Secular Trend of Growth in Height, Weight and Body Mass Index in Young Romanians Aged 18-24 Years

Oprişescu Ioanaa, Gherghel Carmen Lilianaa*, Minculescu Cozetaaa

*National University of Physical Education and Sport, Faculty of Kinetotherapy, Constantin Noica St.140, 060057, Bucharest, Romania

Abstract

The secular trend in height growth recorded in recent years is declining in most Western European countries, while the weight increase trend is becoming more obvious. The present research aims to analyze the trend of growth in height, weight and body mass index (BMI) in the young people participating in the admission examination to the National University of Physical Education and Sport (NUPES) in Bucharest at a distance of 12 years in time. Anthropometric measurements (height, weight, BMI) were used and performed within the medical examination that is part of the admission requirements in 1998 and 2010. Within the research a total of 440 young people were evaluated, ranging from 18-24 years of age; 247 in 1998, and 193 in 2010.

Keywords: secular trend, height, weight, BMI, physical activities;

1. Introduction

The secular trend of growth compares changes in anthropometric parameters and sexual maturation rhythm that occur from one generation compared to the previous one. The secular trend has become an important biological indicator that is used in auxology and for assessing the degree of socio-economic development of a country or region, providing important information for public health policies orientation (Komlos, 2009).

Today, it’s considered that the term 'secular trend' – suggesting mainly an ascending trend – should be replaced by the secular growth change, as body size and maturation rate may grow, decline or remain unchanged (Malina, 2004). With the trend related to height values, at certain ages there occur co-related changes in weight.

* Corresponding author. Tel.: +0-000-000-0000 ; fax: +0-000-000-0000 .
E-mail address: carmen_gherghel@yahoo.com
Generally, in the last decades, stature tends to stabilize, however weight continues to grow, overweight taking pandemic forms in developed countries (Cameron, 2002). Obesity is generally defined using the body mass index (BMI). Weight onset of population growth, differing from the increasing stature, suggests the existence of different etiological factors (Kim and Popkin, 2006), BMI being a proportionality parameter makes it possible to compare current data with the historical one.

Eurostat analysis revealed that in Romania, in the adult population over 18 years, the lowest rate of obesity is recorded in both sexes: 8% among women and 7.6% among men. It was the lowest rate from 19 EU member countries from data from 2008/2009. For the group 18-24 years of age, a rate of 1.6% was reported among women, lower values being recorded only in Bulgaria (1%) and Slovakia (1.3%), and among men was 1.8%, where Bulgaria has a lower percentage (1.3%) (European Health Interview Survey).

The present study aims to analyze the growth trend in height, weight and BMI in young people present at the admission examination to National University of Physical Education and Sport from Bucharest, in two sessions, at an interval of 12 years.

2. Methods

To achieve the purpose of the present study, analyzing the trend of growth in height, weight and BMI in young people presented at the admission examination to NUPES from Bucharest, a total of 440 young people between the ages of 18 and 24 were evaluated, at an interval of 12 years: in 1998, 247 youngsters were evaluated, born between 1974-1980 and in 2010 a total of 193 young people, born between 1986-1992.

The groups were homogeneous, averages being 19.30, respectively 19.79 for girls ± 3.80 years and 20.30 respectively 19.71 ± 3.10 years for boys. The collection of data was done based on anthropometric measurements of weight and height. Based on these measurements the BMI (weight-Kg / height-m²) was calculated. The obtained values were compared to the benchmarks set by OMS.

The data concerning personal data and the practice of physical activity was collected in the anamnesis. In accordance with the Helsinki Declaration on ethical principles of research involving human subjects, within the study, under condition of anonymity, subjects gave their consent to the use of data within the study for publication.

3. Results

The study results show that in terms of height (table 1) significant differences between groups of girls (P-value <0.05, F > Fcrit) were obtained, while no significant differences were observed between the two groups of boys (P-value > 0.05, F < Fcrit).

The results show that body weights (table 2) for groups of girls don’t show significant differences (P-value > 0.05, F < Fcrit), whereas in the boys groups the differences are significant (P-value <0.05, F > Fcrit).

The body mass index (table 3) results highlight significant differences for both groups of girls and boys (P-value > 0.05, F < Fcrit).

