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Efficacy of Core Muscle Strengthening Exercises in Postpartum Chronic Low Back Pain - A Case Study

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ABSTRACT

Low back pain is a global health concern affecting approximately 80% of individuals at some point ranking as the leading cause of worldwide disability. This study investigates the efficacy of core muscle strengthening exercises in postpartum chronic low back pain. This study has been done on a 31-year-old female who complained of low back pain since 2 years after her delivery. The patient was given 15 days of core muscle strengthening exercises and moist heat. After 15 days of treatment, the pain has been reduced from 8 to 4 and has also improved her lifestyle than before. This study concluded that core muscle strengthening exercises was found to be moderately effective in chronic postpartum low back pain.

Keywords: Low Back Pain, Prolapsed Intervertebral Disc, Numerical Pain Rating Scale, Straight Leg Raise Test, Oswestry Disability Index.

INTRODUCTION

Low back pain is a global health concern affecting approximately 80% of individuals at some point ranking as the leading cause of worldwide disability. It significantly impacts individual well-being, manifesting in a reduced quality of life, impaired work ability elevated healthcare costs for those seeking multidisciplinary spinal care compared to primary care. Low back pain is one of the most common musculoskeletal disorders causing disability and a reduction in quality of life. [1]

Aetiology: The LBP can arise due to various reasons.

1. Traumatic-sprain, strain, vertebral fracture
2. Discogenic LBP-due to the lesion in the 4th disc
3. Structural defect-mainly in the vertebral spine (eg: spina bifida, sacralisation, scoliosis and spondylosis)
4. Functional defects-wrong postural attitudes, contractures at the hip and knee, limb length discripency etc
5. Degenerative-degenerative disc disease, OA
6. Metabolic-osteoporosis, osteomalacia
7. Neoplastic-benign or malignant tumours
8. Referred LBP from the lesions in the viscera

a. Abdomen: Duodenal ulcer, Aortic aneurysm
b. GI system: Renal calculus, Urinary tract infection
c. Gynaecological diseases and genitourinary system

9. Miscellaneous causes:

a. Functional backache
b. Habitual bad posture
c. Pot belly etc

10. Idiopathic LBP [2,3]

Low back pain in relation with postpartum women:
Low backache is a frequent complaint of parous women into gynaecologic clinic. It may be the part of the gynaecological complaints or the case may be referred by an orthopaedic surgeon exclude the pelvic pathology to account for the low backache.
The reasons to refer are-

- The low backache often dates back to childbirth process or gynaecological operation.
- The symptoms often aggregate in relation to period.
- To establish correlation between the low backache and gynaecologic pathology, the following facts are to be remembered.
- As the posterior peritoneum is poorly innervated, the pain is dull and diffuse.
- Backache of pelvic region origin never reaches beyond the fourth lumbar vertebra.
- The pain pointed by fingertip is not of gynaecologic origin.

Aetiology: Uterine displacement Prolapse- uterine prolapse produces backache due to stretching of the ligaments supporting the uterus in position. If the ligaments are atrophic, there will be no pain. Vaginal prolapse does not causes backache. The pain in prolapse subsides when the patient is at rest and aggrevates on standing.

Retroversion- Retroverted uterus may produce backache only when it is fixed by inflammatory or endometriotic adhesions. Chronic pelvic infection- Chronic pelvic inflammatory disease producing adhesions and to mass formation may be responsible for backache. There are associated menstrual abnormalities and dyspareunia. Chronic cervicitis produces backache by parametritis. Endometriosis- Endometriosis involving the pelvic peritoneum, uterosacral ligament or rectovaginal septum produces backache and deep dyspareunia. Neoplasm- Benign neoplasm like ovarian tumour or fibroid will not ordinarily produce backache. However cervical/broad ligament fibroid can cause backache by producing pressure on the nerve routes over the sacrum. Pelvic malignancy- Pelvic malignancy produces backache by involving the nerve roots, metastasis in the vertebrae or involving the lateral pelvic wall.

AIMS AND OBJECTIVES

- This study aimed to investigate the core muscle strengthening in postpartum chronic low back pain.
- To find the effect of core muscle strengthening exercises in postpartum chronic low back pain.

LITERATURE REVIEW

1. According to Iqra Nayyab, Misbha Ghous, et al. In their study's The effects of an exercise programme for core muscle strengthening in patients with low back pain after Caesarian section (2021) published in advances in rheumatology concluded that Supervised core stability exercise programme was more effective in reducing pain and disability, and improved core muscle activation than unsupervised, home – based exercise programme.[5]
2. According to Tarun Kumar, Suraj Kumar, et al. In his study's Efficacy of core muscle strengthening exercise in chronic low back pain patients (2015) published in advances in rheumatology concluded that core muscle strengthening exercise along with lumbar flexibility and gluteus maximus strengthening is an effective rehabilitation technique for all chronic back pain patients irrespective of duration (less than one year or more than one year) of their pain.[6]
3. According to Wen- Dien Chang, Hung-yu lin et al. In their study's Core strength training for patients with chronic low back pain (2015) published in advances in rheumatology concluded that All of the core strength training strategies examined in this study assist

in the alleviation of chronic low back pain.[7]

