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A Comparative Study On Effectiveness Of Core Muscle Strengthening Exercises Vs Pelvic Floor Muscle Strengthening Exercises For Lower Back Pain Patient

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ABSTRACT

Background: Low back pain (LBP) is a public and occupational health issue.i.e A huge professional, financial, and social burden. Exercise is frequently used in treatment of chronic low back pain, especially the core stabilizing muscles training including pelvic floor muscle. This study will provide insights into the potential benefit of incorporating core and pelvic floor muscle group strengthening exercises into rehabilitation programme . [Aim] To compare the effectiveness of pelvic floor muscles with core muscles in lower back pain patients. [After approval of the Institutional Ethics Committee. (I.E.C)]

Method: Patients between the age group of 20-35 years having non-specific low back pain were selected based on inclusion and exclusion criteria. Two outcome measures were taken, VAS for pain assessment and ODI for functional disabilities in daily routine activities. The study was done over a sample size of 30 patients which included both male and female patients among the age group of 20 – 35 years suffering from non-specific low back pain. They were divided in two groups where Group A(n-15) received PFSE and Group B (n-15) received CSE. Random sampling method used for selection of patients. Duration of study was 15 weeks.

Results: The result proved significant enhancement in both the groups but Group B who received CSE had a higher effectiveness as well as efficiency with VAS ($P<0.001$) AND ODI ($p<0.001$) as compared to Group A in terms of pain and functional disability. In this individual, CSE considerably decreases the severity of back pain.

Conclusion: although there is significant difference in intensity of low back pain in both the groups but CSE shows more remarkable and effective results compared to PFMSE and improves functional disabilities and quality of life of individual.

1. INTRODUCTION

LOW BACK PAIN [1,6]

The lower back is highly carefully designed framework of interlinked bones, joints, nerves, ligaments, and muscles all working as unit to provide support, strength, and flexibility. Also severe and chronic pain in lower back can occur due to any issue that arises in this unique anatomical framework. Low back pain is described as "pain and discomfort, localized below the costal margin and above the inferior gluteal folds and between the midaxillary lines on both sides, with or without leg pain "in the European Guidelines for Prevention of Low Back Pain. Low back pain (LBP) is a public and occupational health problem that is a major professional, economic and social burden. Low back pain. Nearly 60–80% of people will encounter low back pain (LBP) at some time in their lifespan, making it the fifth leading reason for doctor visits.[3] According to certain research, up to 23% of adults worldwide experience chronic low back discomfort. In addition, a one-year recurrence rate of 24% to 80% has been observed in this group of people.[12,13,14]

In general medicine, acute LBP ranks second among the list of reasons for consultations, whereas chronic LBP ranks eighth[2].Although LBP can be either specific or nonspecific, only about 10% of it is actually specific, while the other 90% being NSLBP.[4]Although LBP is a symptom, not a diagnosis, the findings of non-specific LBP suggests that there is no defined pathoanatomical explanation. There is little reason to take any action until a definite pathoanatomical cause is identified. This may help to explain the difficulty in managing "non-specific LBP" and the constant burden of chronic LBP.[7]

A common occurrence, nonspecific low back pain (NSLBP) is linked to trunk muscle dysfunction. When the muscles of the abdominopelvic cavity work as a single unit, trunk control is important. Weakness of multifidus, transversus abdominis, rectus abdominis, and pelvic floor muscles can cause unsteadiness, difficulty, and dysfunction of spine.

Core and pelvic floor have strong correlation between them as core muscles built on the pelvic floor and weakening of both muscles can result in CLBP.[49]

In an individual, the spine, ribs, and pelvis alignment is provided by core muscles that can withstand static or dynamic force.[17]The majority of the body's kinetic chains transmit forces to the extremities through center of body i.e. core muscles and also full-body functional activities that include most of the sports, is believed to begin in the core whereas muscles of pelvic floor provide support to all organs in abdomen and pelvic region and also provide axial weight bearing capacity in the body is done by this muscle.[23] Rather than contracting separately, these muscles work together. FM cooperate with other muscles like anterolateral abdominal muscles and thoracic diaphragm surrounding the cavity of abdomen. These muscles are also considered as main stabilizer of lower back and PFM provide lower back's support and functionality.[26]

Strengthening programme produce combination of central and spindle mechanism, enhance gamma motor activity and improve central mechanisms of motor control. superficial trunk muscles are also stimulated by this programme and helps in shock absorption of loads and are beneficial for subacute or chronic NSLBP. These exercises can reduce pain and physical impairment, enhance performance of trunk muscles, strength and global trunk muscles control. hence improve overall stability of spine in NSLBP patients.[5,29,30]

PFM contraction plays a crucial part in abdominal muscle training since studies have also shown greater improvement in transversus abdominis (TrA) function and also reduction of pain in lower back[25,37]. Dysfunction in the structure of lumbar multifidus (LM) and TrA can increase the chance of LBP While enhancing their thickness can also reduces LBP.[37,38,39]

Strengthening core muscles and pelvic floor muscles can potentially reduce lower back pain in affected individuals. while there are substantial evidence supporting the benefit of combined effect of core muscle and pelvic floor muscle strengthening exercises in general but specific studies focusing on individual comparison of effectiveness of pelvic floor and core muscle strengthening exercise in patient with low back pain is very limited.

