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Research Article

CORRELATION OF LOW BACK PAIN WITH CORE MUSCLE STRENGTH IN POST-NATAL WOMEN

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A R T I C L E I N F O

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A B S T R A C T

Backround: Low back pain is most commonly seen condition in the postnatal women. The physical stress of parenting or caring for infants can impact tremendous biochemical strain. Repetitive stress from task that requires lifting the child can compromises spinal integrity. Poor unsupported feeding positions and bad nappy-changing postures, in addition to tension and fatigue, can all give rise to low back pain after pregnancy[6]. **Objective:** To observe the correlation of low back pain and core muscle strength in post natal women. **Study Design:** Non Experimental design**,** Observational type**. Procedure:** 124 postnatal women with low back pain were approached and an informed consent was taken. All the subjects were given Roland-Morris disability questionnaire and core muscle strength was evaluated by pressure biofeedback unit. **Results:** There is no significant correlation between Pressure Biofeedback and Numerical Rating Scale and there is no significant correlation between Pressure biofeedback and Roland Morris disability Questionnaire. **Conclusion:** There was no significant correlation of low back pain with core muscle strength in postnatal women.

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INTRODUCTION

The female body undergoes many hormonal and anatomic changes which affect musculoskeletal system during and after pregnancy period. During pregnancy the abdominal muscles stretch in width and length to accommodate the growing uterus. The two sides of the rectus abdominal, oblique's and transverses abdominal expand and in some cases, it may separate by 3-6 inches. It creates lumbar lordosis which causes a shortening of spinal extensors and hip flexors and lengthening of the abdominals.

The physical stress of parenting or caring for infants can impact tremendous biochemical strain. Repetitive stress from task that requires lifting the child can compromises spinal integrity. Injury to the disc, zygophyseal joints, muscles and ligaments of the spine can result from chronic lifting, twisting and poor posture.

During gestation, some women may experience as decline in pain perception. It has been postulated that, as hormones are released through the pregnancy they mute pain perception. As hormones levels are re-established in post-partum, the patient may experience a return in pain perception. They may experience musculoskeletal pain which is not felt in gestation. A manual adjustment may be indicated to prevent mal-articulations as the hardening of ligaments occurs.

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Specifically indicated that this might be particularly necessary with re-hardening of sacroiliac ligaments. The resumption of a mother is often congruent to report of low back pain which is not felt during pregnancy.

The obstetric physiotherapist should be aware of this complaint of 'aches and pains' that should be taken seriously and properly assessed. Low back pain occurs along with back stiffness, decreased movement of the lower back, and difficulty in standing straight. One important factor for low back pain is weakness of superficial trunk and abdominal muscles and strengthening of these muscles is often associated with significant improvements of mechanical low back pain as well as with decreased functional activity.

Back pain may not have been troublesome during pregnancy but it frequently develops following the birth. For many women the passage of the fetus through the pelvis and the resultant stretching and movement because of the laxity of joints is a causative factor. Poor unsupported feeding positions and bad nappy-changing postures, in addition to tension and fatigue, can all give rise to low back pain after pregnancy[6].

It is well known that the life time incidence of low back pain is extraordinarily high, but those who incur in the majority of the cost, both personally and financially, are the persons who suffer recurrent and persistent or chronic pain. Manipulative or manual therapy is one of the fundamental treatment methods used by physical therapists, osteopaths, chiropractors

and manual medicine practitioner in the management of low back pain. There is evidence that manipulative therapy can be effective for the relief of pain and restoration of motion in the short term, but this therapy has not met the challenge of lessening persistent and recurrent episodes of low back pain.[7] Stabilization programmes attracted the interest, with their aims of using the muscle system to protect spinal joint structures from further respective micro trauma, recurrent pain and de-generative change.

In over viewing the stabilizing role of the trunk and back muscles the attention became focused on muscles which controls the lumbar and lumbosacral joints rather than on muscles which span the spine from the thorax to pelvis. It was considered that muscles such as the lumbar multifidus, transverses abdominal, and possibly also part of the oblique internus abdominal would most likely function to stabilize the segments of the lumbar spine. In order to check if these muscles were functioning in low back pain patients, it was necessary to device specific muscles tests.

