RESEARCH REPORT

EFFECTS OF 8-WEEK STABILIZATION EXERCISES ON PELVIC GIRDLE AND LOW BACK PAIN AMONG PREGNANT FEMALES

ABSTRACT

BACKGROUND AND AIM

90% of pregnant female suffer with low back and pelvic girdle pain during the course of pregnancy. This study is aimed to determine the efficacy of stabilization exercises in the pregnant female in order to improve their compliance in activities of daily living (ADL's), with the reduction in the pain intensity.

METHODOLOGY

A Quasi-experimental study was conducted at the out-patient physical therapy department of tertiary care hospital. 89 pregnant female participated and evaluated twice, both before and after treatment. Stabilization exercises were performed including a 10 minute warm up session followed by 40 minutes of circuit training. Circuit training consisted of two phases, phase 1 comprised of muscular exercises while phase 2 consists of cardiovascular exercises followed by a cool down session of 10 minutes

RESULTS

Results showed significant reduction ($p<0.05$) in pain scores on VAS where the median scores of the pain was reduced to 3 post treatment from 6 pretreatment and functional mobility of women on pregnancy mobility index with mean of 15.12±3.88 was improved to 8.54±3.13

CONCLUSIONS

Stabilization exercise helped in reducing pregnancy related Low back pain and showed great improvement in physical activities in the participant which improved the quality of life.

KEY WORDS

Pelvic Girdle Pain, Low Back Pain, Stabilization Exercise, Gestation, Pregnancy, Quality of Life.

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[Hamza F, Badar H,Khan A. Effects of 8-week Stabilization Exercises on Pelvic Girdle and Low Back Pain among Pregnant females. Pak. j. rehabil. 2018;7(2):25-31]

INTRODUCTION

Globally, 24% to 90% of female population suffers with low back and pelvic pain during the course of pregnancy [1]. A study conducted in 2017 revealed that 57.6% come with pelvic girdle pain and 34.3% with low back pain in Nigerian women while in Pakistan a survey taken in Abbottabad revealed that 68.8% women are encounter with such condition [3]. Low back pain of gestational causes is predominantly initiate in between 12th and 18th week of gestational period (second trimester) [4]. In first trimester, females mostly complain of pelvic pain that reaches its peak in 24-36 weeks of gestation [5].

Pregnancy in woman is very remarkable period of her life, bringing changes in physiology of body, behavioral as well as communal changes in life [6-7]. It modifies the normal body physiological functions such as cardiovascular, renal, endocrine, and musculoskeletal system. Maternal body weight increases with increase in uterus size due to growth of fetus. Researches have proven that gestational weight can increase up to 25 to 35 lb. (11-16kg)[7]. That can result in rise of pressure on lumber spine. Hormonal changes leads towards increase in productivity of hormone relaxin that results in joint and ligament laxity. Pelvis tilt anteriorly with the shift in center of gravity leads towards lordosis (increases in lumber spine curvatures). Due to all these factors weakness of abdominal, lumbar and hip become debilitated [3&5]. Walde in 1962 was the first who differentiate between pelvic girdle pain and low back pain [1]. Low back usually occur at the region among 12th rib and gluteal fold in lumber area.,8 while region between posterior iliac crest and gluteal fold (near to sacroiliac joint) is predisposed to pelvic girdle pain. [9]. These pain can radiate to thigh or in some cases up to leg or foot.[10]

Throughout the pregnancy pelvic girdle pain and pain at low back produces inconvenience to perform daily tasks that can lead to physical, emotional and social distress of expecting mothers. In relation to severity, pelvic girdle pain, usually interfere the daily life as compared to Low back pain, detail examination and specified test are required for discrimination of both pain[11] Epidemiological studies suggested that around 45- 65% expecting mothers faced these problems [4]. The routine life of pregnant female who suffered with gestational origin of low back and pelvic girdle pain in response effect the female in sleep, reduction in mobility and that ultimately affect the fetal wellbeing.[12]

During the period of pregnancy most of the females are unable to complete their routine work efficiently as compare to their performance during usual days. Thus pregnancy related changes bring difficulties in performing ADL (activity of daily living) and psychologically compel women for rest to ensure safe pregnancies.

