

Effect of pelvic floor exercise on non-specific lower back pain in post-partum women

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ABSTRACT

The present aim of the study was to investigate improvement in pain intensity and measure disability of women with constant postpartum lower back pain after and tailored exercise protocol. Herein, 30 women aged between 30-35 years having lumbo-pelvic pain after delivery of three years were included and were received tailored exercises. The subjects were classified according to Demographic and Anthropometric characteristics. Manual Screening for pain was done through VAS (visual analog scale) and Oswestry disability questionnaire. Group A and Group B were classified as according to the exercise protocols. Group A were subjected to pelvic floor exercise along with abdominal muscle strengthening while Group B were subjected to Spinal hyperextensions along with abdominal muscle strengthening. The results depicted that the pelvic floor exercise in combination abdominal exercise with routine treatment for back pain provide significant benefits in terms of pain relief and disability over routine treatment as compared to spinal hyperextensions along with abdominal muscle strengthening. A correlation was also established between the changes in disability and pain intensity in between two groups.

KEY WORDS: PELVIC FLOOR EXERCISE, SPINAL HYPEREXTENSIONS, POST PARTUM WOMEN, LOWER BACK PAIN

INTRODUCTION

Back pain is common phenomenon in female which is experienced during postpartum and is expected to prolong for 4-6 months affecting activities of daily living. The majority of women recover from pregnancy related

mechanical lumbo-pelvic pain within 6 months of delivery. However, studies show that 25 % of females still have persistent non-specific lower back pain 2-3 years after delivery and which interferes with their daily activities (Tersi et al., 2015, Corso et al., 2016 and Gausel et al., 2016).

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The pelvic floor is the area underneath the pelvis which consists of muscles and connective tissues a complex structure. It provides support to the abdominal viscera including uterus, bladder and other viscera. The core muscles include pelvic floor muscles, transverse abdominis, multifidus, internal and external oblique, rectus abdominis, erector spinae, quadratus lumborum, latissimus dorsi, and gluteus maximus. The muscles involved in lower back pain are erector spinae, oblique muscles. Since the core muscles and back muscles are involved into spinal rotation, so they are related to each other, (Javadian et al., 2015, Chevidikunann et al., 2016 and Teymuri et al., 2018).

The lower back is related to multiple factors which recount dynamic instability of pelvis and hormonal changes this joint instability initiate the deep muscle activation which demonstrates the sacroiliac stiffness, based on the earlier studies guided exercises for pelvic floor and abdominal are recommended. Consequently, the design of the study should be suitable with observation of relation between motor control and reduction in symptoms. Only few studies describe tailored exercises therapy for strengthening pelvic floor muscles and spinal stability and methods adapted are kegel's exercise protocol, spinal extension and abdominal strengthening. The intervention adapted should target the outcomes throughout the whole intervention period (Portney et al., 2014, Tondel et al., 2016 and Bhadauria et al., 2017).

The exercises protocol adapted to activated the group of deep and superficial muscles which results in improvement in the ODQ and pain score also demonstrating core strengthening exercise of conventional exercises (Saragiotto et al., 2016, Ferla et al., in 2016), also improving on the biomechanics (Bi et al., 2013) also some author established more emphasis should be given over the exercise during the third trimester of pregnancy where chances of weight increase are more established. (Domenjoz, 2014 & Kolu, 2014). Also pelvic floor exercise for organ prolapse and urinary incontinence plays an important role in improving the symptoms and to treat musculoskeletal and movement impairments in women (Kurz et al., 2017). The weakness of pelvic floor muscles and relationship of urinary incontinence was established in both men and women and importance of screening of back pain in patients with urinary incontinence (Cassidy et al., 2017)

The aim of the present study was to investigate weekly improvement in pain intensity and measure disability of women with constant postpartum lower back pain after and tailored exercise protocol. A secondary aim was to establish correlation between the changes in disability and pain intensity in between two groups.

MATERIALS AND METHODS

30 women after lumbo-pelvic pain after delivery of three years were included in the study and received tailored exercises. The subjects aged between 30-35 years were included in the study. The study was performed at RLJT Hospital & Research Centre, Jhunjhunu. Exclusion criteria BMI > 25, traumatic backache history of neurological or autoimmune disorder, history of Pelvic organ prolapse, respiratory or metabolic disease The experiment was conducted on the basis of Demographic data and Anthropometric characteristics of the subjects was recorded including Name, Age, Gender, Height and Weight, therefore BMI was also recorded prior to the study. Manual Screening for pain was done through VAS (visual analog scale) and Oswestry disability questionnaire.

