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Effectiveness Of Lower Limb Strengthening Program on Functional Mobility in Multiparrous Women

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ABSTRACT

Background

Pregnancy is a transformative and special time in woman's life marked by physiological, anatomical emotional and hormonal changes in the women's body affecting various system of the body such as cardiovascular, respiratory, endocrine, renal and musculoskeletal systems. These changes are essential to meet the mother's increased metabolic demand support the foetal development and help both the mother and foetus prepare for childbirth.

Methods

This study was an experimental study which includes 60 multiparrous women in and around Karad residing in urban and rural areas were taken and consent form was signed by the participants were explained regarding the test and it was undertaken.

Result

As there were 2 groups that is group A and group B and the data was prepared for each group as it was divided by 1-2 wks , 2-4 wks . 4-6 wks and each muscle group.For the experimental group , the p-value for muscle strength was 0.02 indicating a statistically significant change in muscle strength over the time . . For the control group , the p-value for muscle strength was 0.08 indicating no significant change in muscle strength. The study findings indicates that 35% of women experiencedsignificant improvement in functional mobility following the lower limb strengthening program in multiparous women. In contrast 25% showed no notable improvements.

Conclusion

The study suggest that a lower limb strengthening program cam enhance functional mobility in multiparous women program significantly improves functional mobility in multiparous women. This data suggests that the intervention used in the Experimental Group has a substantial impact on improving muscle strength compared to the Control Group.

Keywords: *Lower limb strengthening, Functional mobility, Multiparous women*

1. INTRODUCTION

Pregnancy is a transformative and special time in woman's life marked by physiological, anatomical, emotional and hormonal changes in the women's body affecting various system of the body such as cardiovascular, respiratory, endocrine, renal and musculoskeletal systems. These changes are essential to meet the mother's increased metabolic demand support the foetal development and help both the mother and foetus prepare for childbirth. The important changes that occur in the females body are : accelerated heart rate and low blood pressure due to increased blood flow , enlarged blood vessels and increased pressure exerted by the constantly growing uterus on the arteries , which leads to slowing the speed of blood to the heart , an increase number of breaths per minute due to the pressure exerted by the enlarged abdomen on the diaphragm – especially in the last trimester of pregnancy, when the size and weight of the uterus put additional pressure on the back muscles; exacerbated curves of the spine, which leads to the emergence of lumbar pain; increased body weight; increased water retention in the body along with venous stasis, which will cause oedema in the lower limbs and the sensation of tired

legs .

To get through this period more easily, women are encouraged to practice physical exercise and to improve functional mobility aimed to ensure good mental tone, optimal weight gain and better aerobic condition. In most pregnancies, mild to moderate physical activity is beneficial for the mother and will not have undesirable effects on the unborn baby.As pregnant women are increasingly practicing sedentary activities that leads to many negative outcomes such as weight gain, hypertension and mental health disorder.Theincidence of sedentary lifestyle during pregnancy ranges from 57.1% to 78 %. Despite scientifically proven advantages and benefits of exercise in pregnancy, pregnancy itself is still represent one of the causes of a significant reduction and avoidance of exercise.

Functional mobility refers to a person's ability to move through their environment with ease and independence. It is a vital aspect of daily life, influencing overall quality of life and independence in performing basic activities. For multiparous women (those who have given birth multiple times), the physical changes that occur during and after pregnancy can impact functional mobility, often leading to musculoskeletal issues such as pelvic floor dysfunction, lower back pain, and reduced lower limb strength. These changes may result in impaired balance, walking difficulties and reduced endurance which can all limit woman's functional capacity.Frail elderly individuals' independence in daily tasks greatly affects their well-being and support needs, whether living at home or in care facilities. Functional disability and dependence on other people to perform (ADLs) is an important predictor in older adults of developing adverse outcomes of aging .

Lower limb strength plays a significant role in functional mobility, especially in tasks such as walking, standing from a seated position, and climbing stairs. Strengthening the muscles of the lower limbs can help in stabilizing the body, improving posture, and reducing the risk of falls. Moreover, lower limb strengthening is often recommended as part of rehabilitation programs for women postpartum, particularly for those who have experienced multiple pregnancies.