Back pain ranked 1st out of 10 major causes contributing to Years Lived with Disability (YLD), followed by musculoskeletal disorder which ranked 2nd [10]. Meanwhile physical activities during the period of pregnancy produce beneficial effects for mother's health as well as for fetus healthy growth. Exercises and mobility can help improving the physiological function of cardiovascular system, their digestive system and musculoskeletal system [4].

Pregnancy related back pain can be treated by various modes, in which exercises, medicine like analgesic, back stabilizing belts, acupuncture therapies are used. Most of them reduce the pain of the expecting females; however, these do not have strong evidence. A study was conducted in which resisted exercise training was performed on pregnant women that resulted in increased pain

Perception as compare to those women who does not received any training regime. [13]

The World Confederation of Physical Therapy suggested that active and passive exercises program, along with the combination of massage and mobilization techniques, and also providing supporting belt for lumber curvature can help in pain reduction; and it was also advisable to find out the effectiveness of individual technique by further studies.[14] Researches have supported that stabilization exercises can be helpful in controlling pain.[15] Moreover these are safe during pregnancy and beneficial for increasing strength of lower back muscles.

The referral rate to physiotherapist in public sector is lower as compared to the ones who are working in closed vicinity to gynecologist [16]. Some physiotherapist who are treating pregnancy related Low back pain and Pelvic girdle pain has little knowledge for treatment options[17]. Restricted knowledge and limited experience about the management of Pregnancy related problems can lead to pregnancy related complications. Thus management of the conditions like Low back pain and pelvic girdle pain to improve the quality of life of female required development of précised, specific and safe exercise program to contribute in healthy and safe pregnancy.

Hence this research was conducted particularly to evaluate the outcome of stabilization exercises in treating the Low back and Pelvic girdle pain. The reduction in pain will promote functional capacity of an individual and assist in maintaining healthy lifestyle.

METHODOLOGY

Study design

A quasi-experimental study design was selected.

Sampling technique

The participants entering the Out Patient Department were selected through non-probability, convenient sampling technique.

Study Setting
Out-patient Physical Therapy Department of a renowned tertiary care hospital at Karachi.

Target population
18-45 years of pregnant females with the gestational age of 12 to 38 weeks were included in the study.

Sample size
Eighty-nine pregnant women with known case of low back pain and pelvic girdle pain were recruited for the study.

Inclusion criteria
Pregnant females with gestational age of 12-38 weeks presenting with both low back and pelvic girdle pain, were included in the research [1].

Exclusion criteria
Pregnant females suffering from any musculoskeletal condition such as any compression fracture, rheumatoid arthritis, any kind of malignancy, inflammatory diseases, other ongoing complication such as bleeding from vagina due to known or unknown cause, history of miscarriages, placenta previa, fetal development impedance or those on bed rest for any other condition were excluded from the study[18].

Protocol
Pregnant females with symptoms of pain in low back and gestational pelvic girdle pain were selected for performing the back stabilization exercise program comprised of strengthening, aerobic exercise and stretching exercises. The protocol was performed for a total of 8 weeks for 3-4 days per week. Each session lasted for almost 40-60 minutes.

Table 1. Demographic Information

Features	Mean+SD
Age	29.2±4.64
Height	5.3±0.17
Weight	70.4±12.3
Number of pregnancy	27.9±6.3
Week of pregnancy	2.1+1.1
Occupation	
Housewife	60(-68.2)
Working women	28(-31.8)
Total	**88**