Visual analogue scale (VAS) - the pain scale was used to measure the degree of pain, after presenting the pain levels on a straight line of 10 cm without gradation. The calculations were done as 0 presenting as no pain and 10 presenting as extreme unbearable pain. The marking were made from 0-10 in centimeters, (Kersten et al., 2014).

Oswestry Low Back Pain Disability Questionnaire-

The instrument was developed to illustrate functional disability and to measure the clinical reduction and improvement lower back pain. It a self questionnaire to be filled by the patient based on the disability faced during activities of daily living, the questionnaire includes 10 questions related to pain management, personal care, walking, sitting, standing, sleeping, and social life with a scoring from 0-5 for every question with a total scoring of 50. Thirty women with non specific chronic LBP were recruited and randomly assigned into two groups, an experimental group A (n=15) and experimental group B (n=15). The assessment was performed in crook lying position, Pre and post data was collected before intervention, pain intensity was measured on Visual Analogue Scale (VAS) and functional disability was assessed using Oswestry Disability Questionnaire (Pereira et al., 2017).

Total protocol was performed for 8 weeks

Group A: Pelvic floor exercises:

Women in this group were explained the importance of exercises, anatomy of pelvic floor exercises. The patients were taught to contract their pelvic floor muscles and to squeeze with maximum applied effort and hold for 3-4 seconds without holding the breath.

1st phase: The patients were asked to complete 15-20 repetition in sitting and lying for 2-3 sets in a day for first 3 weeks in crook lying positions

2nd phase: For 4th -6th week onwards the repetition were increase nearly double and as per the comfort of the patient completing 2-3 times in a day, patient were advice to practice the session in two positions i.e. sitting and lying

3rd phase: 7th week onwards the patient was asked to increase the no. of repetition to 40-50 with same no. of sets in a day and continued till end of 8th week, patient was advice to continue the exercises in lying , sitting and standing

Abdominal exercises:

A. Pelvic tilt:

- Subject lies in supine lying position with knees flexed, arm placed on the side.
- Subjects were push the lower trunk into the floor and contract the abdominal and glueteal muscles, with rotating the pelvis upwards and inward and making a bridge back off from the floor , the same position is holded for 5 seconds each and relax period of 5 seconds repeating 10 times for 2- 3 times in day.

B. Partial curls:

Subjects is asked to lie down supine with knees flexed, arms are extended the subject is asked to rest hands over the legs and then sliding the fingers over the knees with flexion of the trunk and slightly lifting the shoulders, exercises should be repeated 10 times with 2-3 sets in a day .Subjects were instructed not to hold breath in any exercises.

C. Diagonal curls:

Subject in supine lying position with arm in forwards position , subject is asked to lift the shoulder off the floor bringing the left shoulder towards the right knee and vice-versa then repetition for 10 times for 2-3 times in a day

Group B:

Women in this group are trained for back extensor exercise along with abdominal muscle strengthening.

Spinal hyperextensions: Subjects were asked to lie down in prone position with hand on side, keeping weight on the hands were asked to lift and extend the spine and hold for 5-10 second repeating the process for 10 times and 2-3 times in a day.

Prone on elbows: Subjects were asked to lie down in prone position with elbow on side, keeping weight on the elbow were asked to lift and extend the spine and hold for 5-10 second repeating the process for 10 times and 2-3 times in a day.

Abdominal exercises: Isometrics abdominals: Subjects were asked to lie down supine with knee flexed and hands under the lower back, they were told to contract the anterior abdominal muscles and pres the hand with the back, holding the position for 5-10 second and repeating the same exercise at least 10 times for 2-3 sets in a day during the exercises the breath holding should be avoided followed by same abdominal exercise taught to group A

RESULTS AND DISCUSSION

Data analysis: The data analysis was done using Statistical Package for Social Sciences software Version 19 applying the descriptive data included mean standard deviation was also calculated with paired t test and ANOVAs test were applied to calculate the difference between pre and post treatment intra groups. The data was analyzed using with t-value in inter group and in intra group using F distribution value and the F-crit value. The result will be significant at $p < .05$.and if $p > 0.05$ considering it non- significant.

