

Examination Of The Relationship Between Aerobic Capacity And Body Composition Of Turkish Folk Dancers

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ABSTRACT

The aim of this study is to examine the relationship between aerobic capacity and body mass index of Turkish folk dancers. 14 female and 16 male students in Mugla Sıtkı Koçman University participated in this study. Height, weight, body composition was measured and 20 meter shuttle run test was applied. Collected data was analyzed in SPSS 16.0. Mann Whitney U test was used to analyze differences between male and female Turkish folk dancers in terms of variables. Pearson Product Correlation Test was used to analyze the relationship between variables. Significance level was accepted as $p < 0.05$. Consequently, significant differences were found between male and female dancers in terms of height, weight, body mass index, body fat percentage ($p < 0.01$). No significant correlation was found between aerobic capacity, body mass index and body fat percentage of Turkish folk dancers ($p > 0.05$).

Keywords: Turkish folk dances, aerobic capacity, body composition.

INTRODUCTION

Oreb et al., (2011) stated that folk dance is an unknown field. Because of its' noncompetitive nature, performers have the training process in which they are adapted to be prepared for performances and the development of motor skills is neglected.

Aerobic capacity is defined as maximal oxygen used by one's body. Reaching oxygen consumption level comprises 2 – 3 minutes of exercise duration. More oxygen is needed to meet energy need in this duration (Günay and Yüce, 2008). Birch et al., (2005) defined maximal oxygen consumption as the maximal rates that body consume oxygen during physical activity at sea level. In another definition, Whyte (2006) stated that the highest rate at which oxygen could be extracted, transported and consumed in the process of ATP synthesis was maximal oxygen uptake (VO_{2max}). Jones et al., (2004) suggested that the transport of oxygen from the inspired air to the muscles and its role in oxidative metabolism involves a series of events. They stated that these events could be divided as delivery and utilization.

Aerobic power, VO_2 max and aerobic capacity are some terms that used to define maximal oxygen consumption in literature. Kenny et al., (2011) defined aerobic power as the rate of energy by cellular metabolic processes that depend upon the availability and involvement of oxygen. According to their statement, maximal aerobic power refers to the maximal capacity for aerobic resynthesizes of ATP, and this statement is consistent with the definition of Whyte (2006).

Whyte (2006) suggested that precision was more important issue than accuracy, and one test was better than two where athletes had limited times. Measurement of maximal oxygen consumption has been seen an important issue in literature. According to Kenny et al., (2011), abbreviated VO_{2max} is one of the keystone measurements in exercise physiology. It was conceptualized as an individual's maximal oxygen uptake or maximal aerobic capacity. Maximal volume of oxygen that an individual can utilize during tiring and intensive aerobic exercise is an important physiological measurement. VO_{2max} is measured in liters per minute or L/min.

Body composition consists of fat, bone, muscle cells, other organic substance and extracellular plasma. Factors affecting body composition that is important for human life can be categorized age, gender, muscle, physical activity, diseases and nutrition. Body fat percentage of adult males constitutes 15% - 17% of body weight while body fat percentage of adult females constitutes 25% of body weight. Fat cells are not used to produce ATP; basic aim of fat

cells is to store lipid. Surplus body fat is detrimental for performance (Zorba and Saygin, 2013; Günay, Tamer and Cicioğlu, 2006).

The aim of this study was to examine the relationship between aerobic capacity and body mass index of Turkish folk dancers.

METHOD

14 female and 16 male students in Mugla Sıtkı Koçman University participated in this study. Height, weight, BMI was measured and 20 meter shuttle run test was applied.

Height and weight measurement: Electronic weighbridge in the sensitivity of 0.1 kg was used to measure weight; digital height measurement tool in the sensitivity of 0.01 cm was used to measure height.

Body Mass Index (BMI): The following formula was used to measure body mass index (Tamer, 2000; Zorba and Saygin, 2013).

$$\text{Body Mass Index (BMI)} = \text{Weight} / \text{Height (m)}^2$$

20 Meter Shuttle Run Test: A voice record in which signal range increased 0.5 km/s at every minute was used for this test. Athletes were asked to touch the line at the end of 20 meter at every signal. Test was ended for the athletes who could not touch the lines in front of 20-meter lines twice. The results reported as ml/kg/min (Tamer, 2000).

Body Composition Measurements: Skinfold caliper was used to measure body fat percentage. Durnning-Womersly and Siri formulas were used for calculation after measurement of four different parts (Biceps, triceps, suprailiac ve subscapula) of subjects' body while they stood up (Özer,2001; Tamer,2000; Zorba and Saygin, 2013).

