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Prevalence Of Core Muscle Weakness In Multiple Lower Segment Cesarean Section Women..

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ABSTRACT

Background: Core muscles are characterised as a muscular box that includes the diaphragm as the roof, the pelvis floor, the hip musculature as the bottom, the abdominals in the front, and the paraspinal and gluteal muscles in the rear. The core muscle plays a vital role in spinal stability and functional mobility. However during pregnancy the abdominal and pelvic floor muscles extend to provide room for the developing baby, which causes alterations in core muscles. This may lead to loss in core muscle function, which is exacerbated by the abdominal muscles damage during caesarean sections. As in caesarean section the surgical incision and the healing procedures that follow, have a direct impact on the abdominal wall and thereby on core muscle. These effects can be made worsen by repeated caesarean sections, which could result in chronic muscular weakening and dysfunction.

Objective: The objective of this study is to determine core muscle weakness in women with multiple caesarean section delivery.

Materials and Methods: 90 female volunteers between 20- 40 years were involved in this study fulfilling the inclusion and exclusion criteria and were explained about the procedure and informed consent was taken. Core strength was assessed using two standardized test. Participants performance was recorded and data was collected. Data was analysed to determine the prevalence of core weakness.

Result: Out of 90 participants, 48.88% of female were unable to perform Trunk curl up test which indicates significant weakness in abdominal muscles. Similarly 37.77% of female were unable to perform Bridge test which suggests comprised strength and stability of core muscle.

Conclusion: The study reveals a notable prevalence of core muscle weakness among women with multiple caesarean section delivery.

KEYWORDS: Core muscle , Cesarean section, Trunk Curl Up Test , Pelvic Bridge Test, Postpartum rehabilitation..

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INTRODUCTION

Core muscles are characterised as a muscular box that includes the diaphragm as the roof, the pelvis floor, the hip musculature as the bottom, the abdominals in the front, and the paraspinal and gluteal muscles in the rear. This box contains a number of muscles that support pelvic and spinal stability during functional motions. Both mobility and stability are provided by core muscles. Based on their characteristics and functions, the core muscles—the main muscle group responsible for preserving spinal stability—can be separated into two divisions. The deep core muscles, usually referred to as local stabilising muscle. These muscles mostly consist of the quadratus lumborum, internal oblique muscle, lumbar multifidus, and transversus abdominis. These muscles are principally in charge of spinal stabilisation because they offer exquisite motor control. The shallow core muscles, often referred to as global stabilising muscles, are made up of the quadratus lumborum, rectus abdominis, erector spinae, internal and external oblique muscles, and hip muscle groups. These muscles provide for more spinal control since they connect the pelvis to the thoracic ribs or leg joints rather than being directly related to the spine primarily in charge of preserving spinal stability. Core muscles are also known as the human body's natural brace because, when they are functioning properly, they may preserve segmental stability, protect the spine, and lessen stress on the lumbar vertebrae and intervertebral discs.[2] The abdominal and pelvic floor muscles extend to provide room for the developing baby during pregnancy, which causes major alterations to the core muscles. This leads to a loss in core muscle function, which is exacerbated by the abdominal muscles' damage during caesarean sections. Major surgery is what a caesarean section is. A horizontal incision is made right above the pubic bone during a caesarean section, while a vertical incision may be performed if the delivery is urgent or if other issues necessitate a different method of accessing the baby. To get to the uterus, amniotic sac, and baby, a horizontal incision runs through five layers of skin, tissue, and muscle.The rectus abdominal muscle, fat, fascia, the outermost layer of skin (derma), and the peritoneum (the layer of tissue supporting the abdominal organs) are the five layers. The surgeon stitches the separated layers back together after the baby is delivered, which may leave scars across many layers of the abdominal wall's tissue. Weakness and a lack of core stability may result from the scarring's impact on the abdominal muscles' capacity to glide over one another during muscle contraction. The abdominal muscles' capacity to contract and react to movement may be disrupted by the caesarean section technique, which

