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The Effect of a Selected Aerobic Exercise Program on Body Composition, Lipid Profile and Workability Index of Overweight and Obese Employees

Nahid Talebi*
Assistant Professor, Physical Education and Sport Sciences Department, Faculty of Humanities, Shahed University, Tehran, Iran

Seyd Zahra Haji Aqaei
M.Sc. in sport physiology, Physical Education and Sport Sciences Department, Faculty of Humanities, Shahed University, Tehran, Iran

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Abstract
Purpose: The purpose of this study was to examine the effect of 12 week a selected aerobic exercise program on body composition, lipid profile, and working ability of employees involved overweight and obese. **Method:** In this semi-experimental study with pre-test, post-test design and control group, 65 overweight employees were selected by purposive sampling method and randomly assigned to exercise and control groups. Then aerobic exercise program three sessions per week and each session 65-50 minutes, was performed for 12 weeks for the experimental group. The control group did not have such an intervention. Body composition indices, workability index and, lipid profile were measured before and after the training protocol for both groups. Data were analyzed using the covariance test (ANCOVA). **Results:** The results showed that aerobic exercise significantly reduced body composition indices, including (fat percentage, body mass index, and waist to pelvic ratio) and total cholesterol, triglyceride, low-density lipoprotein (LDL) the exercise group compared with the control group. The levels of high-density lipoprotein (HDL) and the ability to work index of the exercise group also increased ($P < 0.05$). **Conclusions:** The results indicated that aerobic exercise could improve body composition, lipid profile and workability index, and prevented contracting chronic diseases, reducing their ability to work, and retiring early in overweight and obese employees.

Keywords: Body composition, Lipid profile, Workability, Overweight, Obese

* **Author's e-mail:** talebi@shahed.ac.ir **(Corresponding Author)**;
zahra.hajiaghayi@gmail.com

INTRODUCTION

Changes in lifestyle and work have caused different societies to face a new dimension of health problems, namely overweight and obesity. The high body mass index is expanding globally, and the number of overweight and obese people is increasing every year (Gregg et al; 2017). Harmful and detrimental effects and consequences of individual and social overweight and obesity. It can be used as a risk factor for chronic diseases leading to increased disability and early retirement of employees. Body composition is an essential factor in health and fitness and is measured by various factors such as body mass index, waist to hip ratio, and body fat percentage.

Increasing body mass index can have negatively effect on employees' ability to work and increase the risk of accidents and occupational injuries, and the risk of death. On the other hand, obesity and overweight can reduce productivity and eventually lead to premature withdrawal People from work environments. In recent years, increasing the ability to work has been recognized to prevent the reduction of disability due to aging and early retirement (Joav et al; 2013).

Also, body composition is directly related to body fat, and overweight and obese people have an increased chance of having triglycerides and more decreased high-density lipoprotein than normal-weight people. Obesity and overweight are one of the most essential risk factors, for lipid disorders. Studies have shown that factors such as eating disorders, job stress and lack of exercise play an important role in causing overweight and obesity(Durstine et al; 2001). At least 8 million adults worldwide each year lose their lives due to overweight and obesity. A sedentary lifestyle with a higher risk of obesity, coronary heart disease, hypertension, high blood cholesterol, cancer, and musculoskeletal disorders are associated. Overweight and obesity are known as the fifth leading cause of death. Studies have shown that 60% of the world's population, at least they do not do the recommended amount of moderate-intensity exercise. And this is while two million deaths occur annually in the world due to sedentary living (Yu N, Ruan Y et al; 2017).

Studies have shown that participation in sports activities, especially aerobic sports activities, can be useful in preventing obesity and weight

control (Baghinzadeh et al; 2020, Alices et al; 2014, Rump et al; 2002, C.M;2008). In the study of changes in fat profile due to regular exercise, the positive effects of this intervention were reported in reducing the levels of total cholesterol, low-density lipoprotein as well as, triglycerides and cholesterol, and increasing the levels of high-density lipoprotein (Gwendoline Akwa et al; 2017).