In comparing BMI values with the reference values (fig.4) in the group of girls from 1998, it resulted that they fall within the normal limits, and a percentage of 22.40% were underweight. In the group of boys from the same year, 3.36% were underweight and only 1.68% overweight. The female group subjects of 2010 still have a percentage of 19.70% underweight, but there was also 2.80% overweight. In the male group, the underweight percentage had a positive evolution compared to the one in 1998, registering 12.30%. The percentage of overweight in this group remained almost unchanged, at 1.64%. There was also one subject with first degree obesity (0.82%).

Within the results concerning the share of practicing physical activities, a percentage increase can be observed in the group of girls: in 1998, 68.75% said they had practiced sports for a period longer than one year, compared
to 2010 when it came to 87.33%. This alludes to the fact that there was a decrease of female subject percentage that did not practice physical activities as follows: 31.25% in 1998 compared to 12.67% in 2010. Among males, the situation is different; a slight decrease in the number of subjects who practice physical activities can be observed, from 87.39% in 1998 to 82.78% in 2010, while the percentage of those who don’t practice physical activities increased from 12.60% in 1998, to 17.21% in 2010.

Table 1. ANOVA – Height

<table>
<thead>
<tr>
<th>Groups</th>
<th>Covariance</th>
<th>F</th>
<th>P value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female 1998</td>
<td>0.004</td>
<td>8.941</td>
<td>0.003</td>
<td>3.889</td>
</tr>
<tr>
<td>Female 2010</td>
<td>0.003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male 1998</td>
<td>0.006</td>
<td>0.20</td>
<td>0.886</td>
<td>3.880</td>
</tr>
<tr>
<td>Male 2010</td>
<td>0.004</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 1 Average height for the two groups (1998 and 2010)

Table 2. ANOVA Weight

<table>
<thead>
<tr>
<th>Groups</th>
<th>Covariance</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female 1998</td>
<td>42.946</td>
<td>0.126</td>
<td>0.722</td>
<td>3.889</td>
</tr>
<tr>
<td>Female 2010</td>
<td>51.624</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male 1998</td>
<td>80.555</td>
<td>6.199</td>
<td>0.013</td>
<td>3.880</td>
</tr>
<tr>
<td>Male 2010</td>
<td>75.664</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Fig. 2 Average weight for the two groups (1998 and 2010)
Table 3. ANOVA – BMI

<table>
<thead>
<tr>
<th>Groups</th>
<th>Covariance</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1998</td>
<td>3.152</td>
<td>4.168</td>
<td>0.042</td>
</tr>
<tr>
<td>Female</td>
<td>2010</td>
<td>4.645</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1998</td>
<td>3.072</td>
<td>12.547</td>
<td>0.0004</td>
</tr>
<tr>
<td>Male</td>
<td>2010</td>
<td>4.322</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 3 The average BMI for the two groups (1998 and 2010)

Fig. 4 Female - Weight according to data of reference and physical activities
4. Conclusions

The trend in height of girls developed negatively, with significant differences between the two groups (-3 cm), while the height of boys remains constant, the average height being the same (1.79 m). Compared to height, average weight has a positive trend statistically significant in the groups of boys, while in the girls groups presents no significant differences between 1998 and 2010.

The average BMI values showed a positive trend in both sexes, being in accordance with the global trend, staying however within the normal range.

It should be noted that the group from 1998, whose BMI is significantly lower than the one of 2010, grew for 9-15 years under Romanian communist socioeconomic conditions.

Overweight was not detected in girls from 1998, instead a percentage of 22.40% were underweight. A similar percentage of underweight (19.70%) was recorded in the 2010 girls, and 2.80% were overweight. The percentage of overweight boys remained almost the same (1.68% in 1998 and 1.64% in 2010).

Regarding the practice of physical activities, we can observe an increase in the number of candidates who practice physical activities among girls and a slightly decreasing tendency among boys. A correlation between the percentage of those who play sports and the number of those which have a normal BMI can be observed, especially in boys. The low percentage of overweight youth in both groups can be explained by the large number of candidates who have practiced physical activities for more than one year.

References


Komlos J., (2009), How useful is anthropometric history? Munich Discussion Paper No.2009/6, Department of Economics, University of Munich