involves pushing the muscles aside during birth. One of the most popular surgical procedures done on women these days is the caesarean section (CS). Caesarean sections (CSs) are a prevalent surgical treatment due to a number of factors, including improved social and economic situations, increased mother age, and the false idea that vaginal deliveries (VAs) may be harmful. However, the quality of life may be impacted by certain problems following caesarean section (CS). Core weakness may worsen and could worsen as a result of repeated caesarean deliveries. Weakness in the core muscles can lead to a number of musculoskeletal problems, such as pelvic floor dysfunction and low back discomfort, which can affect postpartum women's general quality of life. [1]Another factor linked to caesarean delivery is weak abdominal muscles. Because of the surgical incision and the healing procedures that follow, the abdominal wall—including the rectus abdominis and transverse abdominis muscles—is directly impacted during a caesarean section. These side effects could be made worse by repeated caesarean sections, which could result in chronic muscular weakening and dysfunction. Weak abdominal muscles and a rise in excess midsection weight may be possible after a caesarean section. There might be a chance to temporarily lessen muscular tone. A woman may require an unforeseen or planned caesarean section for a variety of reasons. Whatever the cause for the procedure, recovering from a caesarean section differs from recovering from a typical vaginal birth. Recovery might be aided by knowing how crucial it is to protect the stomach muscles following a caesarean operation. In both situations, the abdominal skin is cut, and the muscles are separated to reveal the uterus. This weakens the abdominal muscles, which in turn weakens the core muscles because the abdominal muscles make up a large portion of the core muscles.[3]Core functions are also impacted by discomfort surrounding the incision site and the healing process following a caesarean section. Research has indicated that postpartum women, especially those who have had a caesarean section, have decreased abdominal muscle steadiness, increased fatigability, and impaired trunk flexor strength. These deficiencies may last for a few weeks after giving birth, and deliveries via caesarean section are linked to more impairments than vaginal births.[4] The benefits and drawbacks of caesarean sections (CS) are still up for dispute, and numerous studies have examined the problems that mothers face after CS. Additionally, research has indicated a favourable correlation between CS and some side effects, including low back pain, abdominal pain, and scar pain (SP).[1] Although research has examined the effects of a single caesarean section on core muscle function, nothing is known about how numerous caesarean section surgeries affect core muscle strength and function. It's critical to comprehend the prevalence of core muscle weakening in women who have had repeated lower segment caesarean section deliveries, given the rising incidence of caesarean sections and the possibility of cumulative effects on the abdominal wall with each procedure. Investigating core muscular weakness in women who have had numerous caesarean sections, identifying those who are at risk for related issues. And developing focused therapies that support recovery and improve the quality of life for women who have had many caesarean sections.

AIM AND OBJECTIVES:

Aim: To study the prevalence of core muscle weakness in multiple caesarean section women.

Objectives: To study the effects of repeated caesarean section on core muscle

To assess the presence of core weakness in women with history of two or more

caesarean deliveries

SELECTION CRITERIA:

Inclusion Criteria: Women having history of two or more than two cesarean section deliveries

Exclusion Criteria: Women with history of full term vaginal deliveries.

PROCEDURE:

90 female volunteers between 20- 40 years were involved in this study fulfilling the inclusion and exclusion criteria. All the participants were explained about the procedure and written consent form were taken from them. Basic demographic data was taken of the participants. Two standardized tests were used to assess core strength. Participants were asked to perform these tests. On basis of this data was collected. All test scores and demographic information was documented. After which the statistical analysis was done of the collected data.

CLINICAL TESTS:

Tests which were used to check core strength included Trunk Curl Up Test and Pelvic Bridge Test. For each test, subjects were given a verbal explanation of the test of correct and incorrect positions were explained, and demonstration of the testing position were provided if necessary. Subject were instructed to perform the test and data was collected and documented.

Trunk Curl Up Test: Trunk curl up test is used to evaluate abdominal muscle strength and endurance, which are critical components of core stability. The test specifically targets the rectus abdominis and internal and external obliques through a controlled flexion of trunk. Participants are instructed to lie supine with knee bent at 90 degrees. From the starting position, the participant contracts the abdominal muscles to lift the upper trunk off the floor until scapulae clear the ground, then slowly return to the starting position.

Pelvic Bridge Test: Pelvic bridge test is used to evaluate the strength and endurance of posterior chain musculature, particularly

the gluteus maximus, hamstring and lumbar extensors, which are critical components of core stability. Participants begin the test in supine position with knees flexed to 90 degrees. From starting position, the participants were instructed to engage the core and gluteal muscles to lift the pelvis off the ground until a straight line is formed from the shoulders to the knees.

STATISTICAL ANALYSIS:

The observational study was carried out among 90 individuals. The study was carried out using two standardized tests to assess core strength. Data collection was done which included basic demographic data of individual and the result of the test which was performed by individual. The study duration was 6 months. The random sampling method was used because of limited time. The collected data was analysed by a statistician using an instat application.

