



Original Contribution

PHYSICAL DEVELOPMENT OF GIRLS PARTICIPATING IN BASKETBALL TRAINING ACTIVITIES

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ABSTRACT

The aim of the present study is to establish the impact of basketball classes on the physical development of 14-year-old girls from the basketball club "Toni - 7" - Sliven.

The subject of research is the physical development and physical capacity of students who participate systematically in basketball training sessions.

The object of study is the signs of physical development of 14-year-old girls.

A total of 19 girls participated in regular basketball training sessions.

For the needs of the research, anthropometric measurements were performed and BMI was calculated.

To achieve this goal we applied the following mathematical and statistical methods: Variation analysis, comparative and frequency analysis, index method, and Student's t-test.

Key words: basketball, girls, physical development

INTRODUCTION

The concept of physical development reflects the set of morphological, functional, and mental characteristics that characterize the level and dynamics of growth of the organism and its ability to adapt to changing living conditions (1). Three groups of signs are used in the study and assessment of physical development - anthropometric, physiometric, and somatoscopic.

The physical development of the individual is one of the most important criteria in assessing his health. From a large number of morphological and functional features for assessing the physical development of children and adolescents at each age, different criteria are used.

Data on the physical development of individuals are grouped by gender, age and are most often used averages and different indices to assess each trait. In sports practice, as well as in everyday life, the most accessible, popular, and easy to use is the Body Mass Index (BMI).

BMI is a biomedical indicator that serves to determine the normal, healthy weight in people of different heights, as well as to diagnose obesity and malnutrition (2).

According to the World Health Organization, more than half of Bulgarians over the age of 20 are overweight, and according to studies by the Bulgarian Center for Public Health, one in five people of active age in our country is obese (3). Being overweight is the fifth leading risk factor for death in the world. A nationally representative survey among children aged 6 to 19 shows that only 24% of children are active for at least 60 minutes a day, and every third child is overweight, 35% of children in our country are physically active for less than 2 days in the week (4).

The aim of the present study is to establish the impact of basketball classes on the physical development of 14-year-old girls from BC "Toni - 7" - Sliven.

METHODOLOGY

The subject of research is the physical development and physical capacity of students who participate systematically in basketball training sessions.

The object of study is the signs of physical development of 14-year-old girls.

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A contingent of research is a total of 19 girls from 7-th grade at "Elissaveta Bagryana" Primary School (Sliven), included in regular basketball training sessions.

For the needs of the research, anthropometric measurements were performed and BMI was calculated.

The following **research methods** were used to solve the purpose and tasks of the research:

Research and theoretical analysis of specialized literature sources - to reveal the state of the researched problem according to literature data.

Anthropometry - to reveal the state of the main morpho-functional features, by collecting information on 2 anthropometric indicators (height and weight, **Table 1** - indicators 1 and 2) (5) and calculated the so-called Body Mass Index (BMI) (6), which gives an idea of the level of nutrition of the studied girls (**Table 1** - indicator 3).

To achieve this goal, we applied the following **mathematical and statistical methods**: Variation analysis, comparative and frequency analysis, index method and Student's t-test (7).

Table 1. List of the studied signs of physical development and physical capacity

Nº	Indicators	Measuring units	Measurement accuracy	Direction of growth
1.	Height	cm	1,0	+
2.	Weight	kg	0,5	--+
3.	Body Mass Index (BMI)	kg/m ²	0,01	--+

RESULTS AND ANALYSIS

As indicated in the Methodology of the study, to establish the level of physical development of the observed girls involved in extracurricular basketball activities, the main morpho-functional features were registered, 2 anthropometric indicators (height and weight, **Table 1** - indicators 1 and 2). The

measurements were performed with standard instruments and standard methods (5).

For a more complete description of physical development, the so-called Body Mass Index (BMI) is calculated (indicator 3).

The results of the variational processing of the initial data are presented in **Table 2**.

Table 2. Mean values and variability of the studied signs of physical development and physical capacity

Nº	Indicators	Mean	S	V	min	max
1.	Height	164,95	6,14	3,72	155	176
2.	Weight	59,63	13,00	21,80	42	90
3.	Body Mass Index (BMI)	21,78	3,74	17,15	17,03	29,3

The analysis of the results from the table shows that the average height of the studied group included in extracurricular basketball activities is 164.95 cm. A closer look at the results of

indicator 1 (height) shows that the relative shares of girls up to 160 cm and those between 161 cm and 165 cm are equivalent - 31.58% (**Figure 2**).