Session started with 10 minutes of warm-up exercises included walking and activation exercise such as stretching of back and thigh muscles and deep breathing exercises, followed by 40 minutes of circuit training. The circuit training was divided into two phases where during phase 1 strengthening exercises were performed on lower back, hip region and knee whereas in phase 2 cardiovascular exercises were performed on treadmill and cycle ergometer. Both the phases go parallel to each program. The first phase of circuit training consisted of hip stabilization exercises including hinge hip, deadlift exercise, swing hip, pelvic tilt whereas for knee squats and lunges were performed, planter flexion was also performed to boost the venous returned to wards the lower limb. Moreover, Kegel exercises were executed for pelvic muscle strengthening for almost 30 minutes.
After completing strengthening exercises circuit, the aerobic exercise session will started with deep breathing exercises, step-ups, front and side strips are in cooperated for 10 minutes. The session was end with 10 minute period of cool down session including stretching of back and hamstrings, followed by breathing, relaxation and myofascial relief protocol. For pain relief and muscle soreness, hot and cold therapy was used. For posture correction sacroiliac belt was advised [19].

Table 2. Shows pre and post analysis pain Scale without the group

VAS	N	Median±SD	P-Value
Pre	88	6±1.59	0.001
Post		3±1.49	

*Wilcoxon Sign Rank test was applied for within group analysis

Data analysis
To analyze the data IBM SPSS version 20 used to calculate the variables. Non-parametric Wilcoxon signed rank test was used to evaluate the pain score while parametric Paired t-test was applied on the score of pregnancy mobility index as per the normal distribution of data.

RESULTS

Total 89 pregnant females' participants were included in this study with their mean age of about 29.1±4.6 years; 27.9±6.3 weeks of pregnancy and 2.05±1.0 number of pregnancy. However, one participant withdraw from the study after one week of treatment session table 1.
The results after 8 weeks exercise treatment showed significant reduction ($p<0.05$) in pain scores on VAS where the median scores of the pain was reduced to 3 post treatment from 6 pretreatment as shown in table 2 (Figure 1).

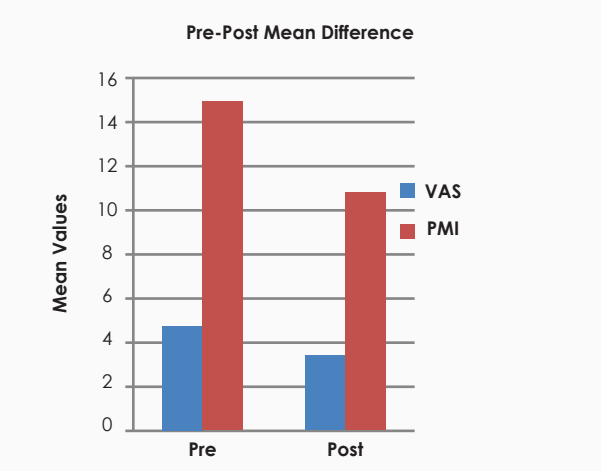

Figure 1. shows pre-post mean comparison of VAS and PMI

Data revealed that after 8th weeks of stabilizations exercise protocol there was significant improvement ($p<0.05$) in functional mobility of women on pregnancy mobility index with mean of 15.12±3.88 to 8.54±3.13 as shown in table 3 (Figure1).

Table 3. Shows pre and post analysis of pregnancy mobility index

PMI	N	Mean±SD	P-Value
Pre	88	15.12 ± 38	<0.05
Post		8.54 ± 3.13	

Pair t Test was applied withinn the group analysis

The pregnancy mobility index result revealed significant improvement in some component of mobility index scale, such as there is greater improvement in activity for instance getting things out of the floor and standing out from the floor,