RESULTS:

TABLE : 1 Demographic Data Of Participants

Demographic data	**Mean**	**Standard deviation**
AGE (Years)	33.5	4.66
BODY MASS INDEX (Kg/m^2)	25.55	4.92

Among the collected 90 individuals the average age of them is 33.5 years with Standard deviation of 4.66, the average body to mass index (BMI) is 25.55 kg/m^2 with Standard deviation of 4.92

TABLE: 2 Obstetric Data Of Participants

Number of deliveries	**Number of participants**	**Number of participants with caesarean deliveries**
2	87	89
MORE THAN 2	3	1
TOTAL	90	90

The total number of 90 individuals had performed the test. Among the 90 individuals around 87 had a two deliveries and 3 of them had more than two deliveries. Further 89 individuals had history of two caesarean deliveries while 1 had history of more than two caesarean delivery.

TABLE: 3 Results Of Trunk Curl Up Test

Trunk Curl Up Test	**Number of participants**	**Percentage**
Able to Perform	46	51.11%
Unable to Perform	44	48.88%

The above table shows the result of Trunk Curl Up Test. Out of 90 females up to 44 females were unable to perform test. This shows that up to 48.88% of female have core weakness.

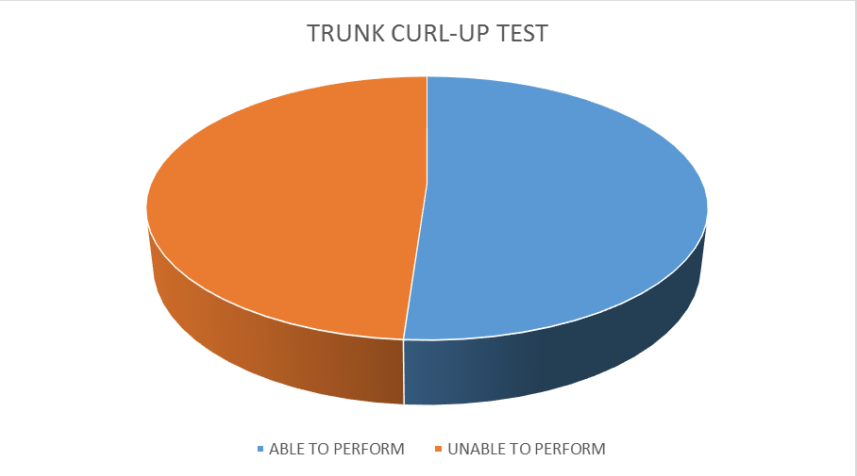
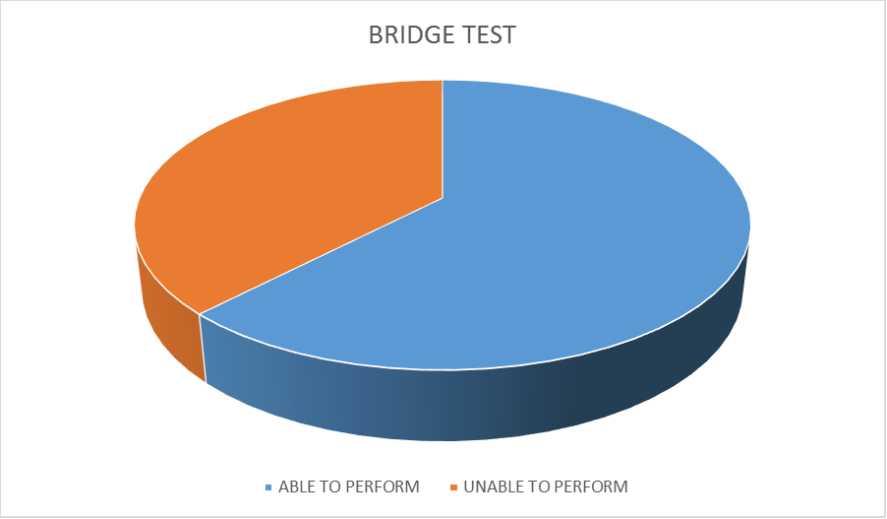


TABLE : 4 Results Of Pelvic Bridge Test

Pelvic Bridge Test	Number of Participants	Percentage
Able to Perform	56	62.22%
Unable to Perform	34	37.77%

The above table shows the results of Pelvic Bridge Test. Out of 90 females up to 34 females were unable to perform test. This shows that up to 37.77% of female have core weakness.



