

EFFECT OF PILATES ON PAIN AND CORE MUSCLE ENDURANCE IN FEMALES WITH CHRONIC LOW BACK PAIN

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ABSTRACT

Objective: To find out the effect of Pilates on Pain and core muscle endurance in females with chronic low back pain.

Materials and Methods: A sample of 20 females with chronic non specific low back pain with age group of 25 -40 years participated in the study. Each subject were given 10 minutes of walk before 40 minutes of Pilates for 5 days a week ,5-6 repetition of each exercise for 4 weeks, exercises incorporated were pelvic tilts, supine leg circles, side lying circles, side lying clamps, prone lying cobra stretch, prone lying leg raise, quadruped superman and seated spine twist. Basic commands regarding the positioning, activation and engagement of core along with breathing control were given to the subjects. Pre and post reading of pain using VAS and core muscle endurance using Plank endurance test was taken. The effect of Pilates was then analyzed.

Result and Conclusion: There was significant improvement in pain and core muscle endurance after 4 weeks of Pilates in females with non specific chronic low back pain.

KEY WORDS: Low Back Pain, Core Muscle, Pilates, VAS, and Plank Endurance Test.

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INTRODUCTION

Core is the box which is referred as powerhouse, the foundation or engine for all limb movements [1]. Anatomically, core is musculature that surrounds the lumbopelvic region. Along with thoracolumbar fascia it plays a role in load transfer and stability of lumbopelvic region [2]. Core stability is achieved by integration of active spinal stabilizer (muscle), passive stabilizer (spinal column), and neutral control to control joint range of motion in order to allow performance of ADL's [3].

Core muscles are divided into local and global stabilizers. Local muscles attach to lumbar vertebrae and influence intersegmental motion while global muscle attach to hips and pelvis and promote mobility and orientation of spine [4]. Core include abdominals anteriorly, paraspinal and gluteals posteriorly, hip abductors and rotators laterally, diaphragm superiorly and pelvic floor inferiorly [5].

Rapid growth in technology and sedentary life style has reduced physical activity. This in turn has reduced physical work of certain muscles

specially trunk and hip muscles. In females habitual wearing of heels cause biomechanical and musculoskeletal changes that reduce BOS, increase anterior pelvic tilt, increase lumbar lordosis, weak abdominals and gluteal muscles. This decreases core stability and contribute to injuries and pain in females. Hormonal changes during pregnancy that allows the body to stretch and the weight of baby also affects stability [6]. Chronic low back pain is defined as the pain or discomfort between costal margin and the inferior gluteal folds, with or without radiating pain in lower limbs lasting more than 12 weeks. Chronic low back pain is associated with absence from work [2]. Around 60-80% adults affects from back pain during their life time and 30-40% never recover completely.

Pilates is the best option for improving static and dynamic stability along with endurance of trunk muscles thus benefitting posture and movement. Pilates is mind body exercises that focus on core stability, strength, flexibility, posture, breathing and muscle control.

Aim and purpose of study: To evaluate the effectiveness of Pilates on pain and core muscle endurance in chronic low back pain females.

Hypothesis: Alternate hypothesis: There may be significant effect of Pilates on pain and core muscle endurance in chronic low back females.

Null hypothesis: There may not be significant effect of Pilates on pain and core ms endurance in chronic low back pain females.

Significance of study: Low back pain is the common disability that affects both males and females but is more common among females due to their continuous involvement at work and home, various postural stress, muscular imbalance leading to the loss of the functional ability of muscles. So the significance of this study is to improve the core muscle endurance, thus reduce the pain so that the posture and activities of daily living can be improved in females with chronic low back pain.

MATERIALS AND METHODS

Study Design: Study design was randomized controlled experimental study with one group.

Sample: A sample of 20 females with chronic low back pain was taken in the studies that were

randomly selected.

Inclusion criteria: Females between 25-40 years of non specific chronic low back pain who did not take any previous treatment (medical or physical therapy) were included.

Exclusion criteria: Subjects having neurological disorders, orthopedic problems, cardiac or pulmonary problems, uncooperative patients, females having chronic back pain under the medical or physiotherapy treatment, back pain females of any specific pathology.

Main Outcome Measure: VAS: Pain intensity was measured by means of this, 10cm line where 0 symbolized no pain and 10 as maximum pain. Patient was asked to mark her pain on this line as per the severity. VAS was taken pre and post intervention.

Plank test: This is simple test for core muscle endurance. Aim of test is to hold an elevated position for as long as possible. The upper body should be supported off the ground by elbow and forearm and legs straight with the weight taken by the toes. Hips are lifted off the floor creating a straight line from head to toe. As soon as the patient is in correct position, the stopwatch is started. The test is over when the subject can no longer maintain the back straight.

Subjects were made to do mat exercises after 10 min of walk for 40 minutes, 5-6 repetitions of each exercise 5 days a week for 4 weeks. All subjects were quantified using the outcome measure before and after the treatment. Patients were advised not to receive treatment elsewhere during participation in the study.