Tawfiqi et al (2016), investigated the effect of a selected aerobic exercise program with a controlled diet on weight loss in obese men. The results showed a significant decrease in weight and body fat percentage of the subjects. Gharibi et al (2016), in the study of general health and job stress of employees of a construction company, showed that high body mass index, sedentary lifestyle and, job stress could have adverse effects be able to work on the index. Hojjati et al(2016), in a study showed a significant relationship between high body mass index, inactivity and the status of health-related indicators and teaching, having sufficient information encouraging employees to engage in appropriate physical activity also helps to improve anthropometric index . In another study, Villarreal et al (2017), reported weight loss during the twenty-six weeks of aerobic exercise, resistance, and a combination of both diet and weight loss in obese adults.

Leadgard et al (2017), examined 12 months of aerobic exercise on the work capacity, productivity, and stress levels of service workers. The results showed a significant increase in workers' workability after the intervention .The purpose of this study was to examine the effect of 12 week a selected aerobic exercise program on body composition, lipid profile, and working ability of employees involved overweight and obese.

METHOD

This research was a semi-experimental study with pre-test, post-test design, excremental and control group. The statistical population included all employees of Jaber Abne Hayan Pharmaceutical Company with a body mass index (BMI) of more than 25.

Sixty-five samples with an age range of 30 to 50 years were selected by purposeful sampling and randomly divided into two experimental group (n = 40) and control group (n = 25). Criteria for inclusion in the research design were: having a body mass index greater than 25, no cardiovascular disease, hypertension, osteoarthritis, respiratory

problems, and no movement problems or any clinical conditions that could limit exercise performance.

The tools of this study include:

1- Work Ability Index Questionnaire: workability questionnaire consistent questions to employee health, the number of diseases, work disorders, individual (mental-physical) ability, and work-related factors assess the individual's ability. The reliability of this questionnaire was conducted in 2014 by Mazloumi et al (2015), using two methods of test-retest and Cronbach's alpha to check the repeatability and the existence of internal agreement and consistency between the questions in the questionnaire. The results showed that the questionnaire has acceptable internal consistency and has good repeatability.

2- Aerobic exercise protocol: Aerobic exercise program was performed for twelve weeks, three sessions per week, and each session for 50 to 65 minutes including (warm-up, main exercises, and cooling-down). The duration of sports activity, taking into account the progress of the subjects, until the end of the twelfth session, gradually increased to 75 minutes. The program consisted of a 15-minute warm-up session with a variety of walking and jogging, flexibility, and jumping exercises, 35 minutes of essential training with of running and aerobic exercise, and a cooling-down session with stretching and flexibility exercises for 10 minutes.

First, the purpose of the research, data collection method, and necessary instructions regarding the questions of health history questionnaires and work capacity index were fully expressed. Than questionnaires complete the (health history, and workability index) related to the pre-test, one day before the start of the training protocol. Body composition index (height and weight), mass index Body weight (kg / m2), body fat percentage (from the Jackson, and Pollack equation) was measured. The subcutaneous layers of the right side of the body were measured in the triceps of the arm, the quadriceps of the hip and, the supraspinatus by a HARPOON Caliper and the waist-to-pelvis ratio was measured using a tape measure. To measure triglyceride levels, total cholesterol, low-density lipoprotein, high-density lipoprotein blood samples were taken from all subjects after 14-12 hours of fasting. At the end of the aerobic exercise protocol, post-test, the same pre-test, was taken from both groups (experimental and

control). To analyze data, the Kolmogorov-Smirnov test (check for normality of data) and, covariance test (comparison between groups) was used.

RESULTS

Table and chart 1 shows the descriptive findings related to body composition indices, fat profile, and ability to work.