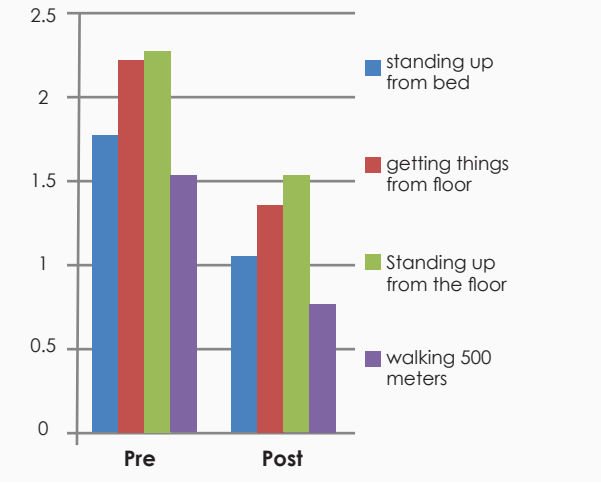

Figure 2. Shows PMI sub-components pre-post mean scores comparison

standing up from bed, all these activities are considering as an important for regular work out for ADL and usual household activities, hence there was noticeable improvement in walking up to 500 meter that showed improvement in cardio muscular endurance. So it will be advantageous in reducing the degree of weariness during the time of pregnancy figure 2.

On the other hand other component also shows moderate improvement in daily physical activities. With the intention of stabilizing exercises reduction of pain as well as augmenting in the level of daily functional activities are accumulated. Description of PMI components with mean±SD are given below table 4.

DISCUSSION

The result of our study showed a significant improvement in pre and post status of pain and physical activities in participant by receiving stabilization exercises. The protocol not only improved their daily activities of the pregnant women but also improved their aerobic capacity. The result showed that female suffered from a great deal of pain before the treatment that 6 on VAS scale reduced up 3 on VAS. Pain is one of the most perturbing factors which can highly effects in carrying out of daily activities. Hence as the result showed worthy decrease in pain scale so ultimately it will lead to enhancement in the work performance.
An earlier study conducted by the Sriyatin Set al21 showed that the back pain effect 80% of pregnant population, but the cause of pain is not cleared however it is suggested that the increases in body weight, body index, and muscular imbalance are contributing factors for developing the pain. According to same author maternal parity is not a major cause of concern when considering cause of gestational Low Back Pain and Pelvic Girdle Pain as in the same study 61.5% participants were pregnant for the first time while 3.8% participants have had multiple pregnancies.

As the previous studies showed that the Low back pain and pain in Pelvic girdle effects most of the daily life activities of not only in house wives but also one the a challenging feature for working women to performed their work efficiently. [10] Stabilizing exercises not only improved pain scale but significantly refining in the functional mobility of the participants, as the result shown that there is noticeable improvement in activities such as pick the things from floor and getting out of the floor these activities are daily encountered by the women, so improvement in such kind of work out can positively affect the physical health of pregnant female. Activities such as a walking required a good cardio-

Table 4. Pre-Post Mean Scores of PMI components

No	Components of PMI	Pre Mean ± SD	Post Mean ± SD	Mean difference	P-value
1	Standing up from a hard chair	1.40±0.6	0.79±0.4	0.16	
2	Standing up from a soft chair	1.5±0.5	0.90±0.5	0.65	
3	Standing up from the bed	1.78±0.7	1.06±0.6	0.72	
4	Getting things from the floor	2.22±0.7	1.37±.0.6	0.85	
5	Putting on shoes	1.41±0.7	0.72±0.6	0.62	<0.05
6	Turning around in bed	1.05±0.8	0.41±0.5	0.64	
7	Standing up from the floor	2.28±0.7	1.44±0.7	0.84	
8	Walking 500 meters	1.55±0.7	0.77±0.6	0.78	
9	Walking on uneven area	1.80±0.7	1.05±0.5	0.75	

vascular endurance, result of this study shown noteworthy enhancement in walking capacity, as the result it can help in normal vaginal deliveries.
A Cochrane systemic review conducted in 2015[3], which stated that their low to moderate effect any kind of exercises (land or water), on reducing pregnancy related low back pain and enhancement in functional ability, while the result of our studies in compression to that shows significant improvement not only in pain but also increases the level of mobility index hence increasing in functional capacity for performing daily task. More on Cochrane also suggested that acupuncture therapy and multi-modal therapies which include in education, exercises in combination of manual therapy have beneficial effect in reducing Low back pain during pregnancy.