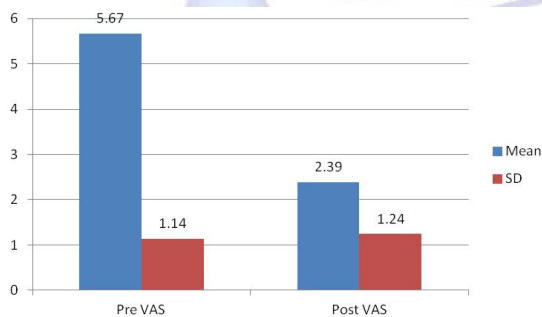
Procedure: Subjects were conveniently selected based on inclusion and exclusion criteria. Procedure was explained and their consent was taken. Subjects were asked to wear comfortable clothing. Food gap was taken 30 minutes before and after the exercise. 10 minutes walk was performed by the patients before starting the exercises. Mat group exercises were performed on ground for 40minutes each day for 5 days a week. Some exercises were tailored according to the patient. The no of repetitions for each exercise was ranged from 5-6 repetitions. Some basic commands regarding the positioning, activation and engagement of core along with breathing control were given to the subjects.

Basal reading of pain and endurance was taken for each patient on first day of first week by visual analog scale and plank test. Each subject were asked to perform the following Pilates exercises: Pelvic tilt, Supine leg circles, Side lying clamps, Side lying leg circles, Prone lying cobra stretch, Prone lying leg raise, Quadruped superman, Seated spine twist.

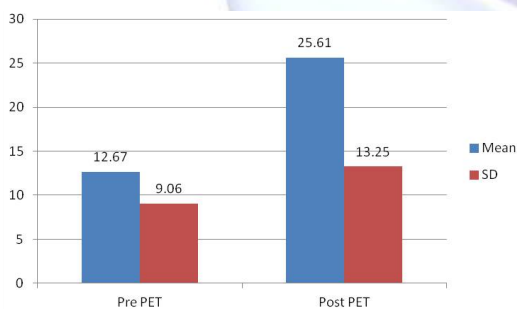
At the end of 4 weeks the outcome measures were taken again to check the improvement in condition of the subjects.

RESULT

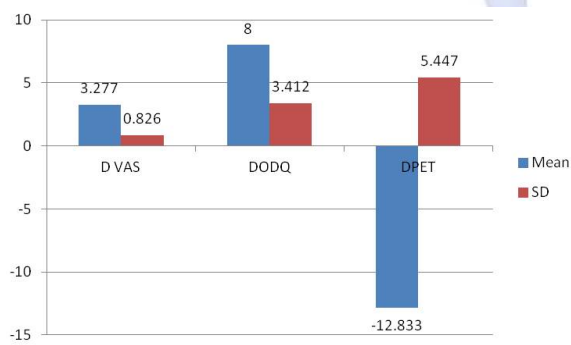
Graph 1: Shows the mean difference, standard deviation and p value for pre and post reading for VAS. Significant changes were found in the pre and post values of VAS with $p=0.01$.



Graph 2: Shows the mean difference, standard deviation and p value of pre and post value for plank endurance test. Significant change was found in the pre and post reading of plank endurance test with $p=0.01$.



Graph 3: Shows the mean value, standard deviation and t value of difference of VAS, difference of plank endurance test. The value of p for VAS is $p<0.01$ so the result is significant. Same for the plank endurance test the value of $p<0.01$, so the result is significant.



Data Analysis: The data was analyzed using SPSS 10.0 software package. Paired t Test was used to see the effect of exercise on pre and post values of VAS and plank test.

DISCUSSION

This was an experimental study which determined the Effect of Pilates on pain and core muscle endurance in females with chronic low back pain.

Twenty females with non specific low back pain of more than 12 weeks duration were taken. They were all given core strengthening exercises for 40 minutes, 5 days a week for 4 weeks which includes pelvic tilt, supine leg circles, side lying clamps, side lying leg circles, prone lying cobra stretch, prone lying leg raise, quadruped superman, seated spine twist.

After analysis of data it was found that there was significant change in the value of VAS and plank endurance test after 4 weeks of Pilate's exercises.

Hodges PW and Sharp RW suggested that global muscles do not attach directly to the spine and local muscles have intersegmental control. Therefore they affect small movement and should be activated before global muscles [7]. Whereas Hurri H et al stated that presence of low back pain leads to avoidance of daily activity contribute to further intolerance for exercises and loss of functional capacity [8]. According to Owesley et al pilate is used to treat people with low back pain and emphasis is placed on holding on neutral spine position [9]. Aldro Gonzalvo et al considered pilate is alternative to minimal interventions to treat low back pain [10]. Leetum et al studied that males have greater core strength compared to females possibly related to bone structure and postural difference in pelvis. It is possible that core stability may be impacted by anatomical alignment of female pelvis which affects angulation of muscular attachment. So angle of pull of core musculature on pelvis may result in decrease ability to control the trunk [6]. Outcome measures used are validated for use in people with low back pain and have been found to be reliable [11]. Schellenberg KL et al suggested using plank test to assess core endurance [12].

It is supposed that because core strengthening allows the local stabilizers to get recruited first to stabilize the trunk, hips and ribs allowing for the accurate and purposeful firing of global mobilizers thus allowing perfect movement over stable framework. Through this study it is found that females suffer from low back pain because of their involvement at work and home, their lack of exercise hampers the core stability and is associated with back pain. Thus improving their local stability by strengthening of core had also produced effect in their endurance and benefited them in their ADL's.

Thus we can accept our alternate hypothesis that there is significant effect of Pilates on pain and core muscle endurance in females with chronic low back pain.

CONCLUSION

Significant effects were found in value of VAS and core endurance after Pilates in females with low back pain. Thus, it is concluded that Pilates are effective intervention in treatment of chronic non specific low back pain.

Conflicts of interest: None

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