Durning-Womersley formula:

Siri Formula:

BD= 1.1620 – 0.0630 x X (Male 17-19 year-old)	Fat% = (4.95/BD - 4.50) x 100
BD= 1.1631 – 0.0632 x X (Male 20-29 year-old)	bi = biceps skinfold thickness
BD= 1.1422 – 0.0544 x X (Male 30-39 year-old)	tr = triceps skinfold thickness
BD=Body Density	si = suprailiac skinfold thickness
Log X = (bi+tr+ss+si)	sc = subscapula skinfold thickness

Statistical Analysis: Collected data was analyzed in SPSS 16.0. Mann Whitney U test was used to analyze differences between male and female Turkish folk dancers in terms of variables. Pearson Correlation Test was used to analyze the relationship between variables. Significance level was accepted as p<0.05.

RESULTS

The aim of this study is to examine the relationship between aerobic capacity and body mass index of Turkish folk dancers. 30 Turkish folk dancers participated in the tests. All the values were examined and displayed in tables.

Table1. Descriptive analysis of Turkish folk dancers

Variables	Female (n=14)		Male (n=16)		Z	P
	X	S.D.	X	S.D.		
Age (years)	21.64	1.59	22.06	2.08	-0.613	>0.05
Height (cm)	161.21	0.57	174.12	0.34	-4.546	<0.01*
Body Weight (kg)	58.07	4.81	76.81	3.54	-4.663	<0.01*
Body Mass Index (kg/m ²)	22.36	1.84	25.35	1.41	-3.619	<0.01*
Aerobic capacity (ml.kg / min)	35.94	2.03	48.26	3.94	-4.661	<0.01*
Body Fat Percentage (%)	19.49	1.71	9.6	1.2	-4.802	<0.01*
Lean Body Weight (kg)	46.81	4.52	69.14	3.37	-4.663	<0.01*

Fat Weight (kg)	11.26	0.92	7.67	1.27	-4.471	<0.01*
Biceps skinfold thickness (mm)	4.65	0.51	4.59	0.56	-0.438	>0.05
Triceps skinfold thickness (mm)	9.55	1.23	6.49	0.59	-4.661	<0.01*
Suprailiac skinfold thickness (mm)	10.17	1.68	7.38	0.73	-4.472	<0.01*
Subscapularis skinfold thickness (mm)	6.22	0.59	4.79	0.97	-3.309	<0.01*

*P<0.05

Significant differences were found between male and female folk dancers in terms of height, body weight, body mass index, aerobic capacity, body fat percentage, lean body weight, fat weight, triceps, supscapula and suprailiac skinfold thickness ($p<0.01$). No significant differences were found between age and biceps skinfold thickness ($p>0.05$).

Table 2. Correlation analysis of aerobic capacity, body fat percentage and BMI of female Turkish folk dancers

Values	Aerobic Capacity (lt)	BMI	Body Fat Percentage (%)
Aerobic Capacity (lt)	—	,183	,001
	—	,531	,999
		14	14
BMI	,183	—	,067
	,531	—	,820
	14		14
Body Fat Percentage (%)	,001	,067	—
	,999	,820	—
	14	14	

No significant correlations were found between aerobic capacity, body fat percentage and BMI of female Turkish folk dancers ($p>0.05$).

Table 3. Correlation analysis of aerobic capacity, body fat percentage and BMI of male Turkish folk dancers

Values	Aerobic Capacity (lt)	BMI	Body Fat Percentage (%)
Aerobic Capacity (lt)	—	,302	-,028
	—	,255	,918
		16	16
BMI	,302	—	,304
	,255	—	,253
	16		16
Body Fat Percentage (%)	-,028	,304	—
	,918	,253	—
	16	16	

No significant correlations were found between aerobic capacity, body fat percentage and BMI of male Turkish folk dancers ($p>0.05$).

DISCUSSION AND CONCLUSION

The aim of this study is to examine the relationship between aerobic capacity and body mass index of Turkish folk dancers. Age, height, body weight and BMI means of female folk dancers were found to be 21.64 ± 1.59 , 161.21 ± 0.57 cm, 58.07 ± 4.81 kg, 22.36 ± 1.84 kg/m², respectively. Age, height, body weight and BMI means of male folk dancers were found to be 22.06 ± 2.08 , 174.12 ± 0.34 cm, 76.81 ± 3.54 kg, 25.35 ± 1.41 kg/m², respectively (Table, 1).