We adopted the motor skill of drawing in the abdominal wall as the test of the function of the deep abdominal muscles. Performance of the tasks such as a sit-up provides indications of the strength and endurance of the entire abdominal muscle group but does not indicate the specific function of transverses abdominal. Further, this test cannot be done in post-natal women.

Pressure Bio-Feedback Unit

An air-filled pressure device (pressure biofeedback unit) was developed to meet the challenge of gaining some quantification of this deep muscle action. A clinical test to assess the action of the segmental lumbar multifidus became another challenge. The pressure bio-feedback unit[9] consists of an inelastic, three section air-filled bag which is inflated to fill the space between the target body area and a firm surface, and a pressure dial for monitoring the pressure in the bag for feedback on position. The bag is inflated to 40mmHg level for the purpose and the pressure recorded. Quite simply, movement of the body part off the bag results in a decrease in pressure, while movement of the body part onto the bag results in an increase in pressure.

The device has come into general use for stabilization exercises for all parts of the body. Its use in assessing the abdominal drawing- in action has, however, become its most important use in relation to the treatment of problems of the local muscle system in low back pain patients. A method was needed to gain some quantification of the abdominal drawing-in action in the clinic, and the pressure biofeedback unit was found to meet this need. As the transverses abdominal produces narrowing of the abdominal wall, measurement of the amount of movement of the abdomen that can be produced provides a method of identifying a patient's ability to perform the contraction.

To determine the prevalence of low back pain and its development over the postpartum period, 124 women who had been followed through pregnancy were studied a minimum of 12 months after delivery. More than 67% of the women experienced low back pain directly after delivery.

So, this study aims to correlate the back pain that is a common problem in post natal period with transverse abdominal muscle training.

METHODOLOGY

In this study 124 Post natal women with mean age 23.53 (Table 1) were selected conveniently from SRM Medical College Hospital and Research Centre. Post natal women between 21– 30 years of age were included with history of low back pain after pregnancy.

After taking written consent from subjects general information was documented. All the subjects were given the Roland Morris Disability Questionnaire and the Numerical pain rating scale (NRS)

The subjects had to answer the questionnaire depending on their present status in terms of severity of pain and disability. The numerical pain rating scale meets the scientific criteria and is suitable for the objective measurement of intensity of pain and self assessment measures are known to have better correlation with pain and disability than objective measures which use physical performance test. Therefore to assess low back pain related disability in post natal women. Roland Morris Disability Questionnaire was used which is a validated scale that reflects limitations in different activities of daily living in subjects with low back pain.

Core Muscle Strength Evaluation

All the subjects were asked to empty their bladder before the test. Subjects were positioned supine crook lying with hip flexed at 45 degrees. Subjects were given proper instructions about how to activate transverses abdominal muscle. The activation of transverses abdominals was confirmed with palpation. Placing the thumb, medial and inferior to the anterior superior iliac spine.

The inflatable cuff of the pressure biofeedback unit was placed under the hollow of the lumbar spine (between L1 and S1).The cuff was inflated to the baseline pressure of 40mmHg. The subjects were then asked to take a relaxed breath and while expiration to draw in the abdominal wall towards the spine so as to contract the deep abdominal muscles, raising the pressure up to 10mmHg.

If the pressure raised up to 10mmHg in the absence of spinal or pelvic movement and without bulging of the abdomen, the test was said to be performed optimally. The test was repeated three times and the maximum pressure only was recorded. Three minutes rest was given after each test.