Subjects (30) were included in the study with mean age of 33.77 ± 1.44 in Group A and 32 ± 1.46 in Group B years. The mean height calculated was 164 ± 7.89 and cm and 156.44 ± 7.59 cm, mean weight was 62 ± 9.50 and 60.5 ± 8.54 in kg, The mean BMI was also calculated as 23 ± 4.58 and 25.73 ± 2.49 respectively for group A and B.

As shown in table 2 and 3 there is significant effect on the VAS score of the patient at baseline in both the experimental Group A & B, there was an significant different seen in the score in experimental group A, but there was no significant improvement seen in the ODQ in group B

As explained in table 4 the difference within the group for VAS score that the mean square between treatments, 2.7 not much larger is than the mean square within treatments, 1.02381. The F value for VAS i.e. MSB/MSW after the treatment is 2.63. The values showed not much variability between treatment groups and within treatment groups. The smaller the ration less confident the score are

Table 1. Illustrates the demographic data and anthropometric data of the subjects

Characteristics	Group A	Group B
Age (Mean ± SD)	33.77±1.44	32±1.46
Height (In cm) (Mean ± SD)	164±7.89	154.44±5.06
Weight (In kg) (Mean ± SD)	64±8.14	60.5±8.54
BMI (Mean ± SD)	23±4.58	25.73±2.49

Table 2. Illustrates Group A-Experimental group (VAS and Oswestry Disability Questionnaire)				
	MEAN	SS/df	T VALUE	P VALUE
Visual Analog scale (VAS)	-3.07	0.78	8.829	< 0.00001
Oswestry Disability Questionnaire (ODQ)	-26.13	34.55	10.508	< 0.00001

Table 3. Illustrates Group B-Experimental group (VAS and Oswestry Disability Questionnaire)				
	MEAN	SS/df	T VALUE	P VALUE
Visual Analog scale (VAS)	-3.73	0.92	9.427	< 0.00001
Oswestry Disability Questionnaire (ODQ)	-2.07	14.50	0.53036	<0.3002