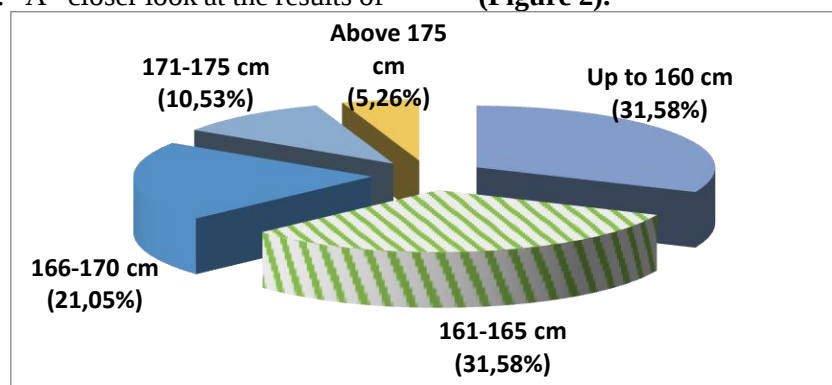


Figure 1. Distribution of girls according to body length (height)

The figure shows that as the length of the body increases, the relative shares of the female students included in the respective height zone decrease:

- ✓ just over 1/5 of them (21.05%) are between 166 and 170 cm tall;
- ✓ only 10.53% are those with a height between 171 and 175 cm, and
- ✓ the lowest is the relative share (5.26%) of girls taller than 175 cm.

Table 2 shows that the average level of the observed population is 59.63 kg. However, considered on its own, this indicator does not provide reliable information. Therefore, very often researchers use different height and

weight indices, which allow to make a more accurate assessment of the physical development of the persons who are the subject of their research.

For the needs of our research, as indicated in the Methodology, the so-called body mass index (BMI) is calculated, which combines information from the first two indicators (height and weight) and allows to get an idea of the degree of nutrition of the body. This is especially important for girls in the studied age group, in whom, under the influence of natural biological development, body disproportions occur, often leading to overweight and even obesity.

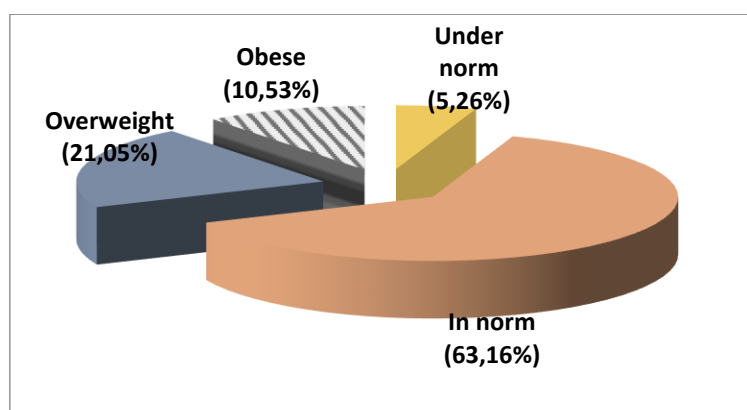


Figure 2. Relative shares of BMI

The analysis of **Figure 2** shows that almost 32% of the girls in the study group are overweight and even over 10% of them are obese.

As can be seen from the figure, 63.16% have a weight in the normal range for the respective age. However, the problem of underweight girls (5.26%) should not be underestimated.

