



INTERNATIONAL GRADUATE COLLOQUIUM

i-SPEAK 2025

SPORTS AND PHYSICAL EXERCISE ASSEMBLY OF KNOWLEDGE SHARING

COLLOQUIUM PROCEEDINGS

**EXTENDED
ABSTRACT**

The Effect of Exercise Bike in 4 Weeks on Muscle Performance Among Obese Adults

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Keywords: Obesity, Muscle performance, Stationary cycling, Balance assessment, Exercise intervention

I. INTRODUCTION

Being overweight interferes with the performance of muscle work and decreases endurance, balance, strength, and motivation for physical activity [1][2]. Cycling is a low-impact activity and can be carried out, carefully, by individuals who are obese, but not many studies have assessed the short-term benefits of cycling as an intervention to improve muscle performance [1]. In this study, the aim was to assess the changes over a 4-week period of stationary cycling on muscle endurance, balance, and strength in individuals who were obese. Suggested comparisons of pre- and post-scores in muscle performance and differences between the experimental and control groups after the intervention.

II. METHODS

In this study, 14 obese adults were separated into a control and an experimental group. For four weeks, the experimental group engaged in one hour of cycling at low to moderate intensity and progressively increased that intensity to a maximum conceivable output. Muscle endurance, balance, and strength were assessed pre- and post-intervention using the 30-second chair stand, single-leg stance, and plank tests. Weight, waist circumference, and fitness indicators were forecasted throughout the intervention phase, except for documenting heart rates and adverse responses.

III. RESULTS AND DISCUSSION

A. Objective 1:

After four weeks, test results for muscle endurance, balance, or strength did not have statistically significant changes. All data for the study, including the 30-second chair stand, single-leg stance, and plank time, resulted in $p > 0.05$. Even in the experimental group that had minor numerical improvements, the differences were not great enough to indicate effectiveness over the intervention period.

B. Objective 2:

Comparisons between the experimental and control groups indicated no significant differences on all measures. The experimental group displayed small increases in lower-limb balance and plank time, but Cohen's d indicated small effect sizes. The similar variability across groups indicates that the 4-week intervention was not enough to promote meaningful improvements in muscle performance in obese adults.

TABLE I
PAIRED T-TEST (30S CHAIR STAND)
Paired T-Test (30s Chair Stand)

Descriptives						
	N	Mean	Median	SD	SE	p
Pre Control Group	7	12.1	12.0	1.95	0.738	
Post Control Group	7	12.4	12.0	1.62	0.612	0.522
Pre Experimental Group	7	11.9	12.0	2.27	0.857	
Post Experimental Group	7	12.4	12.0	2.15	0.812	0.280

TABLE II
PAIRED T-TEST (SINGLE-LEG STAND)
Paired T-Test (Single-Leg Stance)

Descriptives						
	N	Mean	Median	SD	SE	p
LL (Pre Control Group)	7	2.82	3.21	1.06	0.399	
LL (Post Control Group)	7	2.90	3.20	1.05	0.399	0.341
LL (Pre Experimental Group)	7	1.83	1.26	1.07	0.403	
LL (Post Experimental Group)	7	1.99	1.43	1.11	0.418	0.017
RL (Pre Control Group)	7	3.01	3.40	1.09	0.410	
RL (Post Control Group)	7	3.16	3.46	1.08	0.408	0.085
RL (Pre Experimental Group)	7	1.82	1.40	1.07	0.404	
RL (Post Experimental Group)	7	2.11	1.61	1.26	0.475	0.017

Note:- LL: Left Leg & RL: Right Leg

TABLE III
PAIRED T-TEST (PLANK)
Paired T-Test (Plank)

	N	Mean	Median	SD	SE	p
Plank (Pre Control Group)	7	0.390	0.380	0.0900	0.0340	
Plank (Post Control Group)	7	0.367	0.400	0.0869	0.0329	0.370
Plank (Pre Experimental Group)	7	0.481	0.400	0.2556	0.0966	
Plank (Post Experimental Group)	7	0.507	0.400	0.3179	0.1202	0.403

TABLE IV
INDEPENDENT SAMPLE T-TEST

Independent Samples T-Test						
		Statistic	df	p		Effect Size
LL (Pre)	Student's t	1.746	12.0	0.106	Cohen's d	0.933
LL (Post)	Student's t	1.572	12.0	0.142	Cohen's d	0.840
RL (Pre)	Student's t	2.070	12.0	0.061	Cohen's d	1.107
RL (Post)	Student's t	1.677	12.0	0.119	Cohen's d	0.897
30s Chair Stand (Pre)	Student's t	0.253	12.0	0.805	Cohen's d	0.155
30s Chair Stand (Post)	Student's t	0.000	12.0	1.000	Cohen's d	0.000
Plank Time (Pre)	Student's t	-0.893	12.0	0.390	Cohen's d	-0.477
Plank Time (Post)	Student's t	-1.124	12.0	0.283	Cohen's d	-0.601

Note. $H_0: \mu_{ug} = \mu_{cg}$

IV. CONCLUSIONS

A 4-week stationary cycling program did not result in statistically significant improvements in muscle endurance, balance, or strength in obese adults. While the experimental group showed a slight trend in a positive direction with regard to outcomes, the length of the experience may not allow for observable changes. Children and young adults may need a longer or heavier program to see measurable benefits to muscle performance in these patients.

ACKNOWLEDGEMENTS

The author gratefully acknowledges Muhammad Amrun Haziq for supervision and Muhd Hafizi for implementation support, as well as the participants involved in this study.

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