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Comparative Study on the Effect of Core Muscle Stability Exercises Versus William's Exercises on Pain and Function in Post Pregnancy Lower Segment Caesarean Section Lumbar Radiculopathy Patients

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ABSTRACT
Lumbar radiculopathy, commonly characterized by radiating pain from the lower back into the legs, is a significant concern in postpartum women, particularly those who have undergone a lower segment caesarean section (LSCS). . It has been demonstrated that lumbopelvic hip muscle dysfunction (muscle core) increases the stress on the spine and impairs its stability. This study was conducted on forty women who had recently undergone an LSCS and were experiencing lumbar radiculopathy. They were randomly divided into two groups: Group A (core muscle stability exercises) and Group B (William's exercises). Each group participated in a 4 week exercise program. Pain outcome was measured using the Visual Analog Scale (VAS) and functional ability was measured using the Oswestry Disability Index (ODI) both before and after the program. Both exercise programs led to significant improvements in pain and function. However, women in Group A, who performed core muscle stability exercises, experienced a greater reduction in pain (an average decrease of 3 points on the VAS) compared to those in Group B (an average decrease of 2 points). Additionally, Group A showed a more significant improvement in function (an average improvement of 10 points on the ODI) compared to Group B (an average improvement of 7 points). Core muscle stability exercises proved to be more effective than William's exercises in reducing pain and enhancing functional outcomes for women with lumbar radiculopathy following LSCS. These results suggest that incorporating core muscle stability exercises into rehabilitation programs for these patients can offer greater relief and better functional recovery.
Keywords *– Lumbar radiculopathy, Caesarean section, Core muscle stability, William's exercises.*

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INTRODUCTION

Low back pain is the most frequent problem worldwide, but it is especially prevalent after childbirth since the whole-body mechanism changes. Post-partum back pain in women occurs when the abdominal muscles weaken and the stability of the lumbar spine is compromised. It has been demonstrated that lumbopelvic hip muscle dysfunction (muscle core) increases the stress on the spine and impairs its stability. [1] Chronic low back pain reduces lumbar mobility and impairs the core muscles. Several ligaments connect the lumbar region, providing stability and support. Furthermore, low back pain is a common health issue in primary care settings. [2]

Back pain can disrupt daily activities owing to discomfort or suffering. Post-delivery, the belly swells, stretching the abdominal muscles and shortening the back muscles in the lower back, including the lumbar spine and sacrum. Lumbar lordosis is enhanced after pregnancy; the body undergoes physiological changes that cause it to return to its normal position after delivery and afterward. Weakness of superficial trunk muscles is a significant risk factor. [3,4]

Low back discomfort, however, can also be brought on by other factors, such as weak legs and hamstrings, a weak trunk, and short back muscles. These skeletal characteristics may account for the altered spinal shape that predisposes to pregnancy. For different types low back pain symptoms may vary and according to that intervention also changes. [5,6]

Lumbar radiculopathy, commonly characterized by radiating pain from the lower back into the legs, is a significant concern in postpartum women, particularly those who have undergone a lower segment caesarean section (LSCS).[7] The incidence of lumbar radiculopathy in this population is heightened due to

the physiological and biomechanical changes associated with pregnancy and the surgical trauma from a C-section. Addressing this issue effectively is crucial for enhancing postpartum recovery and improving quality of life.[8]

Lower segment cesarean section (LSCS) is a common surgical procedure used to reduce risks during childbirth when vaginal delivery is not possible. Although generally safe, LSCS can cause postoperative complications like chronic lower back pain and lumbar radiculopathy. [9] Pain, numbness, tingling, and muscle weakness that radiates from the lower back to the legs are symptoms of lumbar radiculopathy, which is caused by compression or irritation of the lumbar spinal nerves. [10]

Rehabilitation exercises are integral to managing postpartum lower back pain and lumbar radiculopathy. Two primary exercise regimens, core muscle stability exercises and William's exercises, are often employed to address these issues. Each regimen offers unique mechanisms and benefits for reducing pain and improving functional outcomes.[11,12]

Core strengthening exercises focus on strengthening the deep abdominal and lumbar muscles, including the transversus abdominis, multifidus, and pelvic floor muscles. By enhancing the stability and support of the spine, core muscle stability exercises aim to reduce mechanical stress on the lumbar vertebrae and associated nerve roots.[13]

William's exercises, also known as flexion exercises, focus on strengthening abdominal muscles and stretching the lower back muscles. These exercises, including pelvic tilts, knee-to-chest stretches, and sit-ups, aim to reduce lumbar lordosis and alleviate pressure on the lumbar nerve roots.[14]

Postpartum women, especially those who have had caesarean sections, typically suffer from low back discomfort and lumbar radiculopathy, which has a substantial influence on their daily lives and capacity to care for their babies. Despite the frequency of this problem, there is no clear consensus on the best exercise methods for treating postpartum lumbar radiculopathy. This study tries to close this gap by comparing core muscle stability exercises to William's workouts. Effective pain management and functional improvement are essential for these women to resume regular activities and avoid persistent impairment. Identifying the most effective exercises will aid in developing individualized, evidence-based rehabilitation programs that improve patient adherence and satisfaction. Finally, offering evidence-based recommendations can help physicians choose the appropriate therapies, thereby increasing clinical.

