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BODY PROPORTIONS OF TURKISH PHYSICAL EDUCATION AND SPORTS STUDENTS

INTRODUCTION

The close relationship between health condition and body shape has been known for a long time (Muñoz-Cachón et al. 2007). Since body type can be affected by genetic factors, nutritional intake, socio-economic conditions, age, gender etc., it has the possibility to give valuable information about the societies for researchers (Muñoz-Cachón et al. 2007).

One of the most important health issues of modern societies is obesity and worst of all; it seems to affect children as well. As much as 13-14% of children in USA are determined as obese, while in England it is 10-17%. In 2001, in an obesity research where 6 countries were involved (Brazil, Great Britain, Hong Kong, Holland, Singapore and USA) it was found that children aged 4-11 have obesity rate of 2-3%. Between the years of 1984 and 1994, the percent of overweight children increased 50% (Jebb et al., 2003).

The best method for preventing and stopping this fast increase in obesity is the combination of regular physical exercise and a balanced diet (Nakeeb et al., 2007). From this perspective, the importance of physical exercise in primary/secondary and high school education and the importance of teachers who will organize these exercises is tremendous.

With that in mind, the purpose of this study is to assess the body proportion of Turkish physical education and sports students who are going to be future teachers of children and young people.

MATERIALS AND METHOD

Subjects

258 male students from The School of Physical Education and Sports in Ege University who exercises recreationally participated in this study (age: 22.40 ± 2.75 years, height: 178.67 ± 9.43 cm., body weight: 73.44 ± 13.64 kg.).

Participants written consent was obtained and the purpose of the study was explained. All of the measurements were made by the same group of people during the same day in Ege University School of Physical Education and Sports Performance Lab.

Weight and height measurement: Electronic scales (Angel, 150 MA, Istanbul/Turkey) used in determining weight categories and height of the athletes before official competitions were used.

Body fat percentage measurement: Holtain 0.2 mm sensitive skin fold calliper was used to measure body fat percentage (Holtain Ltd, Crosswell, Crymych, UK). Skin fold thickness was measured on the following sites: triceps brachii, biceps brachii, subscapular, suprailiac, chest, thigh, calves, and abdomen. Yuhazs formula was used to assess body fat percentage

Width measurements: were made with a sliding calliper (Holtain HLT-100, UK)

Girth measurements: Made with a non-flexible tape measure.

Statistical analysis: SPSS for Windows (ver. 17.0) was used to calculate means and standard deviation of the obtained data.

RESULTS

In Table 1 Weight, Height, Weight to Hip Ratio (WHR), Ponderal Index (RPI) and Body Fat percentage is shown. In Table 2 BMI (body mass index), Cornique index, Monourier Index, Acromioiliak index, Martine index, Biacromial index and hip Index values are shown. Results are as follows: BMI 22.86 ± 3.05 (kg/m²), Body fat percentage 14.43 ± 4.41 (%), Cormique index 51.51 ± 1.58 (%), Monourier index 94.31 ± 6.10 (%), Acromio-iliac index 63.88 ± 6.61 (%), Martine Index 6.11 ± 0.48 (%), Biacromial index 22.32 ± 1.86 (%) and Hip index 13.89 ± 0.97 (%).

Table 1. Average Values For Athletes' Body Proportions

Variables	Mean±SD (n=258)	Evaluation
Height (cm.)	178.67±9.43	
Body Weight (kg.)	73.44±13.64	
WHR (%)	0.79±0.05	Low risk
RPI (cm/kg ^{0.333})	42.89±1.77	Optimal
% Fat	14.43±4.41	Optimal

Table 2. Body Proportion Indexes

Index	Calculation Method	Mean±SD (n=258)	Evaluation
Body Mass Index (kg/m ²)	(weight/height ²)	22.86±3.05	Normal
Cormique Index (%)	(Sitting height/ height).100	51.51±1.58	Mid-Trunk
Monourier Index (%)	(Height-sitting height/sitting height).100	94.31±6.10	Sub macroskelia
Acromio-iliac Index (%)	(Biliac width/Biacromial width).100	63.88±27.13	Wide shoulders
Martine Index (%)	(height/chest width)	6.11±0.48	Narrow upper body
Biacromial Index (%)	(Biacromial width/height).100	22.32±1.86	Normal
Hip Index (%)	(Biliac width/height).100	13.89±0.97	Narrow hips

DISCUSSION

Increased BMI, RPI and WHR are the indicators of diseases, such as coronary heart disease or diabetes mellitus. Although it has become a custom to see high values of the above-mentioned criteria in modern societies, it is surprising to see the increasing values for athletes as well. For instance, a study by Joyce et al. (Joyce and Hecth 2005) found that ¼ of American Football players have 2nd degree obesity.