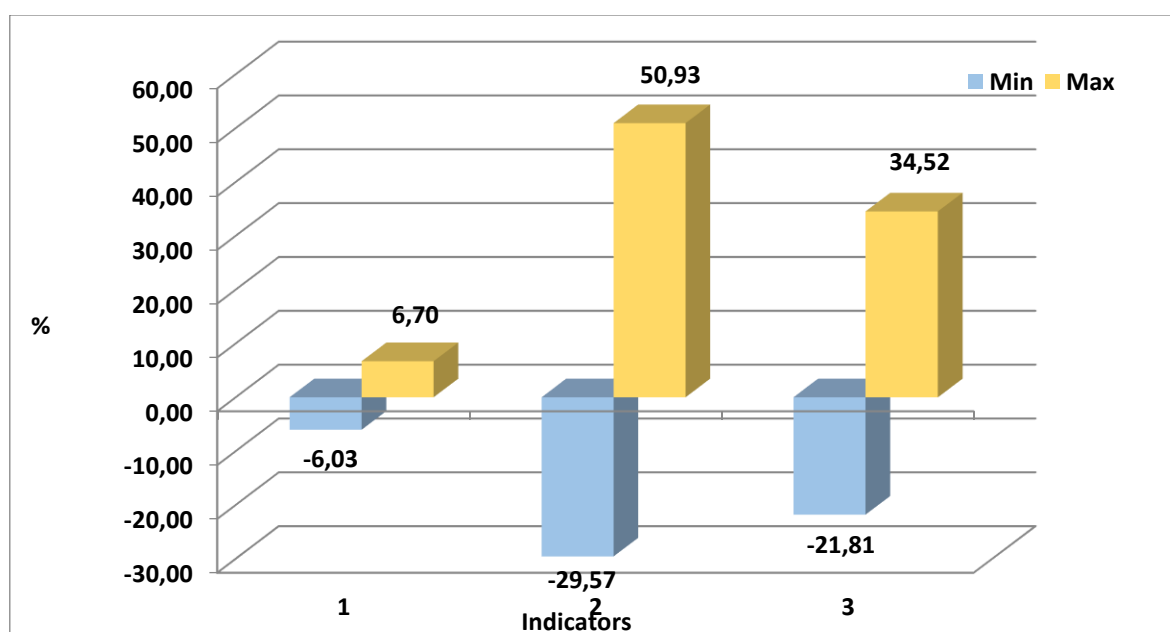


Figure 3. Percentage deviation of the minimum and maximum results from the average level

Both overweight and obese children and underweight children need to be interviewed by their parents and, if necessary, consulted with nutritionists and doctors.

In order to compare the observed deviations from the mean level of the studied features in both positive and negative directions, in **Figure 3** they are presented in percentages.

The figure shows that the largest deviations in the positive direction are observed in terms of body weight and the associated nutritional index - the maximum weight in the group is almost 51% higher than the average, and the maximum BMI is almost 35 % higher. Regarding the deviations in the negative direction, an advantage is given to indicator 6, which proves that there are girls in the group whose level of development of the explosive power of the above is almost 37% lower than the average for the group.

At the same time, the percentage deviations in the positive or negative direction in the "growth" indicators are very small.

All this affects the homogeneity of the studied population (**Figure 4**).

As can be seen from the figure, the values of the calculated coefficients of variation range between 3.72% (for indicator 1 - height) and 21.80% (for indicator 2 - weight).

According to the norms of sports statistics, the coefficient of variation, if within 10%, gives reason to believe that the relevant indicators are stable, and the study population - homogeneous in terms of the signs for which these indicators carry information. Therefore, it can be argued that the group of 7th-grade girls who are the subject of our study is homogeneous in terms of height - indicator 1 ($V_1 = 3.72\%$). For the other two indicators, the coefficient of variation occupies values between 10% and 30%, which means that the group is relatively homogeneous in terms of the level of indicators 2, weight ($V_2 = 21.80\%$) and 3, body mass index ($V_3 = 17.15\%$).

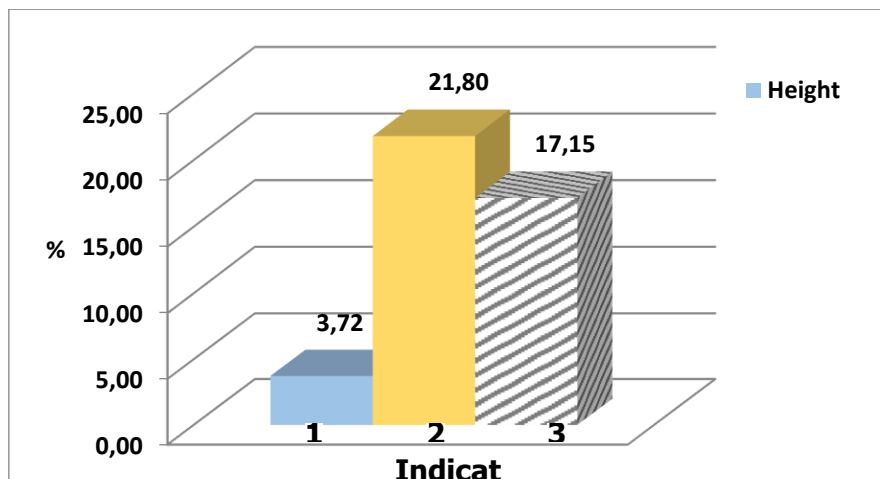


Figure 4. Scattering of individual cases around the average levels of the studied signs (V%)

