treatment options. Moreover, patient's education has been reported to play a significant role in reducing problem associated with back¹⁰. However, the most effective way of treatment the latter condition is applying proper exercise suggested by a physical therapist or clinical guidelines¹¹. Similarly, strengthening of deep and superficial muscles is often affiliated with fundamental improvements of CLBP and with decreased functional disability². Studies have proved that specific stabilization exercises reduces pain and disability in chronic, however, the result have shown little or no improvement for treating patients with acute low back pain¹². Despite the fact the a variety of treatment protocol were reported in treating LBP, still the effectiveness of core stability exercises and general exercises have not been compared¹³. Therefore, this clinical trial was designed to the compare the effects of both latter techniques on the management of LBP.

METHODS

A total of 60 patients were randomly allocated to core stability and general exercise groups through consecutive sampling. Outcome in terms of reduction in pain and disability index were assessed by using Visual Analogue Scale and Oswestry Disability Index, respectively. Initially, all patients were assessed on inclusion and exclusion criteria. Patients with acute trauma, inflammatory conditions, history of neoplasm or malignancy, infections, tumor, fibromyalgia, previous spinal surgery if the surgery had been completed less than 1 year, signs and symptoms of gross spinal instability, radiological diagnosis of spondylolisthesis, neurological disorders, fractures, cardiopulmonary diseases, any serious spinal pathology, rheumatism, osteoporosis, lumbar canal stenosis, bowel and bladder dysfunction, pregnancy were excluded. Patients

presenting with history of unstable angina or with a history of myocardial dysfunction (during the past 1 month), Heart rate > 120, Hypertension with systolic pressure of 180 mmHg/ diastolic pressure 100 mmHg were also excluded. After complete subjective and objective examination, each participant received an information sheet and a consent form. Following inclusion and exclusion criteria, participants were then randomly assigned either of the two groups by placing patients with odd serial numbers in core stability group and even serial numbers in general group. All the patients were blinded to their treatment groups. However, the therapists administering the treatment was aware of the patient's allocation and therefore, this clinical trial may be classified as single-blinded randomized controlled trial. Patient in group I received core stability exercises while patients in group II continued general exercises for the treating their pain in lower back region. Due to the limited resources the principal investigator of this clinical trial was responsible for the treatment of exercise to all patients. The effectiveness of each intervention was evaluated by changes in pain and improvement in functional level. Pain was evaluated with Visual analogue scale VAS while Functional level of patients with CLBP was evaluated with Oswestry disability index ODI.

RESULTS

Baseline measurement of patients in both groups showed no differences on age, gender, pain intensity and physical activity level suggesting similarity of the patient at baseline. Patients in core stability group showed a statistically significant results pain ($p < 0.05$) from a mean pre intervention VAS score of 8.33 ± 1.15 to a mean post intervention VAS score 1.20 ± 1.06 . The effect size observed was 0.63 that may be classified as moderate while the percent changes observed were 35% suggesting that all patients in this

group improved 35% from baseline. Similarly, comparing the effects of core stability exercises on disability index ODI scale shows a significant difference between pre and post intervention assessment ($p < 0.05$). The mean scores on ODI score for the patient in core stability exercise groups were at baseline and final assessment were 56.13 ± 16.38 and 11.60 ± 8.17 , respectively, suggesting same level of 35 % improvement on ODI.

Comparing the effects of general exercises on the patients on pain a significant difference between the pre and post intervention was observed suggesting that the patients in this group showed significant improvement from baseline to final assessment period. The mean group response on VAS for the patients in this group was reported 8.87 ± 1.04 and 0.67 ± 0.60 . The ODI for general exercises pre and post intervention shows a difference from 48.00 ± 11.11 to 6.53 ± 4.20 indicating 34% improvement from baseline to final assessment. Both groups show statistically significant difference in pre and post intervention scores on VAS and ODI (please see table I for mean scores of patients in both groups are baseline and final assessment session).

DISCUSSION

The aim of this randomized controlled trial was to evaluate the effectiveness of core stability exercises and general exercises in managing chronic low back pain. Findings of this clinical trial suggested that the patients in both groups (core stability exercise group and general exercise group) showed significant improvement from baseline to final assessment when assessed on VAS for pain and reduction in disability when assessed Oswestry Disability Index. However, the outcome of both groups was similar when both the groups were assessed at the final assessment occasion. Similar findings were reported by Cairns et al where

TABLE 1

	Group	N	Mean	Std. Deviation	Std. Error Mean
Age	Group A	30	33.07	11.724	2.140
	Group B	30	40.07	10.573	1.930
Baseline VAS	Group A	30	8.33	1.155	.211
	Group B	30	8.87	1.042	.190
Baseline ODI	Group A	30	56.13	16.383	2.991
	Group B	30	48.00	11.117	2.030
Follow up VAS	Group A	30	1.20	1.064	.194
	Group B	30	0.67	0.606	.111
Follow up ODI	Group A	30	11.60	8.177	1.493
	Group B	30	6.53	4.200	.767

two treatment protocols were compared. In this trial, subjective and objective measures for the patients in both these groups showed similar outcomes at the end their rehabilitation. The groups had received conventional physical therapy included general active exercise and core stability exercise in combination with conventional physical therapy¹⁴. In addition, Gladwell et al concluded that Pilates if used specific core stability exercises and incorporated with functional movements can efficiently improve pain in low back in active population in comparison with no intervention¹⁵.

The fact that two techniques might have different outcomes in reducing pain and disability has been endorsed in clinical trial carried out by Ferreira et al when patients in two groups were assessed after 8 weeks. However, the findings of this trial suggested that patients in both groups showed no differences after 12 months when compared on the same assessment tools. Similarly, motor control exercises have been reported to have no extra beneficial short term (8 weeks) or long term (12 months) effects CLBP¹⁶. In contrast, O'Sullivan et al. showed a significant decrease in pain and disability in the stabilization group at 10 weeks while the same results were not observed after 30 months¹⁷. These findings suggest conflicting evidence for core strengthening in low back disorders

with the passage of time.¹⁸

One of the limitations of the previous studies was 'sample size' where majority of the trials reported were underpowered. Moreover, on average the study duration in these trials was about eight weeks showing that these exercises may be effective for treating acute low back pain. The follow up sessions for each interventions were not reported in each individual trials. Some of the recommendations from this clinical trial included carrying out such clinical trials on 'larger population' than the previous one so that result may be generalized. Moreover, a longer period (at least 6 months) may be considered while comparing the effectiveness of two different techniques for treating low pain.

CONCLUSION

Based on the findings of this clinical trial it may be concluded that both core stability exercises and general exercises can be used for the patients having CLBP. As both physical therapy regimes produced a clinically important improvement in pain and disability index. The selection of technique can be based according to the individual needs.

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NOTES ON CONTRIBUTORS

The study was part of SS Bachelors in Physical Therapy Education. DAK, supervised the dissertation, and was involved in every part of the analysis, idea's development, and write-up.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ETHICS APPROVAL

The approval/permission was obtained from Institute of Physical Medicine and Rehabilitation Ethics Board.

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