In a wide research conducted by International Health Behavior in 2006, including 22 countries, covering 18,152 university students (male: 8,115, female: 10,037) BMI values according to countries were: Belgium 22.1 kg/m², England 22.7 kg/m², France

21.9 kg/m², Germany 22.8 kg/m², USA 24.3 kg/m², Bulgaria 23.1 kg/m², Greece 23.1 kg/m², Italy 22.1 kg/m² (Wardle et al., 2006). In another study on 203 male soccer players in Spain, aged 19, the BMI value was 22.96 ± 1.2 kg/m² (Gil et al., 2010). In a study conducted in Turkey, on 153 males having different levels of physical activity, BMI values were as follows: American football players 27.76 ± 5.18 kg/m², volleyball players 24.49 ± 2.90 kg/m², basketball players 24.70 ± 2.65 kg/m², football players 23.37 ± 2.78 kg/m², and for students who do not exercise regularly 23.42 ± 3.62 kg/m² (Pelin et al., 2009).

Another criterion for physical fitness is the amount of subcutaneous fat tissue. Subcutaneous fat tissue value (%) changes according to gender and sport. Sınırkavak et al. (2004) found the subcutaneous fat tissue value of male physical education and sports students to be 11.80 ± 0.55 (Sınırkavak et al., 2004). In a study conducted by Akin et al. with 5 different sports including 100 male athletes, subcutaneous fat tissue values for different sports were as follows: wrestling 13.06%, soccer 15.1%, weight lifting 18.2%, handball 20.8% and taekwondo 16.8% (Akin et al., 2004).

It is notable that although there are numerous studies assessing physical fitness according to anthropometric attributes, there are not many studies concerning body proportions for physical fitness. In body proportion studies handball players were found to have wide shoulders, narrow hips and mid-sized trunk, whereas soccer players had long body and narrow hips (Çakıroğlu et al., 2002; Çıkmaz et al., 2005).

In conclusion, participants in our study were found to have normal BMI, RPI, WHR and percentage of fat values. According to the body indexes, they had sub-macroskelia, mid-sized trunks, wide shoulders and narrow upper body and hips.

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ABSTRACT

The aim of this study was to assess body proportions of Turkish physical education and sports students, who will instruct children and young people in the field of physical education in the near future. In this study, 258 male physical education and sports students who exercise on a recreational level (age: 22.40 ± 2.75 years, height: 178.67 ± 9.43 cm, body weight: 73.44 ± 13.64 kg) were assessed in terms of BMI (Body Mass Index), RPI (Ponderal Index), WHR (Waist to Hip Ratio), percentage of body fat, Cormique index, Monourier index, Acromio-iliac index, Martine index, Biacromial index and hip index. The results were as follows: BMI: 22.86 ± 2.66 (kg/m^2), RPI: 42.89 ± 1.77 ($\text{cm}/\text{kg}^{0.333}$), WHR: 0.79 ± 0.05 (%), body fat percentage 14.43 ± 4.41 (%), Cormique index 51.51 ± 1.58 (%), Monourier index 94.31 ± 6.10 (%), Acromio-iliac index 63.88 ± 6.61 (%), Martine index 6.11 ± 0.48 (%), Biacromial index 22.32 ± 1.86 (%) and hip index 13.89 ± 0.97 (%). Although the subjects were found to be normal- healthy individuals in terms of BMI, WHR and percentage of body fat, they were also assessed as having mid-trunk, sub-macroskelia, narrow upper body and narrow hips.

Key words: *Physical education and sports students, anthropometric attributes, obesity, body proportions*