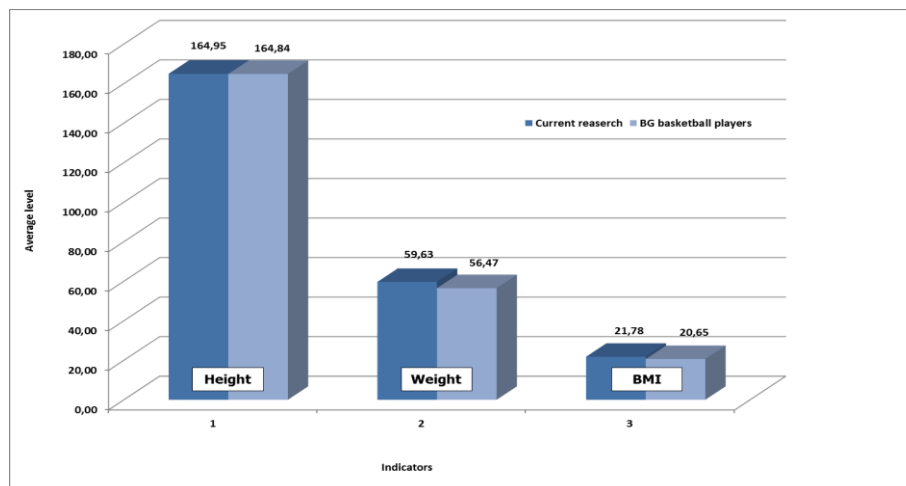


Figure 5. Comparative analysis of the average level of signs of physical development

In order to get a more complete picture of the level of physical development of the study we studied, we compared the features characterizing the physical development of the girls we studied with those of Bulgarian basketball players of the same age group (8).

The comparison of arithmetic mean values of the two groups shows that the girls we studied

have both higher average height (indicator 1) and higher average body weight (indicator 2) and, of course, a higher BMI (indicator 3). At the same time, however, the differences observed at first glance are too small. **(Figure 5).**

To verify the significance of these differences, Student's comparative t-test was applied.

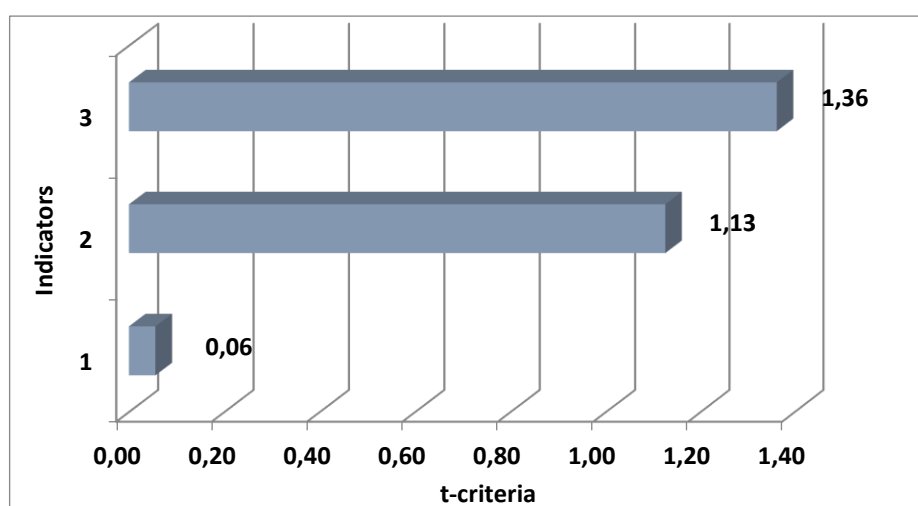


Figure 6. t-criteria of Student

The analysis of **Figure 6** shows that the values of the t-test range between 0.06 (for indicator 1 - height), 1.13 (for indicator 2 - weight) and 1.36 (for indicator 3 - BMI) and therefore, they are lower than the critical value of the comparative criterion ($t_{\text{tabl}} = 1.99$). All this gives grounds, with a high guarantee probability ($P_t \geq 95\%$), to claim that the surveyed girls involved in extracurricular basketball activities have an equal level of physical development with Bulgarian basketball players from the same age group.

DISCUSSION

Particularly worrying is the fact that almost 21,05% of the women we studied have BMI, are overweight and even over 10% of them are obese, 63.16% are in the norm, and (5,26%) with underweight.

The contingent of 14-year-old girls studied by us is homogeneous in terms of height - indicator 1 ($V_1 = 3.72\%$) and relatively homogeneous in terms of weight and BMI (indicators 2 and 3 - $V_2 = 21.80\%$ and $V_3 = 17.15\%$).

The values of the t-test are in the range between 0.06 and 1.36, which gives us a reason, with a high guarantee probability ($P_t \geq 95\%$), to say

that the studied girls involved in extracurricular basketball activities have an equivalent level of physical development with Bulgarian basketball players of the same age group.

CONCLUSION

The analysis of the results gives us reason to conclude that regardless of the systematic participation in sports, in this case, basketball and the population we studied, there is the problem of overweight and underweight, which in our opinion requires optimization of the training process in the direction of increasing of volume, quality and individual work, as well as optimizing the diet of girls.

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