

Effectiveness of Egoscue Exercises versus Lumbar Stabilization Exercises in Asymptomatic Physiotherapy Female Students with Hyperlordosis Age Group 18 To 30 Years: A Comparative Study

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ABSTRACT

Background: Lumbar lordosis is a common cause of back pain, and correcting spinal alignment can reduce stress on the lumbar spine, thereby preventing future problems. Despite its prevalence, there is limited research comparing the effectiveness of different exercise interventions for reducing hyperlordosis.

Aim and Objective: This study aims to compare the effectiveness of Egoscue exercises and Lumbar Stabilization exercises in reducing the hyperlordosis angle in female physiotherapy students.

Material and Methods: A comparative experimental study was conducted in the Department of Community Physiotherapy with 42 asymptomatic female physiotherapy students who had hyperlordosis, randomly allocated to either an Egoscue exercise group or a Lumbar Stabilization group. The outcomes assessed were the Index of Lumbar Lordosis and exercise tolerance, measured at baseline and after 2 weeks. The study was conducted at MIP College of Physiotherapy, Latur.

Results: Both groups showed a significant reduction in hyperlordosis scores after 2 weeks, indicating that both exercise interventions are effective in improving spinal alignment. These findings have implications for the management of lumbar lordosis in physiotherapy clinical practice.

Conclusion: This study provides evidence for the effectiveness of Egoscue exercises and Lumbar Stabilization exercises in reducing hyperlordosis in female physiotherapy students. The results can inform the development of exercise programs for individuals with lumbar lordosis.

Keywords: Egoscue Exercise, BORG Scale, Degree of Index of Lumbar Lordosis.

INTRODUCTION

Lordosis is a medical term for an exaggerated inward curve of the spine, often in the neck and back. Lordosis most often occurs in the lower back, in which case it is called lumbar Lordosis. The defining characteristics of Lordosis can cause the buttocks and stomach area stuck out. [1] Lumbar hyperlordosis is an acquired disorder having increased concavity posteriorly that may be caused due to poor posture, inactivity, improper shoes, etc. [2,3] This occurs to compensate for the inclination of the sacrum to get back to its upward orientation (4). Lumbar Hyperlordosis is characterized by muscle imbalance with tightness of the back and hamstring muscles with weakness of the abdominals. [2, 5, 6] The prevalence of back pain in India is found to be 6.2 in the general population and 90% in construction workers. It is estimated that 1 out of 25 people leave their job and have difficulty in their daily activities due to lower back pain. Studies have shown that approximately 90.5% of people having low back pain have an alteration in lumbar spine alignment. A study states that 70% of the population

with low back pain has postural deviations in spine, changing the normal relationship between the spine and pelvis [7, 8, and 9].

Egoscue exercise was developed with the focus on targeting musculoskeletal dysfunction, aiming to restore postural balance through corrective exercises. It is suggested to be effective in rectifying poor posture [9, 10]. Since the Egoscue method was first founded by psychologist Pete Egoscue in the 1970s, it has widely spread. According to Mr Egoscue, pain is not something to be forced. He said that pain is the body's way of telling us that we are physically off balance. The body is intricately connected so all of its systems and sub systems are interrelated and interdependent. When a part of the body is not working as it should there can a dominating effect in other areas of the body that are thrown off. Some common postural integrity issues today include change in the curve of the back and forward tilt of the hips, which can result in neck, shoulder, back, knee, and/or foot pain. In addition, the internal organs rely on proper alignment and movement of the musculoskeletal system to function correctly effective human being. Egoscue helps to appropriately align the musculoskeletal system and gives exercise to improve your posture, which becomes optional over time. By identifying the cause of the problem rather than just focusing on symptoms. Egoscue can quickly decrease the acute or chronic pain and often end it all together. When it comes to joint pain, joint movement depends on the muscles surrounding it. So when muscles become imbalanced through specific action or inaction, the joint becomes compromised and loses full range of motion, often resulting in a loss of mobility and pain.