Figure 1 Pressure Biofeedback Unit

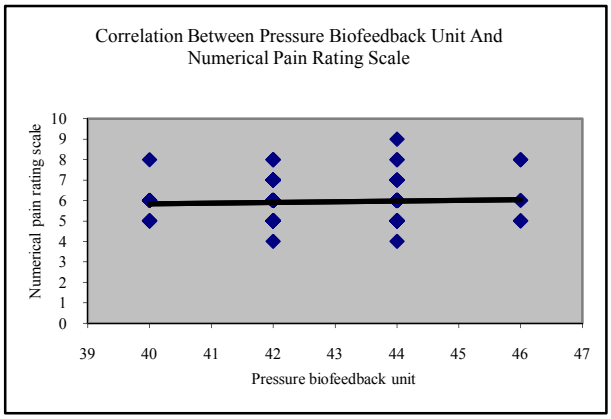
The pressure biofeedback unit (Chattanooga Group, USA.) used in the abdominal drawing in manoeuvre with palpation has been shown to be reliable method in measuring the transverses recruitment.

Data Analysis

Data were analyzed using SPSS version 17.0. Spearman's correlation test was applied to establish the correlation of low back pain with core muscle strength. A 5% level of probability was used to indicate statistical significance.

Table 1 Descriptive Data on Age, Number of Delivery and Month of Delivery

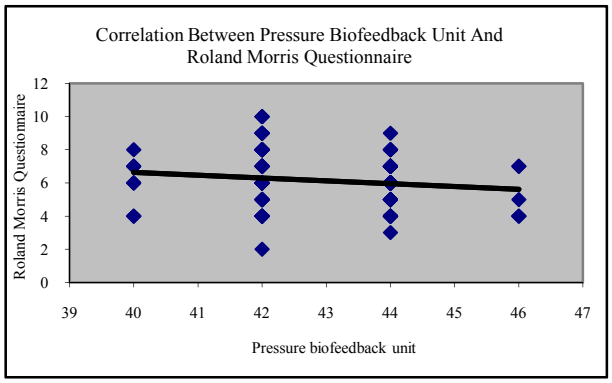
	N	Minimum	Maximum	Mean	Std.Deviation
Age	124	21	30	23.53	2.124
No of Delivery	124	1	2	1.21	.409
Post Delivery (Month of Delivery)	124	1	12	4.22	2.494



Graph 1 Correlation of Coremuscle Strength Using Pressure Biofeedback and Pain Using Numerical Pain Rating Scale among Postnatal Women

Table 2 Correlation of Coremuscle Strength Using Pressure Biofeedback and Pain Using Numerical Pain Rating Scale among Postnatal Women

	N	Mean	Std.Deviation	Sig.
Pressure Biofeedback Unit	124	42.87	1.379	0.584
Numerical Pain Rating Scale	124	5.93	.930	



Graph 2 Correlation of Coremuscle Strength Using Pressure Biofeedback and Pain Using Roland Morris Disability Questionnaire Among Postnatal Women

RESULTS

The descriptive statistics regarding Age, Number of delivery, Month of delivery, of the Subjects is depicted. , the pressure biofeedback unit mean value is 42.87 and Numerical pain rating scale mean value is 5.93. There is no significant correlation between Pressure Biofeedback and Numerical Rating Scale the pressure biofeedback mean value is 42.87 and Roland Morris disability questionnaire mean value is 6.15. There is no significant correlation between Pressure biofeedback and Roland Morris disability Questionnaire.

DISCUSSION

There is reduction in core muscle strength in normal individuals with low back pain but there is no evidence to state whether this is true in case of post natal related low back pain. This study assessed the correlation of low back pain with core muscle strength in 124 post natal women.

During pregnancy, the pelvic joints and ligaments relax. There is an anterior tilt of the pelvis due to the protruding abdomen. There is a compensatory lordosis. The shearing stress on the intervertebral ligament and the apophyseal joints of the lumbo-sacral junction are proportional to the angle formed by the superior surface of the sacrum with the horizontal. Lumbar spine is mounted on the sacrum at an angle of 45 degrees and is always eccentric in position, needing some external support for balance. At the normal sacral angle of about 40 degrees, the shearing force is 65% of the superior incumbent weight. This shearing force increases if the anterior tilt is increased. Therefore protective spasm of the extensors occurs following strain, which flattens the lumbar curve to diminish the stress.