2. MATERIALS AND METHODS

This study was part of a comparative research design that used a pre- and post-treatment plan technique to compare two groups (A and B),which attempted to find out the effect of structured exercises on the intensity of back pain among each group.

Sample design: convenient random sampling method

Study setting: Pacific Medical College and Hospital, Udaipur Raj.

Materials used: Exercise couch, Dumbbells, consent form.

Sample size: It included 30 low back pain patients (15 in each group) fulfilling all the inclusion criteria.

Ethical Clearance

This study was approved by the Institutional Ethics Committee of Pacific Medical College and Hospital (code of ethics:).

Inclusion Criteria:

- Chronic low back pain
- Postural low back pain
- Age:20-35 years

Exclusion Criteria:

- Prior lumbar surgery
- Participants who do not have sufficient language proficiency to understand and respond to the study assessments and interventions will be excluded.
- Inflammatory spondyloarthropathy
- Spinal malignancy
- History of cancer
- Mental impairment that would interfere with answering questions and performing exercises.
- Sciatica
- slip disc
- Any traumatic history
- Spondylosis
- Degenerative changes in spine in lumbar region
- lumbar radiculopathy
- PIVD
- PCOD patients
- Female with menses

Permission was received by signing the inform consent from each participant in both groups after explaining exercise procedure and possible advantages.

3. PROCEDURE

The study performed over a course of 15 weeks including 15 subject in each group. All subjects engaged in a treatment protocol for 45 minutes,3 times a week. The exercises performed by GROUP A participants are as follows-Diaphragmatic breathing exercise, Tonic activation of TrA, Kegel exercise, Reverse Kegel exercises, Pelvic clock exercise and by GROUP B-Side plank, Dead bug exercise, Superman exercise, Russian twist, Single leg dead lift. For each exercise, two sets of 10–12 repetitions were carried out. All subjects Performed tailored exercise programme. Mean, SD, and t-test were used for statistical outcomes.

Results

Table 1: VAS in Both Groups

VAS	Group A		Group B		Mean Diff.	
	Mean	SD	Mean	SD		P value
Pre Op	7.40	1.64	7.33	1.63	0.07	>0.05
Post Op	4.60	1.68	1.80	1.21	2.80	>0.05
Mean Diff.	-2.80		-5.53		2.73	
P value	<0.001		<0.001			

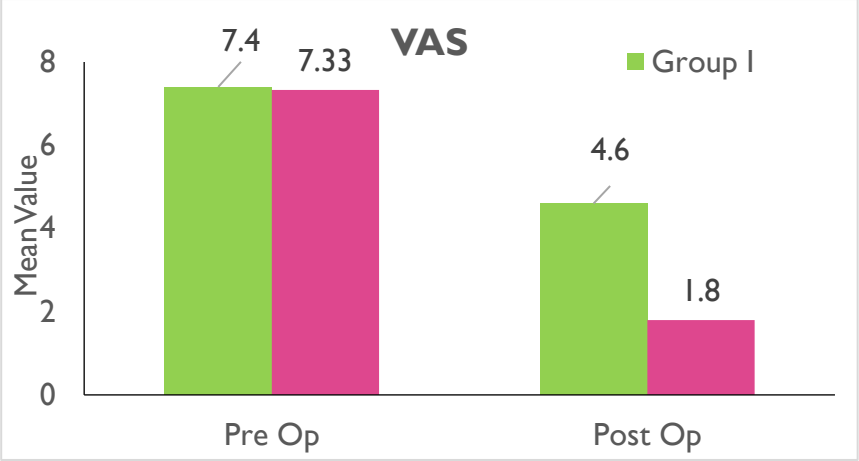
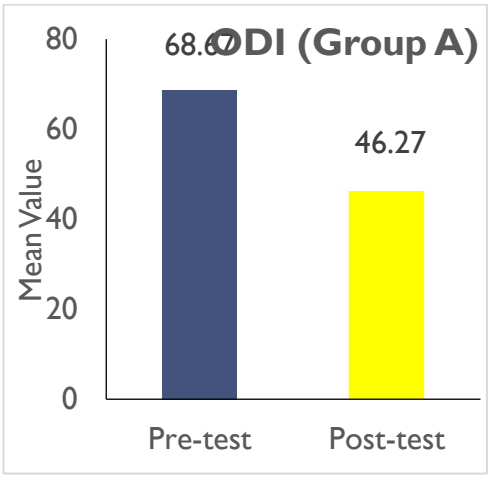
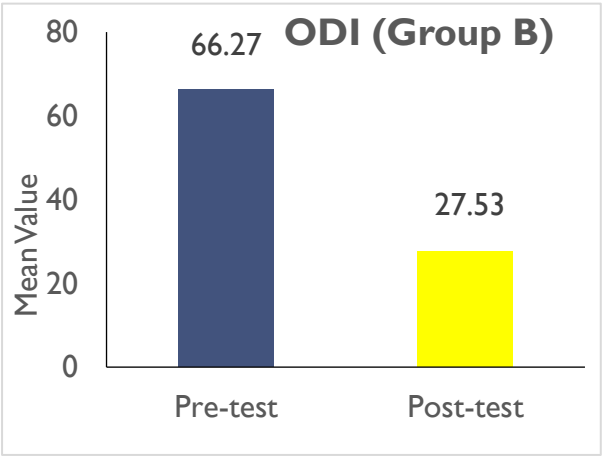