Study has revealed that exercise has a tremendous effect in reducing low back pain, however its effect on pelvic girdle pain is still uncertain. More researches with larger sample size are needed to be done.22 However, in this study we found significant improving not only back pain but also effective reduction in pelvic girdle pain with prominent change in pregnancy mobility index, which can lead towards the improvement in daily work capacity. Another systematic review and meta-analysis of randomized control trial performed by Di Mascio et al[23] which result showed that 35- 90 minutes of aerobic exercises, are beneficial for the reduction of preterm birth, and increases the rate of vaginal delivery with decrease incidence of cesarean delivery, gestational diabetes, and Preeclampsia. the protocol conduct in our study was the combination of circuit training of musculoskeletal system and aerobic exercises, it was showed favorable result in abdominal muscle strength which will make a remarkable role in increase the probabilities of vaginal delivery and also helpful for lowering the risk of preterm birth.

There were certain limitations encountered by the study such as small sample size and longtime duration which hindered the intervention protocol and cause fatigue to pregnant females and poor generalizability of results. It was suggested that more future randomized controlled trials should be conducted solely on exercised based intervention for pain management during pregnancy with appropriate time duration to establish more evident regime for effective outcomes.

CONCLUSION

The result of study showed that by accomplishment of structured program of stabilization exercises for 8 weeks in pregnant female has effective out come in the reduction of pain and refining in pregnancy mobility index as a consequence of that physical functional capability has been improved in participant.

REFERENCES

[1] Arif A, Shahid G, Siddique MA, Aziz K, Fahim MF. Effects of Exercises On Pregnancy Related Low Back Pain: A Quasi Experimental Study.

[2] Miquelutti MA, Cecatti JG, Makuch MY. Evaluation of a birth preparation program on lumbopelvic pain, urinary incontinence, anxiety and exercise: a randomized controlled trial. BMC pregnancy and childbirth. 2013(1):154.

[3] Liddle SD, Pennick V. Interventions for preventing and treating low-back and pelvic pain during pregnancy. Cochrane Database of Systematic Reviews. 2015(9).

[4] Usman MI, Abubakar MK, Muhammad S, Rabiu A, Garba I. Low back pain in pregnant women attending antenatal clinic: The Aminu Kano teaching hospital experience. Annals of African medicine. 2017 16(3):136.

[5] Khan MJ, Israr A, Basharat I, Shoukat A, Mushtaq N, Farooq H. Prevalence of pregnancy related low back pain in third trimester and its impact on quality of life and physical limitation.Journal of Islamic International Medical College. 2017(1):39-43.

[6] Kalinowski P, Krawulska A. Kinesio Taping vs. Placebo in Reducing Pregnancy-Related Low Back Pain: A Cross-Over Study. Med Sci Monit. 2017;23:6114.

[7] Casagrande D, Gugala Z, Clark SM, Lindsey RW. Low back pain and pelvic girdle pain in pregnancy. JAAOS- J Am Acad Orthop Surg. 2015 ;23(9):539-49.

[8] Mahishale AV, Borkar SS. Prevalence of patterns of pregnancy induced pelvic girdle pain and low back pain in a tertiary care centre—A cross sectional study. IJTRR. 2015;4(4):122-24.

[9] Hall H, Cramer H, Sundberg T, Ward L, Adams J, Moore C, Sibbritt D, Lauche R. The effectiveness of complementary manual therapies for pregnancy-related back and pelvic pain: A systematic review with meta-analysis. Medicine. 2016;95(38).

[10] Bergström C, Persson M, Mogren I. Sick leave and healthcare utilisation in women reporting pregnancy related low back pain and/or pelvic girdle pain at 14 months postpartum. Chiropractic & manual therapies. 2016;24(1):7.

[11] Bhardwaj A, Nagandla K. Musculoskeletal symptoms and orthopaedic complications in pregnancy: pathophysiology, diagnostic approaches and modern management. Postgrad Med J. 2014;90(1066):450-60.