By targeting muscles such as the quadriceps, hamstrings, calves, and glutes, a structured strengthening program can enhance balance, improve gait patterns, and increase endurance, all of which contribute to improved functional mobility. Apart from that the women who are engaged in physically arduous occupation require to complete physical activities such as load carriage, and heavy lifting for that the proper strength in the muscle should be there to complete the task.

For women regular physical activity of moderate intensity for at least 20 – 30 mins per day or else alternate days of the week has been suggested by the American College of Obstetricians and Gynecologists (ACOG). Similarlythe 2008 Physical activity Guidelines for Americans recommend approximately 150 minutes per week of moderate intensity aerobic activity during pregnancy and post- partum period.Early post- partum period represent opportune windows to engage women s. Strengthening exercises are commonly incorporated into lower limb rehabilitation programs to enhance the muscle function and recovery. The stability of the lumbar spine is significantly influenced by the lower limb muscles, particularly the hip muscle. The strength and proper activation of the lower limb muscles facilitate the transfer of forces between the lower limb and the lumbo-pelvic region

2. MATERIALS AND METHODS

This was an experimental study carried out in Krishna college of Physiotherapy Krishna Vishwa Vidyapeeth Karad. After receiving approval from the Instiutional ethical committee. For this investigation, 60 individuals were chosen randomly. All participants were provided written informed consent in their native language. The study's methodology and goal were explained to the subjects and a preliminary analysis including demographic information was completed.Participants were selected according to inclusion and exclusion criteria. The 20- 40 age range was chosen for this investigation. The women with multiple pregnancies (2 or 3 pregnancy) and the women who have completed 6 weeks of post-partum period were included in the study. Participants who had a history of fracture, requiring surgery or who had aindications or symptoms of asignificant cause of pain such as inflammatory, infectious, traumatic, neoplastic, degenerative or metabolic were excluded. Comorbidities such as hypertension, thyroidism and diabetes were excluded from the study. This was a randomized controlled trial study design. The lower limb strength was measured using MMT Grades (manual muscle testing) and functional mobility scale and time up and go test respectively. The women were asked previously validated questions about seven ADLs which include walking in a room, walking over the blocks, dressing, bathing, toileting, and getting out of bed. Women's status for each ADL was given to one of the categories which include independent, independent with difficulty while performing ADL and the one who are depended on assistance. In general the functional status was determined by combining responses across all seven ADLs and categorized into three groups. Women who required assistance with one or more ADLs were classified as dependent, those who reported difficulty but no dependence were classified as independent with difficulty and those who reported neither difficulty nor dependence across all ADLs were classified as independent.

In other wordswe assessed compromised mobility using several measures. First we used the timed get up and go test a standard mobility assessment recommended by the American Geriatrics Society. This test conducted in the home measured the time it took a woman to rise from a chair without using an arm rest walk 3 meter, turn around, walk back and sit down. A completion time greater than 12 secs indicated as compromised mobility. We also evaluated whether a woman was

observed walking unsteadily or using a mobility aid, such as a cane. Additional assessments included the frequency of physical activity and self-reported falls within the past 4 months.

In which there were 2 groups they are control group and intervention group as the groups were classified as per group A and group B. As the group A is the control group which was given basic strengthening protocol and group B consist of experimental basic strengthening protocol along with that some advanced exercise. This was an 6 weeks program for strengthening the lower extremities that include four session per week under supervision, each lasting 30 to 40 minutes and given 10 (3sets) repetitions in the intial days and hence forth the repetition were progressed upto 20 to 30 (5 sets)repetitions of each exercise.

These exercise include first starting with the deep breathing exercise for the subject to relax and then progress with some free exercise of lower limb which include flexion, extension, abduction and adduction.Then start with the pelvic tilts, pelvic floor exercise weregiven for the subjects.

Exercise for Group A : Control group.