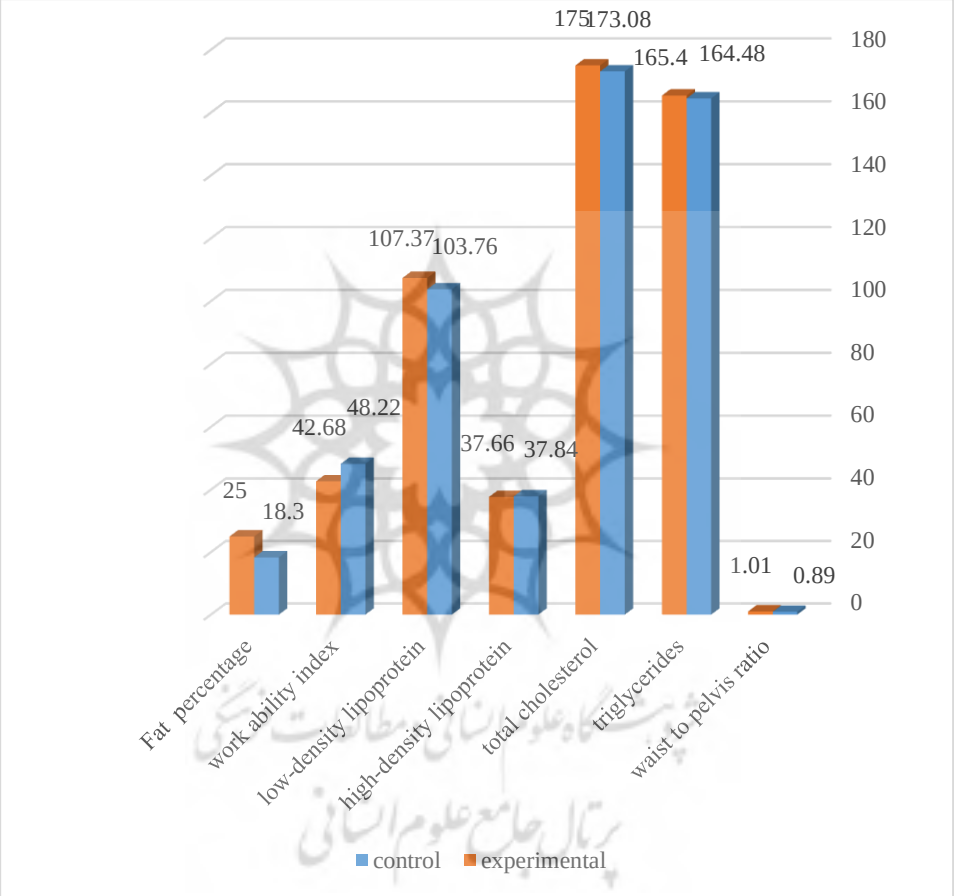

Chart 1. Comparing mean of fat profile and work ability indices between control and experimental group

The highest mean difference between the experimental and control groups was observed in the fat percentage index. In 6 index, the mean value of the control group was more than the experimental group, and in the two index, work ability and high-density lipoprotein, the

mean value of the experimental group was higher than the control group.

Table 1: Descriptive Findings related to Body Composition Indices, Fat Profile and Work Ability

Variables	Group	N	Mean	S D
Waist to Pelvis Ratio	Control group	25	1.01	0.088
	Experimental group	40	0.89	0.110
Body Mass Index	Control group	25	28.13	3.075
	Experimental group	40	24.70	4.511
Triglycerides	Control group	25	165.40	74.0146
	Experimental group	40	164.48	86.546
Total Cholesterol	Control group	25	175.00	30.15
	Experimental group	40	173.08	4.503
High-Density Lipoprotein HDL	Control group	25	37.66	20.923
	Experimental group	40	37.84	16.591
Low-Density Lipoprotein LDL	Control group	25	107.37	33.803
	Experimental group	40	103.76	38.064
Work Ability Index WAI	Control group	25	42.68	4.069
	Experimental group	40	48.22	0.83166
Fat Percentage	Control group	25	25.00	6.531
	Experimental group	40	18.30	7.442

Table 2: ANCOVA Analysis Findings Body Composition Indices, Fat Profile and Work Ability

Variables		F	P	Eta2
Waist - pelvis ratio	Pre-test	0.56	.45	.001
	group	0.20	.00	.226
Body Mass Index (Kg/m2)	Pre-test	0.35	.55	.006
	group	9.79	.00	.136
Triglycerides	Pre-test	11.32	.15	.154
	group	.001	.96	.000
Total cholesterol	Pre-test	4.16	.04	.063
	group	.10	.75	.002
High-density lipoprotein	Pre-test	.006	.94	.000
	group			
Low-density lipoprotein	Pre-test	2.49	.119	.039
	group	.04	.839	.001
Work ability index	Pre-test	33.06	.000	.348
	group	109.45	.000	.638
Fat percentage	Pre-test	12.009	.001	.162
	group			