4. According to Madeline Leopold, Kristen Santiago et al. In their study's Efficacy of a core strengthening program for Diastasis Rectus Abdominis in postpartum Women (2021) published in advances in rheumatology concluded that The 12- week online core strengthening program reduced IRD and improved LBP- related disability SUI. Program participation for 12 additional weeks further reduced IRD. These results suggest that the online core strengthening program can be used in postpartum women with DRA. [8]
5. According to Rekha Chaturvedi and Surya Kant Sharma et al. In their study's Comparison of core muscle strengthening exercise program versus spinal flexion exercises on pain in chronic low back pain patients (2018) published in advances in rheumatology concluded that the core strengthening exercises can be a better choice for improving pain as compared to spinal flexion exercises in patients suffering from low back pain.[9]
6. According to Kulandaivelan, S; Chaturvedi, R et al. In their study's Efficacy of progressive core strengthening exercise on functional endurance tests and hypertrophy of multifidus, transeverses abdominis in healthy female subjects with low core endurance (2014) published in advances in rheumatology concluded that The present study results supports than 6 weeks progressive core stabilization can be used as rehabilitation to prevent LBP in normal healthy female students.[10]
7. According to Laukik Vaidya, R. K. Sinha et al. In their study's Impact of Active release technique and core strengthening on pain, muscle stiffness, muscle hardness and quality of life on non –specific low back pain (2021) published in advances in rheumatology concluded that this study intends to find the effectiveness of active release technique in reduction of pain, muscle stiffness and muscle hardness in patients with non-specific low back pain and also the resultant improvement in quality of life.[11]
8. According to Raee Sareed Alqhtani, Hashim Ahmed et al. In their study's Efficacy of core muscle strengthening and intensive dynamic back exercises on pain, Core muscle endurance, and functional disability in patients with chronic non specific low back pain (2023) published in advances in rheumatology concluded that the experimental group CSE was found to be more effective than IDBE on improving functional disability, core flexors, and side bridges endurance tests than IDBE. [12]
9. According to Mohsen kazeminia, Fatemeh Rajati et al. In their study's The effect of pelvic floor muscle-strengthening exercises on low back pain (2022) published in advances in rheumatology concluded that Based on the results of the present meta analysis, pelvic floor muscle strengthening exercises significantly reduce the low back pain intensity. Therefore, these exercises can be regarded as a part of a low back pain management plan.[13]
10. According to Sana Chaudry, Farah Rashid et al. In their study's Effectiveness of core stabilization exercises along with postural correction in postpartum back pain (2013) published in advances in rheumatology concluded that core stabilization exercises and postural correction are effective techniques in the management of postpartum back pain.[14]

MATERIALS & METHODS

Intervention:

Patient was scheduled for core strengthening exercises for 15 days during the course of study.

Procedural intervention:

The patient was scheduled for physiotherapy daily for 15 days. Short term goals were to reduce pain. Treatment plan and care focused primarily on reducing pain and restore flexibility. The rehabilitation programme consists of three levels. Each level lasted for 5 days during which the patient was trained on selected exercises.

Day wise plan	
Level 1: [1-5days]	• Supine abdominal draw in • Supine abdominal draw in with single knee to chest • Cat and camel • Supine twist • Prone bridging on elbow • Quadruped opposite arm/leg Frequency- 2 times per day Intensity- 5repetations Time- 30mins Type- Body weighted exercises

Level 2: [5-10 days]	• Supine abdominal draw in • Single knee to chest • Supine dead bugs • Prone bridging on elbows with single leg hip extension • Side bridging on elbows • Leg raise • Hot pack for 20mins Frequency- 2 times per day Intensity-10repetations Time-50mins Type-Body weighted exercises

Level 3: [10-15 days]	• Supine abdominal draw in • Single knee to chest • Abdominal crunches • Side bridging on elbows with trunk rotation • Bird dog with elbow to knee • Squats • Hot pack for 25 minutes Frequency-2 times per day Intensity-10repetations Time-1 hour Type-Body weighted exercises [5]

RESULT

The patient reported an overall improvement in NPRS. The patient physiotherapy session was done for 15 days and there was indeed a good prognosis in pain and flexibility of patient in 15 days.

