

# Effects of Pilates Exercises on Trunk Strength, Endurance and Flexibility in Computer Professionals

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## ABSTRACT

Study was designed to obtain a more thorough understanding of effects of Pilates exercises over a time period of five weeks on lower back strength, posterior trunk flexibility and abdominal endurance in adult female computer Professionals. The objective of the study was to compare the effectiveness of Pilates exercises and generalized stretching and strengthening exercises in computer Professionals. study included 60 females with the age group 22-35 years and were participated voluntarily, in which 30 were in experimental group that is in Pilates Group, and 30 were in control group. All training sessions for 5 weeks (3 days in a week) were done under the Physiotherapist's guidance and supervision. SPSS version 20 was used to analysis the data, result indicates that Modern Pilates mat exercises can be suggested for computer professionals to improve lower back muscular strength, abdominal muscular endurance and posterior trunk flexibility.

**Keywords:** Pilates, Flexibility, strength, endurance

## INTRODUCTION

In the tech-driven 21<sup>st</sup> Century, use of Computer devices and gadgets has almost become indispensable in every aspect of life. It has been documented that 75% of all daily activities involve the use of Computer<sup>9</sup>. No doubt the use of Computer in all the institutions, colleges, universities, offices and homes has made life easier and also increased the work output tremendously, but at the same time it has also produced many dangers for human health along with deterioration of the quality of life of the Computer worker<sup>9</sup>.

Continuously working on computer with Crouched and hunched towards the monitors caused musculoskeletal disorders in computer user<sup>1</sup>. Most of the computer professionals have complaint of upper or lower back pain, and one of the reasons, could be the weak abdominal muscles can

cause musculoskeletal problems, overuse injuries of hands and wrists and eyestrain, which can be reduced or eliminated with proper workstation design and with proper posture. Using the wrong chair or sitting improperly in front of a computer for long time can lead to chronic debilities such as stiffness, headache, and backache Muscles and tendons can become inflamed due to greater periods of sitting on PC's.<sup>1</sup>

S. Arun vijay et al 2013, had found in his study, women are more exposed to WRMSDs compare to men. 67% (N= 87) of women had experienced such problems in the past 12 months, whereas, 53% (N=91) of men had annual prevalence of musculoskeletal symptoms and 40% (N=69) during the past week.<sup>4</sup>

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abdominal muscles. Since Abdominals are the front anchor of spine, if they are weak, then the other structures supporting spine that is back extensors muscles will have to work harder. By developing stronger core muscles, one can avoid or reduce the injury or strain related to back muscles.<sup>5</sup>

Since Abdominals are the front anchor of spine, if they are weak, then the other structures supporting spine that is back extensors muscles will have to work harder. By developing stronger core muscles, one can avoid or reduce the injury or strain related to back muscles.<sup>2</sup> Different fitness programs incorporate various aspects of core strengthening and also useful way to maintain compliance in many individuals<sup>3</sup>.

Among all core strengthening exercises, in this study Pilates exercises has been taken. Different fitness programs incorporate various aspects of core strengthening and may be a useful way to maintain compliance in many individuals. And are as Pilates, matrix dumbbell program, Yoga, Tai-chi, Feldenkrais Among all core strengthening exercises, in this study Pilates exercises has been taken.

Pilates is an exercise program as a core stability approach to augment the neuromuscular system to control and protect the core body or spine. This method is a comprehensive body-mind conditioning, which coordinates core stabilizing exercise with mind and breath control challenging by flowing movement of the whole body. Since a Pilates approach focuses on core body exercise and breath control, it facilitates activation of transversus abdominis, diaphragm, multifidus and pelvic floor muscles.<sup>10</sup> In this study female computer professionals have been taken as female has to do multi task work at work place as well as at home and therefore female requires more flexibility, strength and endurance compare to male. At a time, it becomes difficult for working women to go to gym or take a time for their Physical fitness, as a result there is more chances for WRMDs within a short period of work duration or may be after a long year.

There is lack of studies on effects of Pilates on trunk flexibility, strength and endurance especially for computer professionals so further Research is necessary to ascertain the method's potential to improve the outcome of Modern Pilates mat exercises in a sedentary population such as computer professionals. So, the purpose of the study is to evaluate "Effect of Pilates exercises on trunk strength, endurance and flexibility in computer professionals."

**NEED OF THE STUDY:** There is lack of studies on effects of Pilates on trunk flexibility, strength and endurance especially for computer professionals so further Research is necessary to ascertain the method's potential to improve the outcome of Modern Pilates mat exercises in a sedentary population such as computer professionals.

## METHODOLOGY

Total 60 female computer professionals (22-35 years age) who works on computer for more than 6 hours per day since last 6 months or more than that have been taken and 30-30 has been divided for experimental and control group .Female who is having issues like Back pain, had undergone for any surgeries within last 1-year, pregnant women female who play any sports, or female who do regular physical exercises Subjects were assessed through Performa and informed consent has been taken. 3 trials of each test that is for sit and reach test, trunk lift test and one-minute half sit up test were given to each subject After Pretest Measurement Training sessions has been started and gradually progression has been done in exercises, which has been shown in Table A And B. Duration of training session was 15 sessions , 3sessions /5 weeks and Duration of one session was 45 minutes. 10 minutes warm up, 30 minutes training sessions, 5 minutes cool down.