Exercises	Repetitions / Sets
Deep Breathing	10repetition / 3sets
Glutes bridge	10repetition / 3sets
Isometrics of Quadriceps	10repetition / 3sets
Isometrics ofHamstring	10repetition / 3sets
Wall squat	10repetition/ 3sets
Side leg raise	10repetition / 3sets
Calf raises	10repetition/ 3sets
Heel Raise	10repetition/ 3sets
Ankle toe movements	10repetition/ 3sets

Exercise for group B : Intervention group

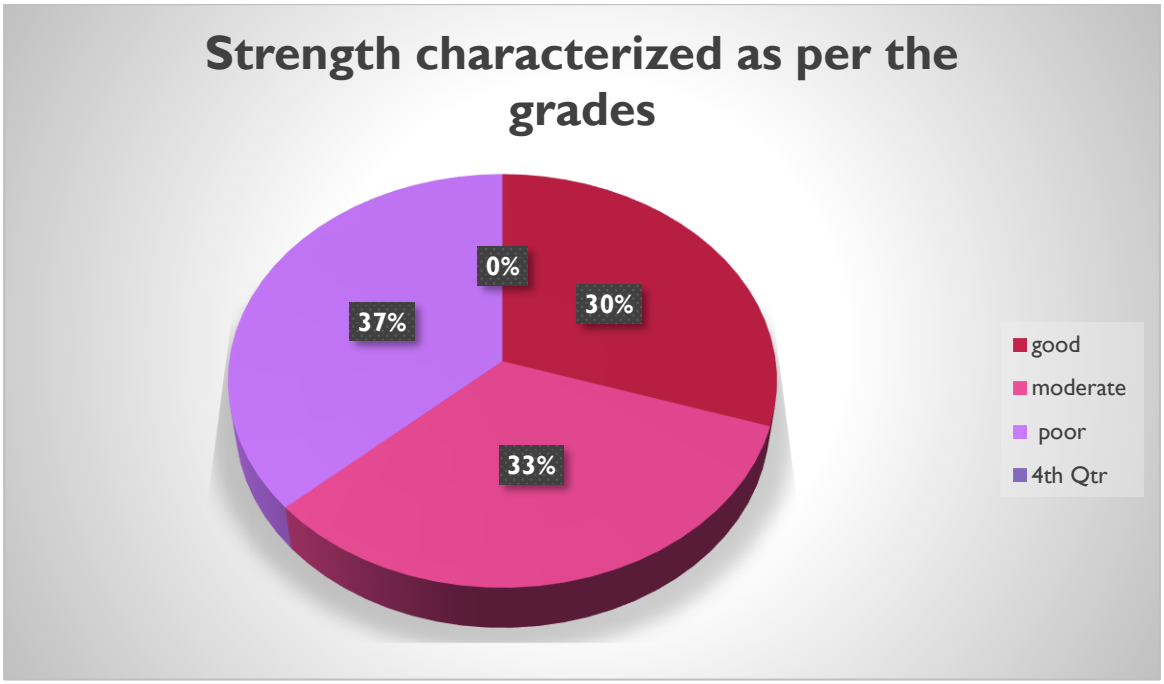
Exercises	Repetition / Sets
Deep breathing	10repetition / 3sets
Free exercise of lower limb Flexion Extension Abduction Adduction	10repetition/ 3sets
Pelvic bridging	10repetition/ 3sets
Lunges	10repetition/ 3sets
Clamshell	10repetition/ 3sets
Squats	10repetition/ 3sets
Single leg squat	10repetition /3 sets
Straight leg raise	10repetition/ 3sets
Burpees	10repetition/ 3sets