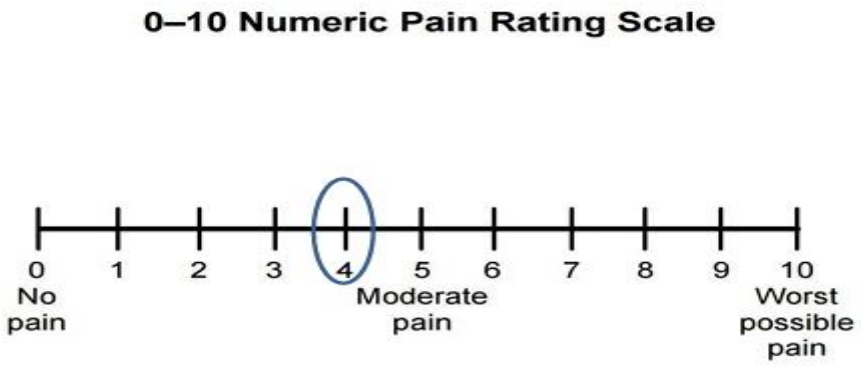
SCALE	PRE- TEST	POST- TEST
NRPS	8	4
Oswestry disability index	18/45	7/45

Post treatment assessment:

Pain:

According to NPRS scale the patient scored 4/10 pain.

Patients pain was improved from severe (8/10) to moderate (4/10).



Oswestry disability index questionnaire: The patient was asked several questions related to functional activities of pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sex life, social life and travelling and scored 7/45 after the treatment.

According to ODI the total score is 7/45

7 - Total score

45- Total possible score

7/45×100=15.5%

The patient has minimal disability (15.5%) as per the ODI.

It means the ODI reduced to lower grade on treatment

0%-20%: Minimal disability: The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.

DISCUSSION

The aim of the study was to find out the effect of core muscle strengthening in patients with postpartum chronic low back pain. The goals of rehabilitation include restoring function, pain free full range of motion and achieving full muscle strength and endurance.

This paper discusses the rehabilitation of postpartum chronic low back pain with the

application of core muscle strengthening special focuses on transversus abdominis and lumbar multifidus muscles.[5]

An experimental study design was done on a 31-year-old female patient to assess the efficacy of core muscle strengthening exercises in relieving postpartum chronic low back pain. The data was collected based on Oswestry Disability Index (ODI) questionnaire and Numerical Pain Rating Scale (NPRS). Prior to the rehabilitation programme the pain assessment has been taken as a pre-test evaluation and post treatment evaluation after the rehabilitation programme has been taken using Oswestry Disability Index (ODI) and Numerical Pain rating scale (NPRS).

In pre test evaluation the patient scored 8/10 as per the NPRS scale which indicates severe pain and 18/45=40% as per the ODI questionnaire which indicates moderate disability.

The patient was given 15 days of treatment which involves various core muscle strengthening exercises and moist heat.

In post treatment evaluation the patient scored 4/10 as per the NPRS scale and 7/45=15.5% as per the ODI questionnaire.

Thus the findings indicates is a significant reduction in pain and disability after the effective core muscle strengthening exercises. Core strength training mainly focuses on the strengthening of the deep trunk musculature, especially multifidus and transversus abdominis muscles that get weak during pregnancy. It effectively reduces pain, improves functional disability, and enhances muscle endurance in chronic LBP by impacting physiological and biomechanical process.

Core strengthening exercises enhances lumbar spine stability, positively affecting pain. Increased core strength improves proprioception and postural control, alleviating lower back strain and pain. It enhances overall physical performance, reducing fatigue during tasks.

According to the [2021] study design done by Iqra Nayyab, Misbah Ghous et al. On topic the effects of an exercise programme for core muscle strengthening in patients with low back pain after Caeserian- section: A single blind randomized controlled trial was done between two groups. Females aged 25-40 years who had LBP for minimum 2 months after CS were part of study. Group 1 was treated with a supervised core stability exercise programme and group 2 was provided with unsupervised core stability exercise programme. This study concludes that supervised core stability exercise programme was more effective in reducing pain, disability and in improving ROM compared to unsupervised home based core stability exercise programme.[5]

According to the [2015] study design done by Tarun kumar and Suraj Kumar et al. on Efficacy of core muscle strengthening exercise in chronic low back pain patients concludes that core muscle strengthening s along with lumbar flexibility and gluteus maximus strengthening is an effective rehabilitation technique for all chronic low back patients irrespective of duration (less than one year and more than one year) of their pain.[6]

According to the [2021] study design done by Madeline Leopold and Kristen Santiago et al. on Efficacy of a Core muscle strengthening program for Diastasis Rectus Abdominis in postpartum women: A prospective observational study assessed IRD and participant- reported outcomes following an online, vedio-based core strengthening program in postpartum women with DRA. IRD measurements at rest were significantly reduced after 12 weeks of the online core strengthening program. Those who completed the program for 12 weeks and participated in an additional 12-week maintenance phase had significantly greater improvements in their IRD at 24 weeks. There were also significantly improvements in LBP- related disability and SUI following the 12-week core strengthening program. These results suggest that the online core strengthening program can be used in postpartum women with DRA. [8]

CONCLUSION

According to this case study core muscle strengthening exercise was found to be moderately effective in chronic postpartum low back pain.

Declaration by Authors
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