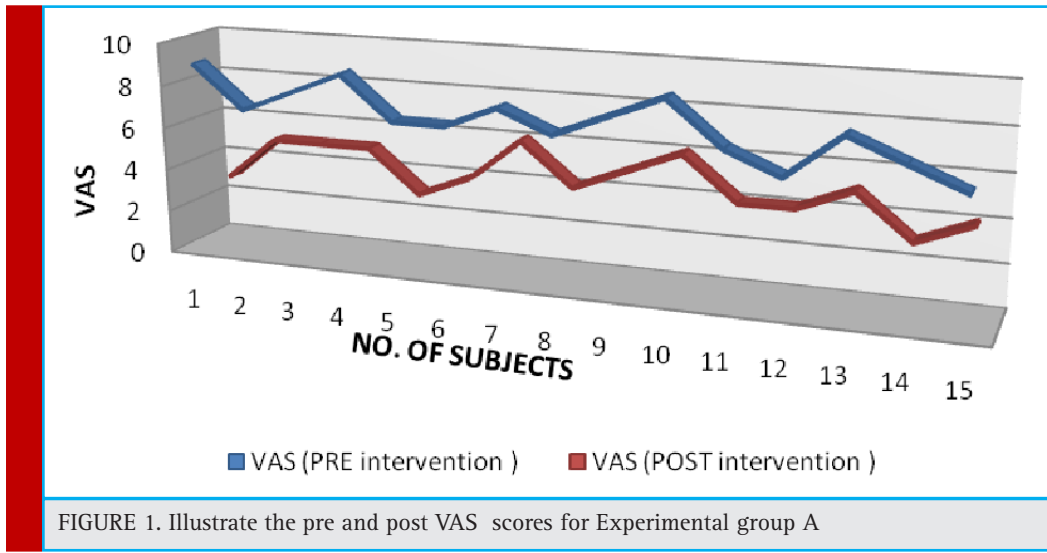


FIGURE 1. Illustrate the pre and post VAS scores for Experimental group A

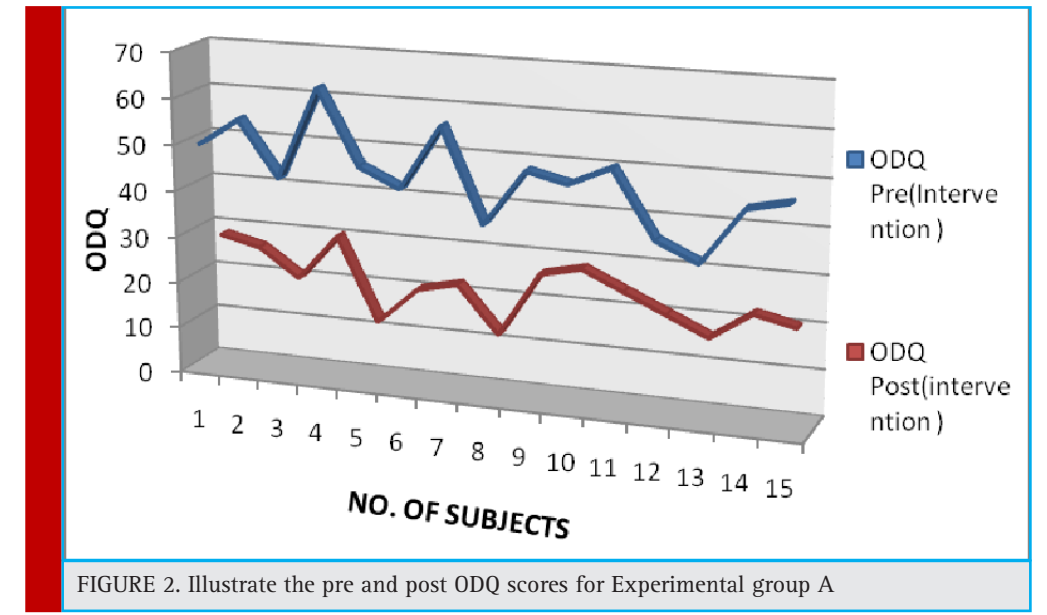


FIGURE 2. Illustrate the pre and post ODQ scores for Experimental group A

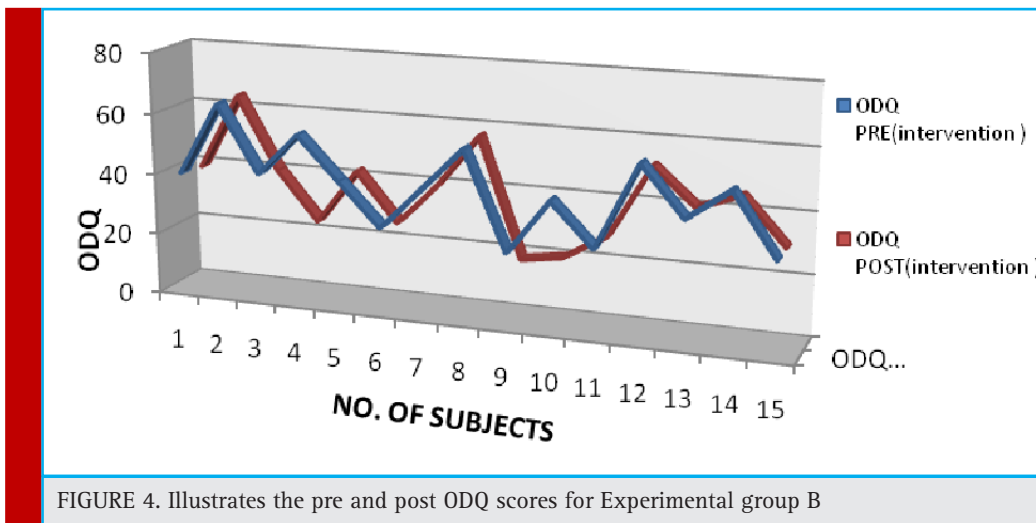
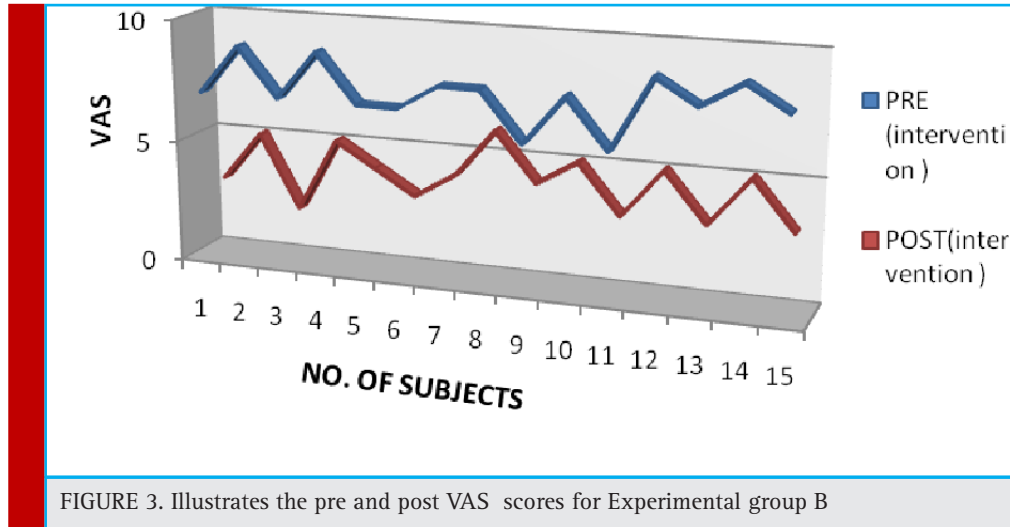