Heel raise	10repetition/ 3sets

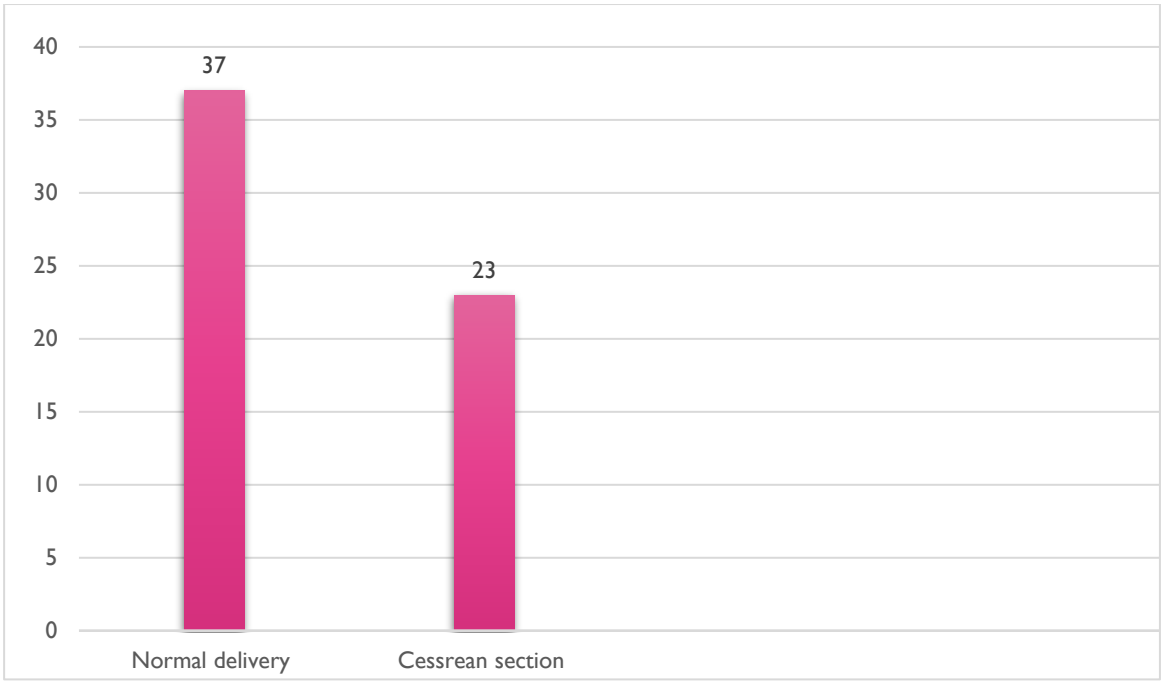
These were the exercise that were given to group A and group B as mentioned above the participants are divided into 2 categories and they were classified according to the group itself. Total number of participants were 60 and they are divided into 30 participants in each group.

3. RESULTS

60 Individual who participated in the experimental study of the multiparous female population. They were examined with the help of Manual muscle testing (MMT), functional mobility scale, time up and go test .Since this is a repeated measures design, you would perform a repeated measures annova to examine the within the subjects factor (time), and the muscle groups could be treated as multiple dependent variables. In this case, since we're dealing with muscle strength at different time points, the analysis would check whether muscle strength changes significantly across the 3 time periods for each group. Data was prepared for each group as it was divided by 1-2 wks , 2-4 wks . 4-6 wks and each muscle group . If the p-value is less than the significance level (usually 0.05), then you reject the null hypothesis, indicating that there is a significant difference in muscle strength over time for that group.For the experimental group , thep-value for muscle strength was 0.02 indicating a statistically significant change in muscle strength over the time . . For the control group , the p-value for muscle strength was 0.08 indicating no significant change in muscle strength over the time .