1. One-minute half sit ups: (Figure - 1)

2. Sit and reach test: (Figure - 2)

3. Trunk lift test (figure-3)

Group A: Pilates exercises
<p><b>warm up exercises</b></p> <ul style="list-style-type: none"> <li>Breathing exercise</li> <li>Ankle pump</li> <li>Trunk rotation</li> <li>Imprint</li> <li>Articulation</li> </ul> <p><b>Pilates exercises with scoop and node</b></p> <ul style="list-style-type: none"> <li>Knee to chest</li> <li>Bridging</li> <li>Single leg stretch</li> <li>One leg circle</li> <li>side kick front and back</li> <li>curl ups</li> <li>prone legs lifting with opposite hand lifting</li> <li>Shoulder bridge without leg lifting</li> <li>The hundred without hand movement</li> <li>Single leg stretch</li> <li>One leg circle</li> <li>Roll up</li> <li>Double leg stretch</li> <li>Roll down</li> <li>One leg circle</li> <li>Swimming</li> </ul> <p><b>cool down</b></p> <ul style="list-style-type: none"> <li>breathing exercises</li> <li>forward bending</li> <li>savasana</li> </ul>
Group B: Generalized Body Exercise
<p><b>warm up exercises –</b></p> <ul style="list-style-type: none"> <li>Breathing exercise</li> <li>Ankle pump</li> <li>Knee flexion</li> </ul> <p><b>Generalized body exercises</b></p> <ul style="list-style-type: none"> <li>Knee to chest</li> <li>Knee to opposite chest</li> <li>Bridging</li> <li>Single leg SLR</li> <li>Pelvic rotation</li> <li>Curl ups</li> <li>Prone on elbow with 5 counts hold</li> <li>Prone on hands with 5 count hold</li> </ul> <p><b>cool down</b></p> <ul style="list-style-type: none"> <li>breathing exercises</li> <li>forward bending</li> <li>savasana</li> </ul>

## DATA ANALYSIS

Total 60 subjects have been participated in the study, which includes active participation of 30 participants in Pilates exercises sessions and 30 participants in generalized stretching and strengthening exercises sessions for 5 weeks. SPSS version 20 was used to analysis of data. The data are expressed as mean, standard deviations. Data collected during assessment was not distributed normally so non parametric test was done. An alpha was set as 5% as a cut off point for statistical significance. Wilcoxon test were used to compare quantitative outcomes in two independent groups. That is within the group pre-test and post-test measurement was compare by Wilcoxon test. And Comparison between the groups has been done through Man Whitney U test. Dependant variables were taken as one-minute half sit up test, sit and reach test and trunk lift test.

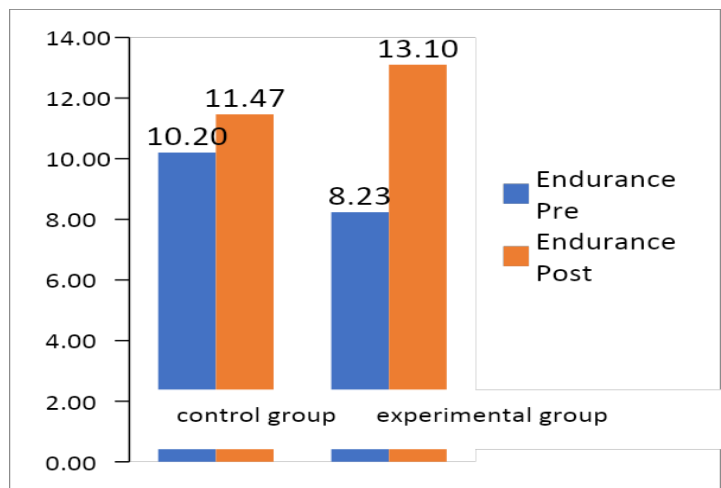
Features	Group A Mean ± SD N=30	Group B Mean ± SD N=30
age (yrs)	25.83 ± 3.23	24.36 ± 1.92
Height (m)	157.13 ± 6.15	155.76 ± 4.98
Weight (kg)	52.96 ± 11.99	51.10 ± 9.54
BMI (Kg/m <sup>2</sup> )	21.38 ± 4.15	22.65 ± 4.53

## RESULT

SPSS version 20 statistical software was used for all statistical analysis. Mean and SD were calculated for numeric data. For group A and group B pre and post test data were compared using Wilcoxon test. And comparisons between the both groups were done using man Whitney test. For all statistical analyses, significant result was considered at P < 0.05 with CI at 95%.