Korencki acknowledges that the stability function of muscles has been neglected in general scientific research concerned with human movement. This omission has been seen in research into energy systems as well as that considering the contribution of individual groups of muscles to a production of a movement task. Therefore, at the present time, principles and methods to re-educate a muscle in its stabilisation function have not been as rigorously studied, and the principles that should be followed are not universally agreed upon.

There is evidence that some muscles, rather than contributing to movement of a joint system, are designed for joint stabilisation. These muscles are those described by Bergmark as local muscles. This evidence supports the proposal that the deep muscles of the local system play a significant role in support and control during movement.

Joint stabilization involves an intricate inter-relationship and precise control between several muscles acting on the joint to protect it during functional movement. Relatively little is known about how individual muscles contribute to joint stabilization. So this study targets to find the effect or its contribution to stabilization of Low back.

Lot of postnatal mothers complain of back pain which is the most common musculoskeletal problem in postnatal period which should be addressed. There are quite a lot of contradictions in training abdominals in postnatal period. Sana Chaudry, (2013) concluded that core stabilization exercises and postural correction were an effective technique in post partum back pain.

In India, still on progressing field, women's health physiotherapy has no as such a standardized protocol for training the postnatal mothers. Still on sad part in lot of areas

Physiotherapy is of no value in postnatal period. Due to the continuous elongation and hormonal effects the abdominal muscles are on the weaker side which demands concentration. And if practiced the postnatal mothers are advised with Transverses abdominals training only, followed by kegel's which demands the training of Pelvic floor muscles.

So, this shook an interest as whether only training transverses abdominals alone is enough and whether it has any correlation with the postnatal mothers back pain that it should be targeted. Thus this study was done with a basic and specific idea to reframe the existing idea and protocol of exercises.

The results of this study shows that there is fair linear and negative correlation between core muscle strength and intensity of low back pain in the post natal women ($p>0.05$).

This is in contradictory of the physiology and biomechanics that as the abdominal muscle stretch to accommodate the growing fetus, their ability to help to stabilize the lumbo-pelvic region decreases. With the anterior shift of the centre of gravity, there is increase in the moment arms of the deep core stabilizers putting them at a mechanical disadvantage. The burden of stability shifts to the paraspinal muscles, which get strained at the time when they may be shortened from the increased lordosis of the lumbar spine leading to low back pain.

But the reason of negative correlation may be that only Transverses abdominals alone is studied not all the core muscles and further more this result says that only the transverses abdominals assessment does not give the complete picture of entire core muscle strength and also transverses abdominal muscle assessment through Biofeedback device does give the pressure produced but an study with Electromyography could have given the proper assessment of Core strength.

The result of this study shows that there is fair linear and negative correlation between core muscle strength and Quality of life of the post natal women with low back pain.

Quality of life is very important among post natal women as they are having so many roles to play. Quality of life is highly compromised among post natal women who report low back pain. Transverses abdominal is a first muscle to report activation when the arm is raised as per the electromyographic studies. So many studies suggest the function of transverses abdominal in a static situation. Response of a transverses abdominal in a dynamic movement is active throughout the movement and it is highly related to the production of intra abdominal pressure. Very good core strength provide a great stabilization for spine but, studies document evidence of dysfunction is in the paraspinal muscles in low back pain patients, and this has been detected through measures of muscle activation, fatigability, muscle composition and muscle size and consistency. The back extensors as a group can become dysfunctional in low back pain patients. Similarly pelvic floor and diaphragm also constitutes to the core which together provides stabilization so, the results of correlation does not stand positive between the Roland Morris disability questionnaire and only the transverses abdominal strength.

The clinical outcome of this study, documents a negative correlation between core muscle strength with pain and Quality of life among post natal women with low back pain. this study recommends the use of other core muscle training along with transverses abdominal training which is always given due importance in the management of low back pain in post natal women.

CONCLUSION

There is no significant correlation of core muscle strength and intensity of low back pain as well as no significant correlation of core muscle strength and disability associated with low back pain in post natal women.

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