Egoscue can help to regain that full range of motion naturally reduce joint pain. In general, Egoscue improve posture which can decrease back pain. Better posture equates to better balance, so there is a direct improvement in balance once the posture is improved through Egoscue [11]. In addition, as a result of improved muscle balance the body will be able to perform more effectively while putting less effort [12]. According to Kendall's theory exercises are the commonest method to correct abdominal posture with stretching of shortened soft tissue structure and strengthening the weak musculature [13]. Lumbar lordosis is primarily aimed at improving neuromuscular control, strength, endurance of muscle which considered being central to the maintenance of dynamic spinal and trunk stability. It is considered as safe exercise with advantages of having multiple stages as well as cost effectiveness [14, 15]. Each individual has different lumbar muscular strength and therefore lumbar stabilization exercise program should be individualised comprising of various posture with varying intensities to maximise therapeutic benefit to the particular individual [15]. Lumbar stabilization exercises are motor control conventional exercise that provide internal stabilization at spine and trunk enhancing the control of neuromuscular system, strength and endurance [16, 17].

METHODOLOGY

After the Institutional Ethical Committee approval, 42 individuals with asymptomatic lumbar hyperlordosis, female students participated in group A and group B. An experimental study was conducted at the physiotherapy department of the Maharashtra Institute of Physiotherapy, Latur. A total of 42 physiotherapy students having asymptomatic lumbar hyperlordosis were selected according to the inclusion and exclusion criteria of the study. Inclusion was a positive prone hip extension test, No physical complaint at spine radiating pain, and the age group was within 18 to 30 years of physiotherapy female students, and Females having a degree of lumbar lordosis >45. Exclusion criteria were a History of back injury in past month, Low back pain having localized or undergone treatment for low back pain in the past month, Practiced any kind of exercises or sports activities during the last six months. A total 42 subjects were included in the study. They were randomly divided into the two groups, each consisting of 21 subjects. Group A include the subjects who received egoscue exercises with a common exercise protocol, and Group B includes the subjects who received the lumbar stabilization exercise and common exercise protocol. All the participants had asymptomatic lumbar hyperlordosis. Written informed consent was taken from the subjects, and the whole study was explained to them. Pre and post-assessment for the degree of lumbar lordosis. Interpretation of the study was done on the basis of a comparison between pre- and post-test assessments.

Group A was given the Egoscue exercises

Group B was given the lumbar stabilization exercises before these exercises, both groups received the common treatment of stretching exercises. The passive stretching was given bilaterally to the hamstring muscles, rectus femoris muscle and Achilles tendon, and Iliopsoas. Three stretches for each muscle with a hold for 30 seconds.

Group	Group-A Egoscue Exercises: Stretching exercises	Group-B Lumbar Stabilization Exercises: stretching exercise
Common stretching Exercises	Stretching for hamstring muscle, Rectus femoris muscle , Iliopsoas muscle, Tendoachilles muscle	
	1) Static back and static back with breathing 2) Abdominal contraction while in the static back position 3) Abductor press 4) Overhead extension 5) Elbow curls on the wall 6) Static wall 7) Spinal twist 8) Pelvic tilts 9) Supine groin 10) Progressive, and air bench Week 1:3 times with 30 sec hold Week2:5 times with 30 sec hold	1) Crooked lying position 2) Crooked lying with one leg extended and resting on the couch 3) Prone lying with arms at the side and head turned to the opposite side 4) Quadruped position with head at neutral, 5) Supine lying with one knee flexed, resting on the couch, and the other knee flexed to be held without support 6) Supine lying with both legs extended and one leg raised 7) Plank position, 8) Erect sitting on a chair Week 1: 3 times with 30 sec hold Week2:5 times with 30 sec hold

Material used: Measuring tape, Mat Flexi Ruler, Swiss ball

OUTCOME MEASURES:

1. Degree of Lumbar Lordosis Using Lumbar Lordosis Index:

A 61 cm Flexicurve was used. It was moulded to the curve of the spine and traced on paper to calculate the index of lordosis. The maximum width and the total length of the curvature were measured. The formula used was $\theta = 4(\arctan [2H/L])$, where H is the maximum width that is the deepest part of the curvature, and L is the vertical line joining the T12 and S2 vertebrae.

2. Tolerance to Exercise Performance Using BORG Scale:

The scale consists of 6-20 scores on which the words are printed as ‘very very light’ at 7 and ‘very very hard’ at 19. In this scale, 6 stated no exertion, and 20 stated maximum exertion. This was done to gauge the difficulty level of the exercises that were performed in each group and to find which exercises were graded with more ease of performance.