Mean and SD values in both the group for one-minute half sit up

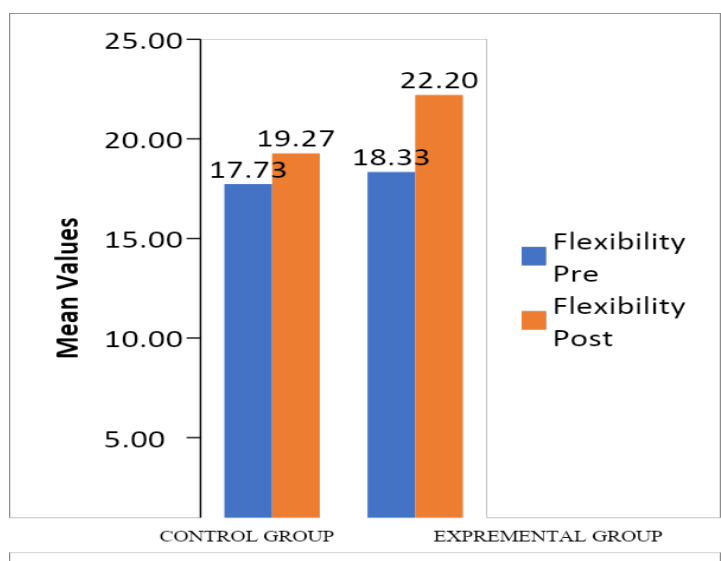
ONE MINUTE HALF SIT UP TEST	GROUP A	GROUP B	P Value
BASELINE	8.23± 2.34	10.20± 2.32	<0.001
AND THE END OF FIFTH WEEK	13.10±2.18	11.47±2.33	< 0.001
DIFFERENCE	4.87 ±0.43	1.27±0.45	<0.001



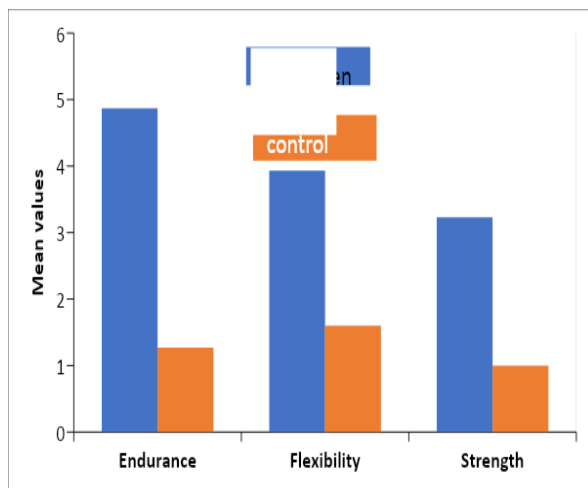
Trunk Lift Test	GROUP A	GROUP B	P Value
Baseline	7.27±0.90	7.93 ± 1.14	<0.001
And The End Of Fifth Week	10.43±0.93	8.80 ± 1.09	< 0.001
Difference	3.23 ± 0.43	1.00 ± 0.26	<0.001

Mean and SD values in both the group for sit and reach test

Sit and Reach Test	GROUP A	GROUP B	P Value
Baseline	18.33±8.02	17.73 ± 7.30	<0.001
And the End Of Fifth Week	22.20±7.94	19.27 ± 7.18	< 0.001
Difference	3.93 ± 0.58	1.60 ± 0.67	<0.001



variables	Pilates Mann Whitney test		Control Mann Whitney test		P Value
	Mean	SD	mean	SD	
One-minute half sit up	4.87	0.43	1.27	0.45	<0.001
Sit and reach	3.93	0.58	1.60	0.67	<0.001
Trunk lift	3.23	0.43	1.00	0.26	<0.001



(Graph shows comparison of mean value of (pre and post value's difference mean) of experimental and control group)

## DISCUSSION

Study was designed to obtain a more thorough understanding of effects of Pilates exercises over a time period of five weeks on lower back strength, posterior trunk flexibility and abdominal endurance in adult female's computer professionals. The differences in the outcome measures in both the groups after the intervention can be attributed solely to the given intervention to the particular group. With regard to the results of this study, Modern Pilates mat exercises were found to be an efficient training method with significant changes in abdominal and lower back strength, posterior trunk flexibility and abdominal muscular endurance in adult females' computer professionals. The group receiving the Pilates exercises showed more improvement in flexibility, endurance and strength compare to other group.

In Pilate's group while comparing improvement among three variables, abdominal endurance had shown more improvement compare to pre-test measurement. When we compared Pilates exercises effects with generalized body exercises it also shows a significant

improvement in variables, but mean difference of Pilates variable is more compare to control group. Difference in the means of the pre- and post-tests of abdominal and lower back endurance of the Pilates exercise group proved to be higher compared to the control group. These findings were in line with the literature (Betul Sekendiz et al 2006) confirming that Modern Pilates mat exercises increase muscular strength, endurance and flexibility of the trunk<sup>8</sup>.

**LIMITATIONS:** This study was carried out for 5 weeks no future follow up of subjects were carried out. Computer professionals with back pain were excluded, hence future study take symptomatic subjects in account.

## Further Recommendation

In this study Pilates has been compared with generalized body stretching and strengthening exercises, in future we can compare with abdominal strengthening and back extensors stretching exercises.

## CONCLUSION

Modern Pilates mat exercises can be suggested for computer professionals to improve lower back muscular strength, abdominal muscular endurance and posterior trunk flexibility.

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