The results of table 2 show that after controlling for the pre-test effect, mean scores of the exercise group compared to the control group in the body composition (variable waist Pelvis ratio, body mass index and fat percentage) fat profile (Triglycerides, total cholesterol, low-density lipoprotein) were significantly reduced. Also, in the high-density lipoprotein levels, and workability index scores have increased significantly.

DISCUSSION

The overall purpose of this study was to investigate the effect of an aerobic exercise program on changes in body composition, lipid profile, and workability of overweight, and obese employees. The results showed that this intervention is the body composition components (waist to pelvis ratio, body mass index, and body fat percentage) in the

exercise group significantly reduces. In contrast this decrease was not observed in the control group. The results are consistent with the findings of Tawfiqi et al (2016),, Banaifar et al (2013), Haghighi et al (2015), Piris Sila et al (2018), Arsalan et al (2017), Dorota et al(2015), is aerobic exercise improves oxygen delivery to the muscles by activating various adaptive mechanisms. As a result, the percentage of body fat gradually decreases. Increasing fat oxidation capability by increasing beta- oxidation enzymes and Krebs cycle following aerobic exercise is one of the most essential reasons for improving the body composition of overweight and obese people. Abdi et al (2014) also showed that factors related to body composition are improved by doing aerobic exercise.

The results of this study show that aerobic exercise had a significant effect on the mean triglyceride levels, total cholesterol, HDL high-density lipoprotein, and low-density LDL lipoprotein in the exercise group compared to the control group. Rahmani Ghobadi et al (2014), show that Triglyceride, cholesterol, VLDL in the exercise group immediately after exercise, had a significant decrease compared to the control group.

Aerobic exercise program reduces low-density lipoprotein, total cholesterol, triglyceride, and increases high-density lipoprotein by increasing lipolysis of triglycerides and increasing fat oxidation, resulting in energy conversion in the body. Studies have shown that increasing the amount of total cholesterol and low lipoprotein Low density and reducing high- density lipoprotein are the leading cardiovascular diseases. Studies have shown a decrease in triglyceride levels immediately after exercise, which lasts up to three days. Aerobic exercise may be able to increase the effects of lipoproteins can be effective in improving cardiovascular disease (Tomar et al; 2015, Ouerghi et al; 2014).

Also about the effect of the intervention the aerobic exercise program on the workability index can be said to be consistent with some of the findings of researchers, and several studies support the current findings, which can be found in the studies of Tomar et al (2016), Ketonen et al (2014), Kolten et al (2015), Saed Panah et al (2015), and Mohammadzadeh et al (2015) Cited.

The ability to work can be affected by various factors, including the physical and psychosocial factors, occupation, physical and mental power of people and, lifestyle. Many researchers have a higher capacity to maximize oxygen consumption with the ability to work in women with higher mental demands on jobs, and men are associated with a higher physical demands. Research has shown that people who receive an aerobic exercise program significantly increase their ability to do work and, their job needs, both physical and, mental, improve. Also, the number of diseases and statistics of work-related injuries significantly reduced. Having adequate physical fitness and strength can prevent problems and injuries at work and work disorders due to illness and reduce sick leave. Also, avoid the risk of early retirement.

CONCLUSIONS

Overall, according to the findings of this study and other studies that have been done in this field, it seems that aerobic exercise can improve lipid profile (lower triglycerides, lower cholesterol, lower low-density lipoprotein and increase Dense lipoprotein) and decreased body mass index (Reducing the waist to pelvis ratio, reducing the percentage of fat) and increase the ability of employees to work. Therefore, it is suggested that promoting staff exercise by emphasizing regular aerobic exercise will improve health and well-being and consequently increase staff work efficiency and minimize frequent sick leave absences, reduced workability, and early retirement.

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