

Research Paper

Effects of 10-Week Concurrent Training on Insulin Resistance and the Serum Levels of Vaspin and Visfatin in Overweight Females



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Concurrent training, Insulin resistance, Vaspin, Visfatin, Overweight females

ABSTRACT

Aims The present study investigated the effects of a 10-week concurrent training on the serum levels of vaspin and visfatin in overweight females.

Methods & Materials Twenty-four over-weight females from Kerman City, Iran (Mean±SD age: 11.23±0.62 years; Mean±SD weight: 64.83±2.70kg; Mean±SD BMI: 27.97±0.47 kg/m²) were randomly assigned into the control and concurrent training groups. The intervention group performed the training protocol as follows: endurance training: 65-85% of Vo₂ max for 20 minutes per session, and resistance training: 50-60% of One Repetition Maximum (1RM) for 30 minutes per session and 3 days a week for 10 weeks. Fasting plasma vaspin, visfatin, and insulin levels were measured by ELISA method. To analyze the data, Analysis of Covariance (ANCOVA) was used.

Findings Performing 10 weeks of concurrent training significantly decreased vaspin and visfatin plasma levels, and insulin resistance resting levels (P≤0.05); however, there was no significant decrease in glucose levels.

Conclusion Concurrent training can decrease insulin resistance, probably by reducing vaspin and visfatin in overweight females. Therefore, it is suggested that overweight females use concurrent training to improve insulin sensitivity and prevent metabolic diseases.

Extended Abstract

1. Introduction

Overweight and obesity in children and adolescents are closely linked to cardiovascular disease, asthma, mental disorders, hypertension, and lipid disorders. The prevalence of obesity and overweight has increased in adolescents, especially among females. Moreover, the release of adi-

pokines by adipose tissue may affect insulin resistance and sensitivity through inflammatory factors. Additionally, the potential impact of concurrent training on body composition could affect adipokines levels. Therefore, it was necessary to conduct this study.

Barzegari and Amouzad Mahdirezaji [1], and Askari et al. [2] have previously investigated this research area. The present study aimed to investigate the effects of a 10-week concurrent training on the serum levels of vaspin and visfatin in overweight females.

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2. Methods

This was a quasi-experimental study. The study samples were 24 overweight female students living in Kerman City, Iran, in 2016. The samples were randomly assigned to the training (n=12) and control (n=12) groups. The serum level of insulin and the blood glucose were measured by ELISA kit (MercoDIA, Sweden) and calorimetric kit (Pars Azmon, Iran), respectively, and according to the manufacturers' instructions. Moreover, for measuring the serum levels of vaspin and visfatin, the ELISA kit (USCN Business Co.) was applied.

3. Results

The obtained data suggested that a 10-week concurrent training program significantly decreased the plasma levels of vaspin and visfatin as well as insulin resistance. The collected results revealed no significant decrease in fasting blood glucose level (Tables 1, 2 & 3).

4. Discussion

Concurrent training demonstrated a regulatory effect on vaspin levels and decreased those. Barzegari and Amouzad Mahdizeji [1] argued that an 8-week resistance training

significantly reduced the plasma level of vaspin. In addition, they reported a significant decrease in cholesterol level and a significant increase in high-density lipoprotein cholesterol level. In the present study, it was also observed that performing 10 weeks of combined training significantly decreased the vaspin level. The study findings of Askari et al. were in contrast with that of the present study [2]. We conducted 10 weeks of concurrent training; however, their studied subjects completed 12 weeks of concurrent training. The data obtained from both investigations suggested the prominent role of concurrent training, compared to other exercise methods. For instance, endurance training reduced inflammatory adipokines, like vaspin and visfatin, and modulated insulin resistance [2].

It is suggested that future studies precisely evaluate the investigated variables together with their receptors in target tissues and adipokines releasing tissues in concurrent training programs. A limitation of the present study was disregarding the measurement of variables in the tissue.

5. Conclusion

Concurrent training program reduced insulin resistance by modulating the plasma levels of vaspin and visfatin in overweight females. As a result, using this type of

Table 1. The demographic data of the study participants (n=12)

Group	Mean±SD			
	Age, y	Height, cm	BMI, kg/m ²	
			Pre-test	Post-test
Control	11.4±9	153.3±3.2	28.12±0.5	28±0.4
Exercise	11.1±5	151±2.7	27.83±0.4	26.9±0.5

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Table 2. Serum levels of vaspin, visfatin, insulin, glucose, and insulin resistance of study participants (n=12)

Groups		Mean±SD				
		Vaspin, ng/mL	Visfatin, ng/mL	Insulin, mU/l	Glucose, mg/dL	Insulin Resistance (HOMA-IR Score)
Control	Pre-test	1.6±0.3	2.8±0.5	15.2±3.2	93.5±7.9	3.4±0.7
	Post-test	1.7±0.3	2.8±0.5	15.3±2.9	91.1±3.9	3.4±0.6
Exercise	Pre-test	1.6±0.3	3±0.4	16±2.9	89.4±6.1	3.6±0.7
	Post-test	1.2±0.3	2.3±0.5	10.1±1.9	85.6±4.9	2.3±0.5

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Table 3. ANCOVA results for comparing vaspin, visfatin, insulin, glucose, and insulin resistance in the study participants

Variabels	Source	Sum of Squares	F	P
Vaspin	Corrected model	1.567	106.488	0.000
	Intercept	1.658	112.712	0.000
	group	1.587	126.197	0.000
	Error	0.015		
Visfatin	Corrected model	2.504	15.314	0.000
	Intercept	2.847	17.416	0.000
	Group	3.092	18.911	0.000
	Error	0.163		
Insulin resistance	Corrected model	6.795	162.94	0.000
	Intercept	5.584	133.910	0.000
	Group	10.167	243.799	0.000
	Error	0.042		

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exercise may improve sensitivity to insulin and prevent metabolic diseases.

Ethical Considerations

Compliance with ethical guidelines

This a registered clinical trial (Registration Code: IRCT20180708040399N2) with ethical approval (Ethical Code: IR.KMU.REC.1394.407). All ethical principles including informed consent, confidentiality, non-invasion of privacy, protection of subjects from pressure and harm and physical and psychological hazards, were fully respected.

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Authors' contributions

Conceptualization (contribution rate= 85%), article writing (65%), formal analysis (75%) and methodology (50%) by Abdolreza Kazemi; Conceptualization (contribution rate=15%), article writing (35%), formal analysis (25%) and methodology (50%) by Sareh Mahalati.

Conflicts of interest

The authors declared no conflict of interest.