DISCUSSION :

This is the survey study aimed to find the prevalence of core muscle weakness among the women who have undergone multiple lower segment caesarean section. We conducted survey among 90 women using the standardized outcome measures: Trunk Curl-up test and Pelvic Bridge test. According to the results in Trunk Curl-up test, only 51.11% of participants were able to perform the test, while 48.88% were unable to complete it. This nearly equal distribution suggests that almost half of the study population had a measureable deficit in the abdominal muscle strength and endurance due to surgical trauma from repeated caesarean sections. The high proportion of participants are unable to perform the Trunk Curl up test which suggest deficit in anterior core strength particularly the rectus abdominis and transversus abdominis muscles. As caesarean delivery particularly when repeated involves incision through abdominal musculature and fascial layers which can lead to long term impairment in abdominal muscle function. The scar tissue formation may contribute to reduce muscle mobilization and coordination, making daily task difficult to

perform. In Pelvic Bridge test, 62.22% of participants were successfully able to perform the test, while 37.77% were unable to perform, indicating weakness in the gluteal and lumbar stabilizing muscles. The slightly better performance on the Pelvic Bridge test may be due to less direct surgical involvement of posterior structure compared to anterior abdominal wall. The pelvic bridge test assesses the integrity and strength of the posterior core, including gluteus maximus , hamstring, and lumbar extensors. This finding is critical because adequate function of these muscles is essential not only for pelvic stability and locomotion but also for spinal health and postural control. Weakness in this area can make women prone to chronic lower back pain , pelvic instability, and difficulty in returning to normal activity levels postpartum. The discrepancy in performance between the two tests also suggests differential recovery and adaptation of various core muscle groups. While anterior muscles (such as the rectus abdominis) are directly incised during caesarean sections, posterior core muscles may be less directly impacted. However, compensatory weakness or lack of rehabilitation focus on posterior muscles can still result global core dysfunction as indicated by the 37.77% failure rate in the pelvic bridge test. These findings supports literature that suggest repeated abdominal surgeries such as multiple lower segment caesarean section, have reported persistent abdominal muscle weakness in postpartum women, it has shown that abdominal wall strength can be compromised up to several months or even years postpartum, especially without targeted rehabilitation so abdominal muscle weakness can impair core muscle integrity. According to Deering et al.(2018), whose study reported that postpartum women, exhibited reduced trunk flexor strength, increased fatigability and decreased steadiness compared to nulligravid controls. Similarly, the study by Fede et al.(2021) demonstrated that caesarean section is associated with significant fascial thickening, asymmetry in internal oblique and rectus abdominis muscles and widened inter- rectus distance, all of which may predispose women to scar pain, abdominal discomfort, and low back pain. This supports the present study's observation that repeated caesarean section delivery is not only a localized surgical event but has long term implications on core stability and musculoskeletal health. Functionally, impaired core strength has significant consequences. It comprises spinal stability, increases the risk of musculoskeletal disorders, and contributes to pelvic floor dysfunction, low back pain, and reduced quality of life. This study highlights the clinical importance of targeted rehabilitation for women with multiple lower segment caesarean section delivery. Early physiotherapy intervention focusing on progressive core strengthening, scar tissue mobilization, and posture correction may mitigate long term complications and restore functional capacity.

In conclusion this study highlights a significant prevalence of core muscle weakness in women with multiple lower segment caesarean sections. The inability of a considerable proportion of participants to perform basic core strength tests like trunk curl up test and pelvic bridge test highlights clinical importance of targeted rehabilitation for these women. Early physiotherapy intervention focusing on progressive core strengthening, scar tissue mobilization, and posture correction reduce the risk of musculoskeletal complications and restore functional capacity and thus improve overall quality of life.

CONCLUSION:

The findings of this study suggests a notable prevalence of core muscle weakness among the women who has history of multiple lower segment caesarean section. Approximately 48.88% were unable to perform which indicates deficits in abdominal muscle strength, while 37.77% of women were unable to perform the test which reflects weakness in core stabilization muscles.

These results suggest that the multiple lower segment caesarean section may be a contributing factor in developing core muscle weakness. Core muscle strength is important for posture and efficient movement, and its impairment can lead to musculoskeletal complications including low back pain and difficulty in performing daily activities

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