RESULTS/ FINDINGS

There was a statistically significant reduction in the mean degree of index of lumbar lordosis, when compared for pre and post-intervention scores, indicating improvement with both forms of exercise. For TTEP P value for the Egoscue and Lumbar stabilization groups were <0.001 and <0.001, respectively, which were statistically significant [Table 1]

The degree of the Index of Lumbar lordosis $P < 0.001$ was significantly different from the Lumbar Stabilization group [Table 2]. The lumbar lordosis angle (degree) was reduced in both two groups, but more reduction was seen in the Egoscue Group when compared to the lumbar stabilization group.

For TTEP, the P value for the Egoscue group and lumbar stabilization group were < 0.001 and < 0.001 , respectively, which was statistically significant [Table 2]. Ease of exercise performance was graded during exercise, and the individual in the Egoscue exercise group found to be difficult to perform, where in lumbar stabilization group graded the exercise to be constant throughout the exercise time.

Table 1: Degree of Index of Lumbar Lordosis

Groups	MEAN		SD	t	P
Group A post	39.55714		2.42808	2.021075	0.040738
Group B post	41.21905		2.659816		

The mean values of Post of Egoscue and Lumbar Stabilization Exercises are 39.55714 and 41.21905 respectively standard deviation values are 2.42808 and 2.659816 respectively & P value is < 0.04 . These values suggest that there is a significant decrease in degree of index of lumbar lordosis in group A Egoscue as compared to Group B Lumbar Stabilization Exercise.

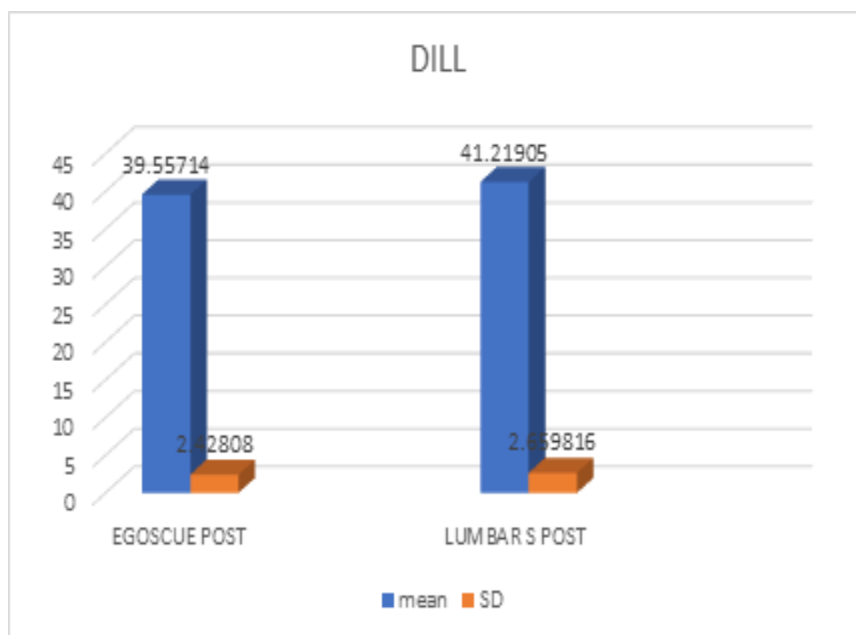


Figure 1: Degree of Index of Lumbar Lordosis

Table 2: Borg Scale

Groups	Mean	SD	T	P
Group A	16.04762	1.023533	2.024394	< 0.001
Group B	13.57143	0.92582		

The mean values of BORG SCALE in Egoscue and Lumbar Stabilization are 16.04762 and 13.57143 respectively and the standard deviation values are 1.023533 and 0.92582 respectively & P value is < 0.001 . These values suggest that there is decrease in ease for doing exercise.