Table 4. The above two table illustrate the comparison between groups and within groups

Source of Variation for VAS	SS	df	MS	F	P-value	F crit
Between Groups	2.7	1	2.7	2.637209	0.115593	4.195972
Within Groups	28.66667	28	1.02381			
Total	31.36667	29				
Source of Variation for ODQ	SS	df	MS	F	P-value	F crit
Between Groups	3349.633	1	3349.633	54.9206	4.53E-08	4.195972
Within Groups	1707.733	28	60.99048			
Total	5057.367	29				

rejecting the H1 and accepting the H0 hypothesis, stating there was no difference in VAS score in between two group A and B showing similar results. Secondly the P value is more than the significant the p-value is 0.115593. The result is not significant at $p < .05$. The difference within the group for ODQ score that the mean square between treatments 3349.633, much larger is than the mean square 60.99048 within treatments. The F value for ODQ i.e. MSB/MSW after the treatment is 54.9206. As the value shows much variability between treatment groups and within treatment groups. The larger the ratio more is the confidence of score in rejecting the H0 and accepting the H1 hypothesis, stating there was a difference in ODQ score in between two group A and B. The f-ratio value is 54.9206. The p-value is $< .00001$. The result is significant at $p < .05$.

We hereby discuss that pelvic floor muscles make up a large part of the body's core, which is the foundation for all movement, balance, stability and flexibility. The pelvic floor muscle exercise protocol used in the present study was designed to co-activate superficial, deep core muscles and abdominal exercises which resulted in significantly better improvements in pain scores and ODQ score. Javadian et al., (2015) compared with routine treatment with back extension exercise and abdominal exercises. Back function parameters were improved over 8 weeks regular exercise protocol from baseline in group A, with significant between-group differences. In the previous studies VAS and Oswestry disability index was used to demonstrate the effect of pelvic floor exercises, (Mohammad et al., 2011 & Teymuri et al., 2018).

These results are consistent with the findings of others, who demonstrated the superiority of a pelvic floor strengthening protocol to over spinal extension exercises for LBP. Others have suggested, however, that pelvic floor exercises do provide benefit over conventional physiotherapy exercises in terms of pain or disability reduction (Bi et al., 2013 & Bhadauria et al., 2017).

A spinal extension exercises protocol comprising exercises every day for 8 weeks was found to provide no additional significant improvement in ODQ score compared with routine treatment. The more intense training and longer treatment period (a minimum of 15 contraction cycles/day for 12 weeks) may explain the significant improvements in pain and disability seen in the present study. Improving the biomechanical characteristics of muscles in patients with LBP may require longer duration in case of patients treated with spinal extension exercises.

The current studies also have some limitations. The sample size was too small to draw any firm conclusions.

Finally, as the study population included patients with nonspecific low back pain, it is not possible to generalize these findings to those with low back pain of specific cause.

CONCLUSION

In conclusion, the PFM exercises in combination abdominal exercise with routine treatment for back pain provide significant benefits in terms of pain relief and disability over routine treatment. Also it may be recommended that PFM exercises should be an routine protocol for any mechanical lumbo-pelvic pains. Further, larger-scale studies with long-term follow-up are required before these findings can be applied to a wider patient group.

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