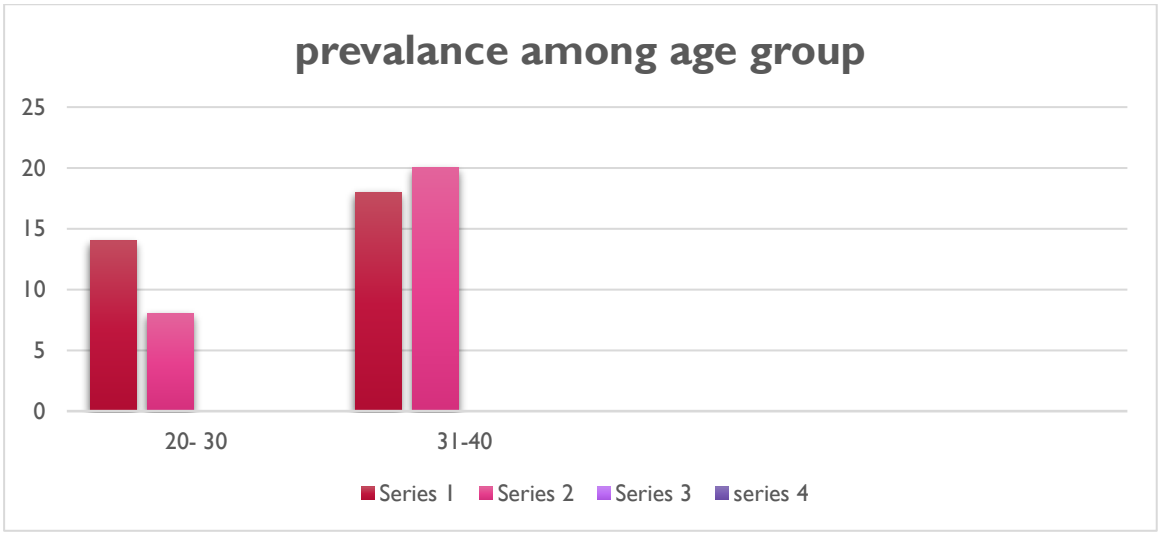


Graph 1 : Female are characterized according to the strength on the basis of Good, Moderate, Poor.



Graph 2: Represents the Normal delivery and Caesarean section.

In the age group 20 to 30 there were 22 female out of which 14 were found to be good strength comparative then the 8 female. In the age group 31 to 40 there were 38 female out of which 18 were having good strength and 20 were having moderate.



Graph 3: Represents the prevalence among age group.

These figure overall tells about the effectiveness in the multiparous group.

Interpretation

Experimental Group: The intervention appears to have a significant positive effect on muscle strength, with marked improvements over the 6 weeks.Control Group: While the Control Group also shows improvement, the changes are more gradual and less pronounced than those in the Experimental Group, indicating that the observed improvements in the Experimental Group are likely due to the specific intervention.

4. DISCUSSION

Pregnancy is a transformative and special time in woman's life marked by physiological, anatomical, emotional and hormonal changes in the women's body affecting various system of the body such as cardiovascular, respiratory, endocrine, renal and musculoskeletal systems. A study compared pelvic proprioceptive neuromuscular facilitation (PNF) and lower limb strengthening exercises in postmenopausal women. Both interventions led to significant improvements in balance and strength, suggesting that such exercises can enhance functional mobility in this demographic. The postpartum women with pelvic floor muscle training showed significant reduction in pain, functional disability, along with that increased range of motion and pelvic floor muscle strength. These finding indicate that exercise program improve functional mobility in postpartum women. The program led to significant improvements in muscle strength and functional performance and having the benefits of lower limb strengthening in enhancing mobility among women. The program led to notable improvements in postural stability and gait parameters, highlighting the positive influence of lower strengthening on functional mobility. While these studies do not exclusively focus on multiparous women, the changes that are faced by this group such as pelvic floor muscle weakness and altered biomechanics are comparable. Therefore it is a reasonable to interfere that lower limb strengthening program could similarly benefit multiparous women by enhancing functional mobility.

5. CONCLUSION

The lower limb strengthening program significantly improves functional mobility in multiparous women. This data suggests that the intervention used in the Experimental Group has a substantial impact on improving muscle strength compared to the Control Group.It suggest that targeted exercise enhance muscle strength, balance and overall mobility leading to improved daily activities and reduced the risk of fall and musculoskeletal issues. Implementing these programs can be beneficial in postnatal.

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REFERENCES

[1] Tan EK, Tan EL. Alterations in physiology and anatomy during pregnancy. Best practice & research Clinical obstetrics & gynaecology. 2013 Dec 1;27(6):791-802.