[12] Bishop A, Holden MA, Ogollah RO, Foster NE, EASE Back Study Team. Current management of pregnancy-related low back pain: a national cross-sectional survey of UK physiotherapists. Physiotherapy. 2016;102(1):78-85.

[13] Mühlemann D, Mühlemann MB. Rückenschmerzen in der Schwangerschaft: Diagnose, Behandlungsoptionen, Outcomes: Low Back Pain in Pregnancy: Diagnosis, Treatment Options and Outcomes. PRAXIS. 2015;104(11):565-74.

[14] Ozdemir S, Bebis H, Ortabag T, Acikel C. Evaluation of the efficacy of an exercise program for pregnant women with low back and pelvic pain: a prospective randomized controlled trial. Journal of advanced nursing. 2015;71(8):1926-39

[15] Van Benten E, Pool J, Mens J, Pool-Goudzwaard A. Recommendations for physical therapists on the treatment of lumbopelvic pain during pregnancy: a systematic review. Journal of orthopaedic & sports physical therapy. 2014;44(7):464-A15

[16] Ramos LA, Callegari B, França FJ, Magalhães MO, Burke TN, Carvalho AP, Almeida GP, Comachio J, Marques AP. Comparison between transcutaneous electrical nerve stimulation and stabilization exercises in fatigue and transversus abdominis activation in patients with lumbar disk herniation: A randomized study. J Manipulative Physiol Ther. 2018;41(4):323-31

[17] Akmeşe ZB, Oran NT. Effects of progressive muscle relaxation exercises accompanied by music on low back pain and quality of life during pregnancy. J Midwifery Womens Health. 2014;59(5):503-9.

[18] Waterfield J, Bartlam B, Bishop A, Holden MA, Barlas P, Foster NE. Physical therapists' views and experiences of pregnancy-related low back pain and the role of acupuncture: qualitative exploration. Physical therapy. 2015;95(9):1234-43.

[19] Franke H, Franke JD, Fryer G. Osteopathic manipulative treatment for nonspecific low back pain: a systematic review and meta-analysis. BMC musculoskeletal disorders. 2014;15(1):286.

[20] Aparicio VA, Ocón O, Padilla-Vinuesa C, Soriano-Maldonado A, Romero-Gallardo L, Borges-Cósic M, Coll-Risco I, Ruiz-Cabello P, Acosta-Manzano P, Estévez-López F, Álvarez-Gallardo IC. Effects of supervised aerobic and strength training in overweight and grade I obese pregnant women on maternal and foetal health markers: the GESTAFIT randomized controlled trial. BMC pregnancy and childbirth. 2016;16(1):290.

[21] Sriyatin S, Martin D. KNOWLEDGE OF PRIMIGRAVIDA'S WOMEN TROUGHS PREGNANCY EXERCISE. Journal of Maternity Care and Reproductive Health. 2018;1(2).

[22] Shiri R, Falah-Hassani K, Heliövaara M, Solovieva S, Amiri S, Lallukka T, Burdorf A, Husgafvel-Pursiainen K, Viikari-Juntura E. Risk Factors for Low Back Pain: A Population-Based Longitudinal Study. Arthritis care & research. 2019;71(2):290-9.

[23] Di Mascio D, Magro-Malosso ER, Saccone G, Marhefka GD, Berghella V. Exercise during

pregnancy in normal-weight women and risk of preterm birth: a systematic review and meta-analysis of randomized controlled trials. Am J Obstet Gynecol. 2016;215(5):561-71.

[24] Licciardone J, Aryal S. Manual therapy, exercise, and education for low back pain and pelvic pain during pregnancy. Am. J. Obstet. Gynecol. 2014;210(6):592-3.

[25] Yan CF, Hung YC, Gau ML, Lin KC. Effects of a stability ball exercise programme on low back pain and daily life interference during pregnancy. Midwifery. 2014 Apr 1;30(4):412-9Liddle SD, Pennick V. Interventions for preventing and treating low-back and pelvic pain during pregnancy. Cochrane Database of Systematic Reviews. 2015(9).