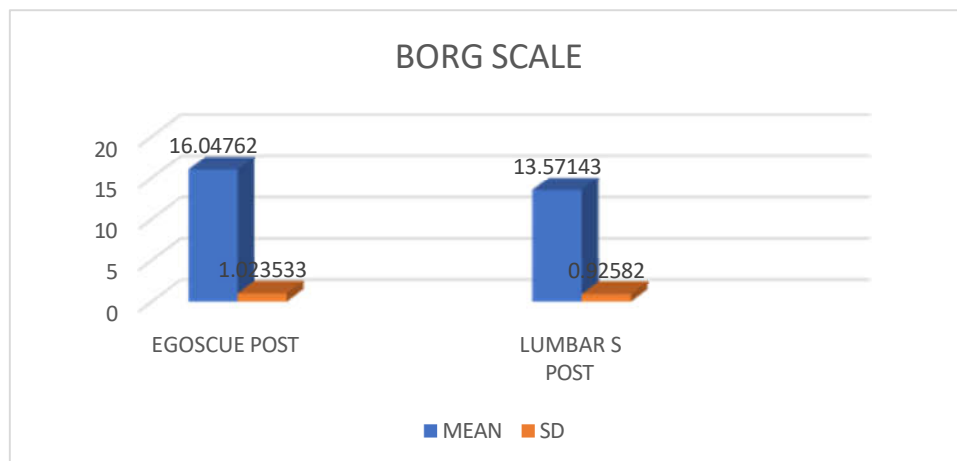


Figure 2: Borg Scale

DISCUSSION

The present Randomized Controlled Trail was done to compare the effect of Egoscue exercise and lumbar stabilization exercise in individuals with lumbar hyperlordosis. The result from the statistical analysis showed that the Egoscue group was better in the reduction of lumbar lordosis as compared to lumbar stabilization group.

The main aim of the Egoscue method is to apply corrective exercises to get the whole body or spine closer to “ideal” posture, which help in reducing the pain. In the present study, the selected were mainly focused on the lumbar and pelvic region. This might have corrected the posture at lumbar spine. The exercises included have caused more of posterior tilting at the pelvis than anterior tilting. Egoscue have stretched and strengthened the muscles effectively in order to correct the spine and pelvis posture. They are mainly corrective exercises, and the main focus of these exercises is to correct the whole body posture. [12]

Literature suggests corrective exercises to improve posture positively, and since Egoscue exercises are similar to corrective exercises, it has also shown a beneficial effect. A study was conducted by Yazidi et al. to see the effectiveness of corrective exercises on the thoracic kyphosis and lumbar lordosis, which showed a significant improvement after 8 weeks.[13] These results were similar to the present study as the corrective exercise focuses on strengthening, endurance, and flexibility of the muscle, which will accelerate the posture correction.

Till date, only one study has been published on Egoscue exercise. The study was conducted to see the effect of Egoscue exercise in hip and knee pain, conducted for 2 weeks. Significant improvements in pain and function were seen. This change was due to the correction of the malalignment posture which will reduce the overuse or increase the activity of underused skeletal muscle to correct the muscle imbalance [14]. A similar effect might have occurred in the present study, as there was a change in lumbar spine posture.

Lumbar stabilization exercises are said to reduce the load on the spine and reduce the stress on the spinal structure [15]. Stabilization exercises have been planned to improve the neuromuscular control system and perfect dysfunction. Lumbar stabilization exercises help in enhancing motor units which are regulated by a large unit muscle system as well as the local muscular system. This helps in building up the postural control of the muscles of the trunk and abdomen [16].

In literature review done so far on the efficacy of lumbar stabilization exercise on the lumbar spinal curve shows contradictory results. A study was conducted to see the effect of abdominal strengthening on lumbar lordosis and pelvic tilt, which did not show any change in lumbar lordosis angle, The reason could be that the protocol used mainly focused on the abdominal muscle rather than focusing on the trunk extensors and hip muscles to correct the imbalance [10]. Another study was done to see the effectiveness of lumbar stabilization, Pilates exercise and dynamic strengthening exercise groups. This indifference could be because the outcome measures used were different in both studies, and the study population included was patients with LBP [17].

In the present study, individuals in the Egoscue group found the exercise to be difficult to perform with more

soreness due to longer and static hold times; however lumbar stabilization group graded the exercise to be constant throughout the exercise time, although the exercises were given progressively by increasing the number of repetitions.

Limitations of the study: Standard outcome measures, like X-ray, could have been used to measure the angle of lordosis. Other curvatures of the spine could have been assessed, as a change in one spinal curvature will change the curvature at the other spinal levels. Egoscue exercise can be implicated in other musculoskeletal disorders. Electromyography can be used to study the muscle activity of the abdominal and trunk extensor muscles during the Egoscue exercise.

CONCLUSION

Egoscue exercise is significantly effective than lumbar stabilization exercises for reducing lumbar hyperlordosis in asymptomatic physiotherapy students.

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CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

ETHICS STATEMENTS

Ethical approval was given by the Maharashtra Institute of Physiotherapy Research Ethical Committee.

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