MATERIAL AND METHODS

A sample of 40 patients with the mean age of 27 years, those who fulfill the inclusion and exclusion criteria were taken for the study. Ethical approval was obtained from Institutional ethics committee of Mahatma Gandhi Hospital, Jaipur. Patients were divided equally into two groups (20 each) on random after obtaining informed consent.

GROUP A: patients treated with William’s Exercises.

GROUP B: patients with Core Stability Exercises.

Patients inform consent will be taken before the participation of subject within study, The patients will be randomly assigned into three groups Group A & Group B (20 each).

Inclusion/ Exclusion Criteria: Patients aged between 20-35 years, Caesarean postoperative patients post 3 months, Low back pain after caesarean, Core muscle weakness after caesarean, unbalancing of pelvic muscle and Postural muscle weakness were included. Normal delivery cases, PIVD, Postpartum haemorrhage, Potential participant who also had co- morbid neurological and severe systemic disease as well as physical limitation that undermined their ability to cope with the demand of the study were excluded from the study.

Procedure:

Group A was given the Williams flexion program, which consisted of Pelvic Tilt, Single Knee to Chest, Double Knee to Chest, and Sit-ups. For the first two weeks, the patient performed workouts with 10 repetitions and a 10-second hold. After two weeks, the patient advanced to 20-second holds for these activities. [14]

Group B received core muscle stability exercises such as Transverse Abdominis Activation (Abdominal Bracing), Pelvic Floor Exercises (Kegels), Quadruped Arm/Leg Raise (Bird-Dog), Plank, Side Plank, and Bridge. For the first two weeks, the patient performed workouts with 10 repetitions and a 10-second hold. After two weeks, the patient advanced to 20-second holds for these activities. The treatment plan was carried out three times each week for four weeks. [12]

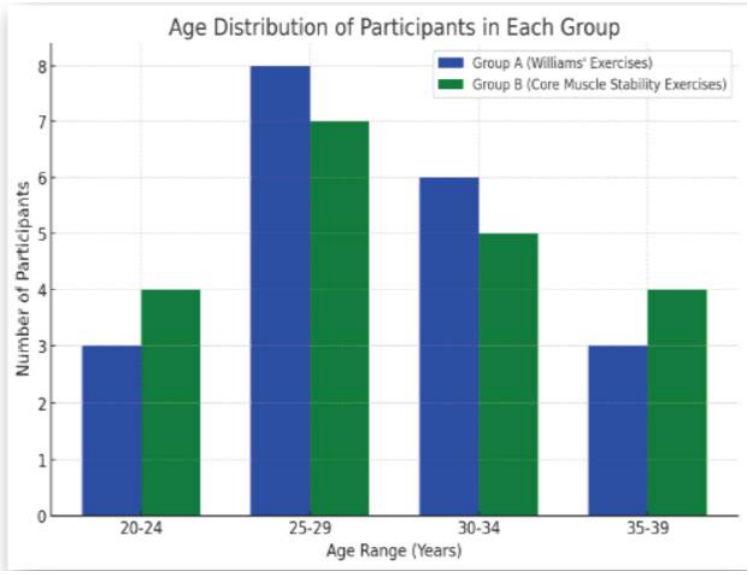
RESULT

The study included 40 postpartum women experiencing lumbar radiculopathy after lower segment cesarean section (LSCS). Split equally into two groups, Group A and Group B, they shared similar age ranges, body mass indices (BMIs), and postpartum durations.