Table 2: ODI in Both Group

ODI	Group A		Group B		Mean diff	P	Sig
	Mean	SD	Mean	SD			
Pre-test	68.67	11.60	66.27	11.23	2.4	<0.001	HS
Post-test	46.27	11.26	27.53	8.90	18.74	<0.001	HS
P value	<0.001		<0.001				





Discussion:

Table: 1 Both groups displayed changes in VAS Score. However, group B showed a significant improvement where Pre-treatment mean VAS is 7.33 with SD of 1.63 whereas post treatment mean VAS is 1.80 with SD OF 1.21. compared to Group

A where Pre-treatment mean VAS 7.40 with SD of 1.64 whereas post treatment mean VAS is 4.60 with SD of 1.68. **Table:2& 3:** PRE-TREATMENT mean ODI score for GROUP B is 66.27 with SD of 11.23. Post treatment mean ODI score is 27.53 with SD of 8.90 . Pre-treatment mean ODI score for GROUP A is 68.67 with SD of 11.60, Post TREATMENT mean ODI score is 46.27 with SD of 11.26. Both VAS and ODI score showed substantial reduction in lower back pain in both groups where group B outscores group A.

Conclusion

LBP is an inconvenience felt by sufferers because it can hinder daily activities. To reduce low back pain and minimize the effects of pharmacological treatment, non-pharmacological methods such as exercise therapy are used, which can increase spinal stability and thus reduce low back pain.[45]In this study CSE and PFSE are used as exercise therapy intervention. In this study, core-strengthening and pelvic floor-strengthening exercises for people with chronic LBP were compared. In both groups, the data presentation was comparable and reliable. Strong evidence were drawn from the examination of subject initially and after 15-week of treatment which showed major differences in both the outcome measures(VAS and ODI) between the groups. In this study all findings provide strong evidence for the overall efficacy of the CSE protocol that has result in remarkable decrease in intensity and severity of pain, reduce excessive pressure from back and help in relaxation of muscles around lumbar and abdominal region. Group B gives far better results when compared to group A Study revealed that treatment taken for good amount of time will provide better outcomes and also Subjects of 21-30 years of age responds to the exercise protocol more phenomenal. This study proved that CSE promote stability and function, increases range of motion, decreases the likelihood of recurrence and also significant pain reduction. As a result core and pelvic floor exercises both play major role in reducing the intensity of back pain and there is not much difference between both the protocol followed by strengthening regime but CSE shows more remarkable and effective result in LBP patients compared to PFMSE and improves functional disabilities and quality of life of individual.

Limitations:

- The small sample size hampered the study.
- The study was limited as all patients with LBP was not included due to inclusion criteria
- The study was limited because there was need to be follow-up for the interventions.
- Participation of male participants was limited
- The study was limited to age group 20-35 years with no other medical conditions.
- Some patients failed to do the pelvic floor muscle exercises correctly.

Recommendation

- The strengthening protocol should be progressive, starting with basic exercises and gradually increasing the intensity, duration, and frequency of contractions
- long-term follow-up is recommended to assess the adherence and provide ongoing support
- It is recommended to use more outcome measurement assessment tools for assessing core and pelvic floor muscles

It may be recommended that future study should be perform on the long term effect of CSE and pelvic floor strengthening exercise

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