[2] Filipec M, Matijević R. Why We should Recommend Exercise in Pregnancy?. Clinical and Experimental Obstetrics & Gynecology. 2022 Nov 9;49(11):243.

[3] CROITORU H, TEODORESCU S, ENE-VOICULESCU C. EFFECTS OF PHYSICAL EXERCISE ON A MULTIPAROUS PATIENT IN THE PREPARTUM PERIOD. CASE STUDY. Discobolul-Physical Education, Sport & Kinetotherapy Journal. 2020 Jun 1;59(2).

[4] Sogut, M., Demir, A., & Guler, M. (2020). Musculoskeletal changes and functional mobility in multiparous women: A systematic review.Journal of Obstetrics and Gynaecology, 40(1), 51-58.

[5] Blake, C., Coughlan, G. F., & O'Sullivan, L. (2017). Postpartum pelvic floor and lower limb rehabilitation for multiparous women. Journal of Women's Health Physical Therapy, 41(3), 107-113.

[6] Dai, Y., Zhang, W., & Li, J. (2020). The effect of lower limb strengthening on improving mobility in postpartum women. Journal of Physiotherapy Research, 34(2), 146-152.

[7] American College of Obstetricians and Gynecologists. Physical activity and exercise during pregnancy and the postpartum period. Committee Opinion No. 650. Obstet Gynecol. December 2015;126:e135–e142.

[8] US Department of Health and Human Services. 2008 Physical Activity Guidelines for Americans. Washington, DC: US: Department of Health and Human Services; 2008.

[9] DiPietro L, Evenson KR, Bloodgood B, Sprow K, Troiano RP, Piercy KL, Vaux-Bjerke A, Powell KE. Benefits of physical activity during pregnancy and postpartum: an umbrella review. Medicine and science in sports and exercise. 2019 Jun;51(6):1292.

[10] Priya S, Haripriya S, Paul C. Effectiveness of Core Strengthening and Lower Limb Exercises to Improve Body Movements in College Students with Chronic Low Back Pain: A Pilot Study. RGUHS Journal of Physiotherapy. 2023;3(3).

[11] Campos-Villegas C, Pérez-Alenda S, Carrasco JJ, Igual-Camacho C, Tomás-Miguel JM, Cortés-Amador S. Effectiveness of proprioceptive neuromuscular facilitation therapy and strength training among post-menopausal women with thumb carpometacarpal osteoarthritis. A randomized trial. Journal of Hand Therapy. 2024 Apr 1;37(2):172-83.

[12] ElDeeb AM, Abd-Ghafar KS, Ayad WA, Sabbour AA. Effect of segmental stabilizing exercises augmented by pelvic floor muscles training on women with postpartum pelvic girdle pain: a randomized controlled trial. Journal of back and musculoskeletal rehabilitation. 2019 Sep;32(5):693-700.

[13] Lustosa LP, Silva JP, Coelho FM, Pereira DS, Parentoni AN, Pereira LS. Impact of resistance exercise program on functional capacity and muscular strength of knee extensor in pre-frail community-dwelling older women: a randomized crossover trial. Brazilian Journal of Physical Therapy. 2011;15:318-24.

[14] Beena AS, James TT, Dhargave P. Effect of an early administration of a structured exercise protocol on balance and gait in premenopausal women: A quasi-experimental study. Physiotherapy-The Journal of Indian Association of Physiotherapists. 2021 Jan 1;15(1):28-32.

[15] Payette H, Hanusaik N, Boutier V, Morais JA, Gray-Donald K. Muscle strength and functional mobility in relation to lean body mass in free-living frail elderly women. European journal of clinical nutrition. 1998 Jan;52(1):45-53.

[16] Erekson EA, Ciarleglio MM, Hanissian PD, Strohbehn K, Bynum JP, Fried TR. Functional disability and compromised mobility among older women with urinary incontinence. Urogynecology. 2015 May 1;21(3):170-5.

[17] Gill TM, Robison JT, Tinetti ME. Difficulty and dependence: two components of the disability continuum among community-living older persons. Annals of internal medicine. 1998 Jan 15;128(2):96-101