Macura et al. (2007) found BMI means to be $23.9 \pm 1.7 \text{ kg/m}^2$ in male folk dancers having height means of $185.96 \pm 6.15 \text{ cm}$ and weight means of $82.69 \pm 7.96 \text{ kg}$, and BMI means to be $19.3 \pm 1.3 \text{ kg/m}^2$ in male folk dancers having height means of $169.78 \pm 5.0 \text{ cm}$ and weight means of $55.61 \pm 4.91 \text{ kg}$. Bozkuş (2013) found height, weight and BMI means of folk dancers having age means of 20.6 ± 2.03 in university to be $171.9 \pm 7.4 \text{ cm}$, $61.7 \pm 9.5 \text{ kg}$ and $20.9 \pm 2.3 \text{ kg/m}^2$, respectively. Ocağ and Tortop (2013) found BMI means to be $21.6 \pm 2.16 \text{ kg/m}^2$ in female folk dancers having height means of $162.36 \pm 5.38 \text{ cm}$, weight means of $56.85 \pm 6.07 \text{ kg}$ and age means of 20.45 ± 1.22 . Karacabey et al., (2008) found weight and height means of male Turkish folk dancers who do dance of Halay region and have age mean of 19.25 ± 2.34 and training age mean of 9.8 ± 2.9 to be $72.3 \pm 6.8 \text{ kg}$ and $175.0 \pm 0.5 \text{ cm}$, respectively and weight and height means of male Turkish folk dancers who do dance of Horon region and have age mean of 20.12 ± 1.86 and training age mean of 9.4 ± 2.2 to be $67,6 \pm 1,9 \text{ kg}$ and $176,0 \pm 0,2 \text{ cm}$, respectively.

In this study, aerobic capacity of female Turkish folk dancers was found to be $35.94 \pm 2.03 \text{ ml.kg/min}$, body fat percentage was found to be $19.49\% \pm 1.71$. Aerobic capacity of male Turkish folk dancers was found to be $48.26 \pm 3.94 \text{ ml.kg/min}$, body fat percentage was found to be 9.6 ± 1.2 (see Table 1). Ünveren (2005) found aerobic capacity of female Turkish dancers, who have age mean of 23.3 ± 2.61 and have danced for 7.1 ± 2.87 years, to be $37.2 \pm 5.84 \text{ ml.kg/min}$. In the same study, Ünveren found aerobic capacity of male Turkish dancers, who have age mean of 22.4 ± 1.93 and have danced for 8.5 ± 4.84 years, to be $48.6 \pm 5.16 \text{ ml.kg/min}$. Maciejczyk and Fec (2013) found aerobic capacity ($\text{VO}_{2\text{max}}$) of female folk dancers to be $43.43 \pm 3.81 \text{ ml.kg/min}$ and male folk dancers to be $51.8 \pm 7.39 \text{ ml.kg/min}$. Macura et al. (2007) found aerobic capacity ($\text{VO}_{2\text{max}}$) of female folk dancers to be $42.15 \pm 4.03 \text{ ml.kg/min}$ and male folk dancers to be $45.34 \pm 4.11 \text{ ml.kg/min}$. Kaya (2011) found aerobic capacity of folk dancers doing Zeybek dance to be $38.87 \pm 6.21 \text{ ml.kg/min}$, dancers doing Horon dance to be $40.27 \pm 8.51 \text{ ml.kg/min}$. Ocağ and Tortop (2013) found aerobic capacity of female folk dancers to be $28.55 \pm 5.99 \text{ ml.kg/min}$. Macura et al (2007) found body fat percentage of male and female folk dancers to be $18.15\% \pm 3.07$ and $24.44\% \pm 2.14$, respectively. In the study in which zeybek and horon dancers participate, Kaya (2011) found body fat percentage of zeybek and horon dancer to be $15.64\% \pm 4.64$ and $11.68\% \pm 4.16$, respectively. Bozkuş (2013) found body fat percentage of Turkish folk dancers in university to be $10.1\% \pm 4.1$. Ünveren (2006) found body fat percentage of Turkish folk dancers to be $11.22\% \pm 1.2$.

Agbuga et al (2007) found negative correlation between body mass index and aerobic capacity (20 meter shuttle run). Afolabi and Akanbi (2013) suggested that increase in aerobic capacity could result in decrease in body mass index. Gerek (2007) found that there was significant difference between male Turkish folk dances and students having sport education in terms of $\text{VO}_{2\text{max}}$ while females showed no differences. There studies in literature in which negative correlations were found between aerobic capacity and body mass index (Lloyd et al, 2003; Nassis et al, 2005; Stratton et al., 2007; Kamtsios, 2008; Agiovlasis et al, 2011; Héroux et al, 2013). There are different results examining correlation between body mass index, aerobic capacity and body composition in literature. In our study, there were no significant differences between these variables.

Consequently, significant differences were found between male and female dancers in terms of height, weight, BMI, body fat percentage ($p < 0.01$). No significant correlation was found between aerobic capacity, BMI and body fat percentage of Turkish folk dancers ($p > 0.05$). Although no significant relations were found between aerobic capacity and body composition of Turkish folk dancers, it is important to consider these properties for Turkish folk dancers. It can be stated that these aerobic capacity and body composition have important place in Turkish folk dances because Turkish folk dances have all the characteristics of a physical activity. It can be thought that relationships between physical fitness properties of Turkish folk dancers should be examined to reveal more information about benefits of Turkish folk dances. Bigger sample size can involve in future studies.

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