Age Distribution –

Age Range (Years)	Group A (Williams' Exercises)	Group B (Core Muscle Stability Exercises)	Total
20-24	3	4	7
25-29	8	7	15
30-34	6	5	11
35-39	3	4	7
Total	20	20	40

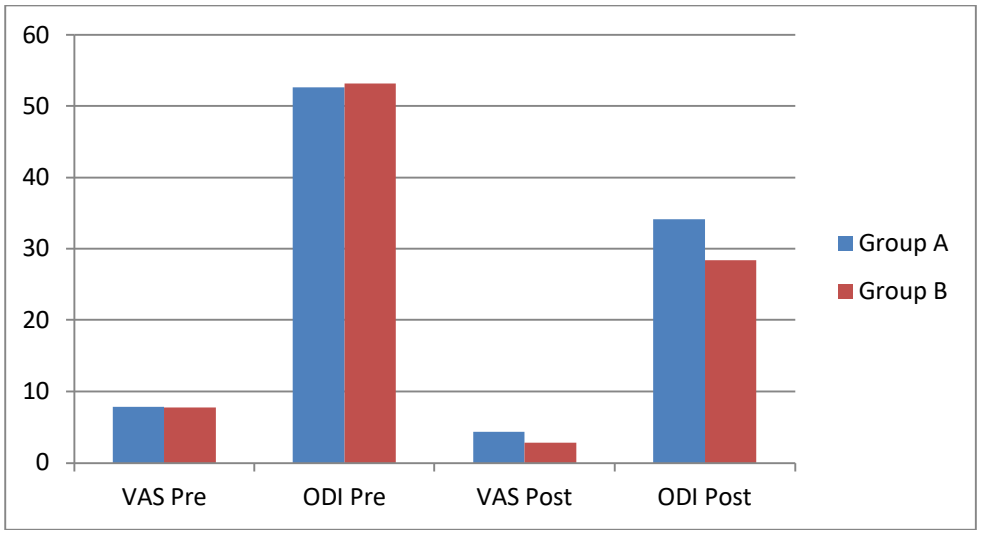
Table 1 : Age distribution among both the groups



Graph 1 : Age distribution among both the groups

Table 2 : Outcome measure pre and post intervention

	Group A		Group B	
	Pre	Post	Pre	Post
VAS	7.8	4.3	7.7	2.8
ODI	52.6	34.1	53.2	28.4



Graph 2 : Outcome measure pre and post intervention

The result indicates that on comparing both the groups, there was significant variance in both primary outcomes: VAS ($p < 0.01$), ODI ($p < 0.01$). Hence, it is proved in this study that Williams Flexion Regime is better as compared to Core stability exercises to improve pain and function in post pregnancy LSCS patients with lumbar radiculopathy.

DISCUSSION

This study aimed to compare how well Williams' Exercises and Core Muscle Stability Exercises work to reduce pain and improve function in new mothers dealing with lumbar radiculopathy after a lower segment cesarean section (LSCS). The findings offer valuable insights into the effectiveness of these two exercise regimens.

Pain Reduction

Both groups experienced significant pain relief, as shown by their Visual Analog Scale (VAS) scores.

For those in Group A, who did Williams' Exercises, the initial average VAS score was 7.8. After the intervention, it dropped to 4.3, a notable reduction of 3.5 points. This suggests that Williams' Exercises significantly alleviated pain. Williams' exercises are effective in reducing lumbar lordosis and associated pain. Mayer et al. (2005) found that spinal flexion exercises can help reduce back pain and improve functional ability. [15] Group B, which practiced Core Muscle Stability Exercises, saw an even more dramatic pain reduction, with VAS scores falling from 7.7 to 2.8, a decrease of 4.9 points. This indicates that core muscle stability exercises might be even more effective in managing pain for these women. Richardson et al. (2004) have shown that core stability exercises are effective in enhancing spinal stability and reducing back pain. [16]

Research by Hayden et al. [17]) showed that core stabilization exercises are very effective in reducing pain and disability in patients with chronic lower back pain compared to general exercise programs. Similarly, Hides et al. [18] found that targeting the multifidus muscle with specific stabilization exercises led to better pain outcomes than general physical therapy.

Functional Improvement

We also saw significant improvements in functional ability, as measured by the Oswestry Disability Index (ODI). Group A started with an average ODI score of 52.6, which improved to 34.1, showing an 18.5% improvement. Group B began with an average ODI score of 53.2 and improved to 28.4, indicating a 24.8% enhancement. This suggests that while both exercise regimens are effective, core
muscle stability exercises might offer a slight edge in improving functional outcomes.

Koumantakis et al. [19] found that core stability exercises significantly improved functional disability in patients with low back pain.[19] Similarly, Ferreira et al. [20] reported that specific stabilization exercises resulted in better functional outcomes compared to general exercise programs for chronic low back pain patients.

CONCLUSION

Both Williams' Exercises and Core Muscle Stability Exercises are effective in reducing pain and improving function in postpartum women with lumbar radiculopathy following LSCS. Core Muscle Stability Exercises showed a slightly greater improvement in both pain and functional outcomes. These findings support the incorporation of core stability exercises into postpartum rehabilitation programs, highlighting their potential to enhance recovery and improve quality of life for affected women. Further research is warranted to build on these findings and optimize rehabilitation strategies for this patient population.

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